LIFE+ Project “Reintroducing the Great Bustard Otis tarda to Southern England” (LIFE09/NAT/UK/020) Year 3 Summary

01/09/2012 – 31/08/2013

Photograph ©David Kjaer
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A3: Develop long-term strategy to secure great bustard recovery

A review of the potential to obtain birds for reintroduction from source populations other than that being used at present

By David Waters, Director, Great Bustard Group

The initial proposal made in 2001 by the GBG to DEFRA (then the licensing authority in the UK) for a reintroduction project was based on the use of birds derived from eggs rescued from destroyed nests in Saratov Oblast in the Russian Federation. Despite the unusual, even unique, suggestion of the project limiting itself to eggs which had no chance of hatching under natural conditions, the alleged impact on the donor population (which was held to be either level or increasing in population) became a difficult issue for the GBG, with the Birdlife network of organisations protesting strongly to prevent or terminate the project. The licences issued by the local, regional and federal authorities in Russia all restricted the collection of eggs to those from destroyed or abandoned nests. This condition was also imposed by the UK authorities in the import licence and the licence to release the birds. Regular and frequent inspections by Russian officials were not judged to be thorough or competent enough by the UK licensing authorities and their advisors, and the whole project was threatened until independent witnesses and inspectors were able to report on the project. The GBG was obliged to fund two trips by staff from the Hungarian Birdlife Partner, MME, and these trips resulted in a report which confirmed the previous findings and statements from the GBG and the Russian state authorities.

There is no other country in the world where a significant number of nests are destroyed by agriculture, so adherence to the conditions then set by the UK authorities made the use of any other populations impossible.

Within Europe the central and eastern Great Bustard populations are relatively small and subject to large state funded conservation projects. The UK project (Trial Reintroduction) did receive much support from the German Bustard project and they did give the GBG two young hand reared males, but the UK licences prevented these birds from being released. They lived in the large release pen and acted as living decoys. However, national politics, funding restrictions and low numbers prevented the eastern and central Great Bustard range states from being able to offer birds in enough quantity to sustain a reintroduction project. Both Germany and Hungary operate an egg rescue programme and approaches were made to both countries, but neither was able to offer birds.

The Iberian population was widely held to be genetically distinct from the rest of the world’s population. The idea being that having entered the Iberian Peninsula across the Straits of Gibraltar they were then unable to negotiate any crossing of the Pyrenees and became isolated. Despite many other bird species being able to negotiate the Pyrenees, including Little Bustards, this idea was circulated in the conservation and scientific press and was generally accepted. Further dampening on the use of Iberian birds came from an article published in the scientific press.
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Press about the failure of a captive breeding project run by the Great Bustard Trust in Wiltshire during the 1970s and 80s. One of the explanations given in the article for the failure of the project to generate stock for repopulating the UK was that the majority of the birds used were Iberian and therefore unsuited to the UK latitude. There was no evidence to support this suggestion, but as it appeared in print it was widely believed.

The operations of the GBG in Russia and its aim to raise awareness of the species in Russia, along with staff changes in the Russian partner organisation made it harder to export larger numbers of birds from Russia, with only 6 birds total for a years work on one occasion. Working with the University of Chester, the GBG sought to compare the different Great Bustard populations which may be suitable for release in the UK. The University of Chester undertook a comparison of the genetic analysis of Great Bustard samples from Russia, Germany and from historical specimens from the UK. The UK LIFE+ project made a contribution to the laboratory material costs of this analysis. The results showed there was very little variation between the populations and that the closest population to the old UK Great Bustard population was from Spain.

In January 2013 the GBG identified landowners in Spain who were willing to assist with the UK Trail Reintroduction. Through the LIFE+ project meetings Natural England (now the licensing authority) have indicated the matter of only using eggs from nests destroyed or abandoned through cultivation need no longer apply, and the changes in the licence to release could be amended to allow the use of eggs collected from viable nests in Spain. In February 2013 RSPB and GBG met SEO, the Spanish Birdlife partner, and GBG was asked to cease any activity in Spain connected with the collection eggs, as RSPB and SEO would take on the action. At the end of May that year SEO reported to RSPB that they did not wish to be directly involved in the proposal and the matter was then taken up again by GBG, but this was too late for the 2013 season. An application by the Great Bustard Group has been submitted to the Spanish authorities for the collection of up to 100 eggs a year for up to 5 years. It is anticipated that this action will commence in 2014.
B1: Lease land at chick rearing facility

For clarity, we have slightly changed the Action title for the period going forward. This action will now refer to what was the original release site as the rearing facility for great bustard chicks, and as site 1 throughout this report.

The original release site here was last used for that purpose in 2011. With the developments in the activities of the project, the External Monitor agreed that this site will continue to be leased but as a chick rearing site for the remaining two years of the project. The 7Ha managed for bustards (see C3) being surrounded by the permanent predator-proof pen lends itself perfectly to housing rearing facilities and providing the habitat for walking young chicks as part of the rearing process.
B2: Lease land for additional release sites and management areas

Introduction

This action involved a substantial amount of work during year 3, as we sought to establish a second release site after the closure of the original release site, and attempted to find ways to buffer release site 2 with improved habitat management for bustards. The report on this action is therefore split into two parts: lease land for additional release sites, and lease land for additional management areas.

Lease land for additional release sites

The relative success of releases at site 2 and the decision to stop releasing birds at site 1 caused us to look for further new release sites for the 2013 release and beyond, to comply with the LIFE action to have two release sites. The set of criteria by which sites would be scored, as shown in Table 1, was agreed by the project’s Land Management Group on 19th October 2012. This is based on a similar set of criteria used to choose a site to release cranes in the UK.

Table 1: Criteria for selection of a new great bustard release site

<table>
<thead>
<tr>
<th>1. Risk of predation</th>
<th>a. Fox density</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b. Level of predator control</td>
</tr>
<tr>
<td></td>
<td>c. Ability to enhance predator control</td>
</tr>
<tr>
<td>2. Land ownership and designations</td>
<td>a. Landowner supportive of project</td>
</tr>
<tr>
<td></td>
<td>b. Landowner prepared to make a long-term commitment to the project</td>
</tr>
<tr>
<td></td>
<td>c. Land holding large enough for some land to be devoted to great bustard conservation</td>
</tr>
<tr>
<td></td>
<td>d. Land designated for conservation in area</td>
</tr>
<tr>
<td>3. Landscape suitability</td>
<td>a. Open landscape, relative absence of hedgerows/woods</td>
</tr>
<tr>
<td></td>
<td>b. Mixed farming, presence of unimproved grassland</td>
</tr>
<tr>
<td></td>
<td>c. Oil seed rape grown</td>
</tr>
<tr>
<td>4. Human disturbance</td>
<td>a. Proximity to roads and built-up areas</td>
</tr>
<tr>
<td></td>
<td>b. Proximity to rights of way, particularly if well-used</td>
</tr>
<tr>
<td></td>
<td>c. Level of game bird shooting</td>
</tr>
<tr>
<td>5. Flight hazards</td>
<td>a. Threat of collision with overhead lines</td>
</tr>
<tr>
<td></td>
<td>b. Threat of collision with fences</td>
</tr>
<tr>
<td>6. Proximity to existing populations and other suitable habitat</td>
<td>a. Proximity to existing great bustard populations</td>
</tr>
<tr>
<td></td>
<td>b. Frequency of bustard records from immediate area</td>
</tr>
</tbody>
</table>
The most important criteria are numbers one to six, those that the project cannot influence. Risk of predation and land ownership are our two highest priorities. Criteria seven to eight, which the project can influence, are of secondary importance.

Through our initial investigations, we identified areas which we felt best met our requirements. We also referred to the maps produced by habitat modelling, covered in reports on E2. Because our two most important criteria could not be assessed only by looking at the landscape, these areas became our target areas for contacting landowners. We chose to focus initially on the areas closest to site 2, as the only active release site.

We approached landowners by a variety of means. A letter (see Appendix 1) was sent to eleven landowners in the highest priority area. We contacted Natural England advisors covering the relevant area to seek their suggestions of landowners who would be particularly interested. The farmland bird advisor working in the Cranborne Chase and West Wiltshire Downs AONB as part of the South West Farmland Bird Initiative contacted her farmers on behalf of the project. The farmland bird advisor working in the North Wessex Downs AONB included a similar request in a newsletter sent to her contacts.

Through this process, and over the course of the following nine months, seven landowners came forward expressing an initial interest in bustards being released on their land. All were visited by members of the project team to assess the suitability of their farm as a release site, using the criteria detailed above.

One farm, site 3, met all the criteria, and after a series of positive meetings with the landowners the project was confident by the end of year 3 that a release site could be established here for releases from 2014 onwards.

Lease land for additional management areas

The starting point for this action was to assess the quantity of highly suitable habitat for great bustards within a 3km radius of each release site. This includes around 2800 hectares for each release site, although it should be remembered that not all of this area will be suitable for great bustards in landscape terms.

Information on existing habitat was then combined with a map showing land ownership within that area, and approaches were made to landowners where considered appropriate. Sites 1 and 2 are covered in turn below. There is also a brief look at the possibility for management areas outside the 3km buffer zones.
**Site 1** (release site 2004 – 2011)

Habitat provision for great bustards in this zone is already good. There are nine stone-curlew fallow plots, along with a large block of semi-natural calcareous grassland. This grassland is part of the Salisbury Plain SSSI/SPA, and covers around a third of the buffer zone. Management here is not flexible, so any additional habitat management for great bustards would need to take place in the arable fringes.

There are three major land holdings within the buffer zone. The project already works very closely with one of these, and in addition to the great bustard release pen, the farm's Higher Level Stewardship (HLS) agreement contains options which are targeted at great bustards. It would be possible to manage additional areas for great bustards, but only if appropriate compensation were available, through agri-environment funding or through the project.

The MoD tenant at the second farm is not supportive of the project, and no habitat management for great bustards will be possible on this farm. The farm has an Entry Level Stewardship (ELS) agreement, but no HLS agreement.

The third farm is organic, and works closely with the RSPB to protect several nesting pairs of stone-curlew. The MoD tenant here is likely to be amenable to an approach from the project, but as with the first farm any potential habitat management for great bustards would be dependent on financial support. The farm has an existing HLS agreement, with no specific habitat provision for great bustards.

No approach for management areas in the zone around site 1 has been made, as releases at this site have stopped and the project does not see a long term future here, for reasons documented elsewhere.
Summary

Site 2 (release site from 2011)

Already the buffer zone around site 2 provides two areas of excellent, continuous great bustard habitat. To the north of the release site is an area of around 140 hectares of semi-natural calcareous grassland, reverted from arable land between 2002 and 2007. This contains three stone-curlew fallow plots, providing an ideal mosaic of habitats. A similar habitat mosaic is available to the east of the release site, where around 80 hectares of semi-natural calcareous grassland has two stone-curlew plots either within or adjacent to it. In addition to these blocks of habitat, smaller points of good habitat are available in the form of three stone-curlew plots to the south of the release site, one associated with a small area of semi-natural calcareous grassland.

There are four sizeable land holdings around site 2 which are particularly suitable for great bustards in landscape terms. The owner of the farm on which the release site is located is highly supportive of the project and of wildlife conservation in general. An HLS agreement is in place on the farm with some options directly targeted at great bustards and others suitable for great bustards.

At the northern end of the farm, and extending onto the neighbouring farm, is an area of semi-natural calcareous grassland, and habitat management here is well suited to great bustards. The suitability of this block of land for great bustards is demonstrated by the regular records of bustards in the area, between 2006 and the present, and no major adjustments in habitat management would be necessary to improve the habitat for great bustards. However, it would be possible to make minor adjustments to management to suit great bustards were this necessary, for example in the case of a nesting female. This area can therefore be considered a great bustard management area.

The additional area of semi-natural calcareous grassland with associated stone-curlew plots to the west of the release site is habitat of similarly high quality which is also relatively attractive to great bustards, although not quite to the same degree. The landowner supports the project, and may well be prepared to further enhance habitat for great bustards on his land in 2017, when his current HLS agreement will end. No approach has been made due to a high voltage power line crossing the farm which renders a number of the fields unsuitable.

The project has a relationship on several levels with the landowners immediately to the west of the release site. This estate has a HLS agreement with some provision for stone-curlew, but there is room to improve provision for great bustards, especially close to the release site. We have approached the estate with some suggestions for modifications to their HLS agreement, but they are not currently interested. If it were possible for the project to fund habitat management in addition to agri-environment payments, a further approach might be successful. No modifications to existing HLS agreements will be possible until the start of a new agri-environment scheme in January 2015 or January 2016.

The northern part of the farm adjacent to the south western edge of the release site would also be suitable for a great bustard management area. The owner was keen to enter a new HLS agreement in 2011, with options targeted at great bustards, but the restricted financial offer under HLS prevented this. Since then, the success of great bustard releases at site 2 has given
the farm added conservation importance, and when a new agri-environment scheme starts, it should be a priority for the project to approach this landowner and Natural England once again. A dedicated great bustard management area in the field adjacent to the release site, funded through the new agri-environment scheme, may well be possible.

3. Management areas away from release sites

In the description of action B2, a management area at RSPB Winterbourne Downs nature reserve is suggested. This has been fully considered, but for three main reasons we have decided that it would not be appropriate. These reasons are: the low number of great bustard records at the site (four individuals and only one long-staying individual, no records since 2011), the distance from existing release sites and the fact that the surrounding landscape is not especially well-suited to great bustards.

More generally the extreme site-faithfulness of surviving great bustards to the two places that they have been released and their immediate surroundings means that it is only appropriate to consider management areas close to those sites. Any additional release sites are likely to attract other bustards due to strong conspecific attraction, but management areas will only attract great bustards if located close to release sites.

Actions for year 4

- If agreement confirmed for a second release site, fully investigate possibilities for management areas around the site.
- As project finances allow, approach farms close to site 2 again to seek additional management areas.
- Depending on expected number of birds available for release in 2014, approach landowners between the two release sites with a view to finding locations for further trial releases at additional sites.
20th November 2012

Dear Sirs,

Re: Sites for the release of great bustards

The great bustard is the heaviest flying bird in the world. It inhabits open spaces across Europe and Asia and was present in Britain until the 1830s, when it became extinct due to overhunting.

The Great Bustard Group was founded in 1998 and has been releasing bustards back into Britain under DEFRA license since 2004. As part of the expansion of the project, the Great Bustard Group needs new areas in which to release young birds and create suitable breeding habitat for adults. Our exploration of Wessex has shown us that there is a great deal of favourable habitat in your area. Bustards use open arable and grassland landscapes, with as few trees, fences and power lines as possible.

The project is funded by an EU LIFE grant and we fully expect to pay for access to appropriate areas. The landowners we currently work with benefit not only from a rental income, but also from HLS payments on the same land.

Our existing release sites each cover around 25 acres. In these areas we grow a range of foraging and nesting habitat. When releasing birds we erect temporary release pens and electric fencing. Predators, especially foxes, are a major threat to released and nesting bustards. Consequently, we seek areas with low numbers of foxes and the ability to work with you to control predators. To protect landowner anonymity, release site locations on private farmland remain confidential and we do not encourage visitors. For more information about great bustards and the project please refer to the enclosed leaflet.

If you feel your property could be suitable for releasing bustards and would like to hear more about how we might work together, I would be delighted to hear from you.

Yours faithfully,

Austin Weldon – Project Officer
C3: Optimise condition of site 1 rearing facility

Introduction

Site 1 was the original release area for the great bustard reintroduction project but following successive predation events, is no longer to be used to release bustards. From 2014 onwards the site is managed as a lek/potential breeding site and rearing facility for bustard chicks (<2 months of age) prior to their release elsewhere.

The enclosure at site 1 covers seven hectares. This area is enclosed by a 2m high predator-proof fence, with two electrified wires around the base, set at approximately 8cm and 20cm from the ground, and one approximately 25cm from the top. The main habitat around the area is grassland, extending continuously for at least 1km in three directions. A track runs close to the southern edge of the site, and after a narrow strip of grass, a block of arable land extends south for 2km.

The enclosure runs along the north side of a valley which runs east to west. The southern edge of the enclosure finishes in the bottom of the valley and its northern edge ends approximately halfway up the valley slope. The landscape in the wider area is comprised of rolling chalk hills with flat, open tops, divided by shallow valleys.

Land has been managed at this site for great bustards since the first release in 2004. In 2007 the original four hectare fenced area was extended to its current size. Habitat management within the enclosure is designed to provide the best possible conditions for feeding, resting and breeding bustards. The primary focus for habitat management up to the end of 2011 was on the period immediately after the release of new birds. This changed in two ways during 2012: first, it was decided that the site would no longer be used for releases, and second, it became the primary great bustard rearing location for the project. Although no rearing took place in 2013, it is expected that providing habitat for rearing juvenile great bustards will be the focus of habitat management work during year 4.

The habitat within the enclosure is a mosaic of grassland, lucerne, arable crops and periodically cultivated land. In order to keep this habitat in the best possible condition, a range of management activities are necessary. These are detailed below.

In addition, it is important to maintain the fence around the enclosure, to ensure mammalian predators are excluded from the site. This has allowed released birds to adapt to their new environment without immediately facing the threat of predation.

The site should not be understood simply as the seven hectare fenced enclosure. In fact, the surrounding area and its suitability for bustards is equally important, and our input into the management of this area will also be considered.
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Summary

Habitat management

Figure 1 shows the approximate layout of the enclosure. The numbers allow us to refer easily to individual parcels. These numbers will be used in the account of the management that follows.

![Figure 1: Layout of land within the enclosure at site 1](image)

Table 1 shows the habitat available to bustards in each area, and how it changed during the year. Table 2 details all habitat management activities carried out within the enclosure.

**Table 1: Habitat through the year**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Grass</td>
<td>Grass</td>
<td>Grass</td>
<td>Grass</td>
</tr>
<tr>
<td>2</td>
<td>Grass/lucerne/mustard</td>
<td>Grass/lucerne</td>
<td>Grass/lucerne</td>
<td>Grass/lucerne</td>
</tr>
<tr>
<td>3</td>
<td>Oil seed rape</td>
<td>Oil seed rape</td>
<td>Oil seed rape</td>
<td>Oil seed rape stubble</td>
</tr>
<tr>
<td>4</td>
<td>Grass</td>
<td>Grass</td>
<td>Grass</td>
<td>Grass</td>
</tr>
<tr>
<td>5</td>
<td>Fallow</td>
<td>Fallow</td>
<td>Fallow</td>
<td>Fallow</td>
</tr>
<tr>
<td>6</td>
<td>Lucerne → bare earth</td>
<td>Bare earth</td>
<td>Fallow/lucerne</td>
<td>Fallow/lucerne → bare earth</td>
</tr>
<tr>
<td>7</td>
<td>Grass/lucerne/pumpkins</td>
<td>Grass/lucerne</td>
<td>Grass/lucerne</td>
<td>Grass/lucerne</td>
</tr>
<tr>
<td>8</td>
<td>Fallow</td>
<td>Fallow</td>
<td>Fallow</td>
<td>Fallow</td>
</tr>
<tr>
<td>9</td>
<td>Grass</td>
<td>Grass</td>
<td>Grass</td>
<td>Grass</td>
</tr>
<tr>
<td>10</td>
<td>Oil seed rape</td>
<td>Oil seed rape</td>
<td>Oil seed rape</td>
<td>Oil seed rape stubble</td>
</tr>
<tr>
<td>11</td>
<td>Bare earth → winter wheat/beans</td>
<td>Winter wheat/beans</td>
<td>Winter wheat/beans</td>
<td>Winter wheat/beans</td>
</tr>
<tr>
<td>12</td>
<td>Lucerne</td>
<td>Lucerne</td>
<td>Lucerne</td>
<td>Lucerne</td>
</tr>
<tr>
<td>13</td>
<td>Mustard</td>
<td>Mustard</td>
<td>Mustard</td>
<td>Mustard stubble</td>
</tr>
<tr>
<td>14</td>
<td>Fallow</td>
<td>Fallow</td>
<td>Fallow</td>
<td>Bare earth → oil seed rape</td>
</tr>
<tr>
<td>15</td>
<td>Grass/clover</td>
<td>Grass/clover</td>
<td>Grass/clover</td>
<td>Grass/clover</td>
</tr>
<tr>
<td>16</td>
<td>Lucerne</td>
<td>Lucerne</td>
<td>Lucerne</td>
<td>Lucerne</td>
</tr>
</tbody>
</table>
**Table 2: Habitat management undertaken**

<table>
<thead>
<tr>
<th>Date</th>
<th>Area(s)</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>09/2012</td>
<td>8</td>
<td>Ploughed and rotavated.</td>
</tr>
<tr>
<td>28/09/2012</td>
<td>11</td>
<td>Broadcast home saved winter beans at 1.6 seeds/square metre. Ploughed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Broadcast organic winter wheat seed at 60kg/ha. Rotavated. Harrowed/rolled.</td>
</tr>
<tr>
<td>15/10/2012</td>
<td>5, 6, 14</td>
<td>Ploughed.</td>
</tr>
<tr>
<td>07/2013</td>
<td>1, 2, 3, 4, 5, 7, 8, 9, 12, 13, 14, 15 (parts)</td>
<td>Topping.</td>
</tr>
<tr>
<td>08/2013</td>
<td>1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 15 (parts)</td>
<td>Topping.</td>
</tr>
<tr>
<td>08/08/2013</td>
<td>6, 14</td>
<td>Ploughed.</td>
</tr>
<tr>
<td>14/08/2013</td>
<td>14</td>
<td>OSR broadcast, harrowed and rolled.</td>
</tr>
</tbody>
</table>

The final management tasks of autumn 2012 were to plough areas 5, 6, 8 and 14 to ensure they remained open into the following spring, and to sow a mixture of winter wheat and winter beans in area 11.

No further habitat management was carried out until July 2013, when large areas of the site required topping to create suitable open habitat for the bustards present. Oil seed rape sowing was a little later than in previous years, taking place on 14th August, due to the absence of any released birds. Further management was planned for the final four months of 2013 to leave the pen ready for 2014.

**Fence maintenance**

No substantial maintenance to the fence of the enclosure took place, and it remained predator proof throughout the period. The vegetation along the fence line was cut and sprayed occasionally during the spring and summer to prevent any growth of vegetation along the electrified wires. The rabbit population within the enclosure remains at a low level, but still causes occasional damage by individual animals burrowing under the fence. These holes can be filled with gravel, but the problem does recur. Further rabbit control may be required during 2014.

**The surroundings of the site**

The farm on which the site is situated entered a Higher Level Stewardship (HLS) agreement on 1st April 2011. The agreement includes three stone-curlew plots, all of which are located in areas which could be used by bustards. An additional three stone-curlew plots are located in land managed by the MoD. These are left as long as possible during the winter without management, to provide weedy fallow ground for bustard feeding and cover. Adjacent to one of the MoD stone-curlew plots is a two hectare block of wild bird seed mixture which is also part of the HLS agreement. This was sown with a mixture of kale, sunflowers and cereal, with great bustards as the target species.
Habitat on other farms around the site is described in more detail in the year 3 report for action B2.

**Constraints**

The reasons for the discontinuation of releases at this site have been discussed in detail elsewhere, but the site still has three major uses, for rearing juvenile bustards, as a safe site for birds which cannot be released in their first autumn, and as year-round habitat for older bustards which still frequent the area. Importantly, it is currently the only large area managed by the project with permanent and secure predator-proof fencing.

There has been a pair of nesting stone-curlews within the fenced enclosure annually since 2006. This makes it important that the location of stone-curlew eggs or chicks is known before any management is carried out. The presence of breeding stone-curlew, a Schedule 1 species, also places limitations on the acceptable level of disturbance caused by habitat management, even when bustards are not present.

The project has one tractor, and over the period covered by this report had only one skilled operator, a regular volunteer. The times where habitat management is not possible concentrate this management into relatively short periods. This situation, combined with the fact that the project is now managing two sites, did at times mean that we were unable to carry out as much habitat management as we would have liked. We plan to rectify this during year 4, when the number of trained tractor operators will be increased to four.

Tractor equipment remains a concern. A rotavator owned by the Great Bustard Group was stolen in early 2013, and replaced in September 2013 by a spring tine cultivator. The project does not currently have the equipment to spread seed or to spray for weed control mechanically. The plan for the autumn of 2013 was to broadcast seed by hand, but this is not particularly well suited to the scale on which the project is operating.

**Great bustard outcomes**

The trend of increased use of the enclosure by bustards observed in year 2 continued during year 3. The enclosure was again used almost daily by great bustards through the year. The bulk of the adult population departed for site 2 on 7th September 2012, and returned to site 1 on 3rd December 2012. They remained in and around the enclosure for the following nine months, before moving back to site 2 on 28th August 2013. Usage of the enclosure itself varied, with some days spent entirely inside the fence, and other days spent outside before returning to roost in the evening. Use of different parts of the pen was recorded intensively throughout the year, and will be analysed in detail in a future report.

Great bustard lekking activity was observed between 11th March and 4th June, and was largely confined to the enclosure itself, particularly for the dominant male Purple 5. A maximum of five males were present at the lek.
Summary

Although the site had been designated for rearing and not release from 2012 onwards, circumstances dictated a slight change in this policy. Five juvenile bustards were reared on site from hatching, and the enclosure was used for the pre-release period as planned. However, due to poor feather development, these birds were not suitable for release elsewhere and spent the winter ranging freely within the enclosure, unable to fly out of it. Their progress during the winter is good evidence for the suitability of the habitat within the enclosure.

The site was not used for rearing juvenile bustards during 2013, but it is planned for it to be used again for this purpose in 2014.

Actions for year 4

• If snow covers all oil seed rape, clear an area, either within the enclosure or in a nearby field, to make it accessible to bustards, and provide supplementary food
• Ensure oil seed rape leaves are available within the enclosure throughout each winter.
• Maintain a mosaic of short and long patches of grass and lucerne.
• Continue to record the use of different areas of the enclosure by great bustards, in order to analyse their use of the site and inform further improvements to it.
C4: Optimise condition of release sites/management areas

Introduction

Site 2 was used for the first time in September 2011. This release took place on a trial basis in a 21 hectare field of stubble turnips and fodder rape, with no contractual agreement between the project and the landowner, and no special land management for bustards. Following the relative success of the release here compared to historical releases at the original release site, steps were taken to establish a release site for at least the remainder of the LIFE+ project and a new field was chosen to improve relations with the gamekeepers, by moving away from their main shoot area. The 2012 field also gave more privacy to project operations as well as to the bustards due to its topography. We agreed to take management control of ten hectares, with the majority of the area coming under the control of the project in August 2012. During the period covered by this report, we started to implement the long term management plan for the site, although it will take several years for the habitat to become properly established.

The immediate surroundings of the release site are primarily arable, although there are significant areas of chalk grassland reversion to the north. To the south, east and west is an open arable landscape, typical of Wiltshire. The regular observed interchange of great bustards between sites 1 and 2 pre-LIFE project was one of the primary reasons this area was chosen as a second release site. The 2012 release falls within the period of this report, but there was no release planned at the site during 2013. It is expected that it will be used again for releases in 2014.

In contrast to site 1, no permanent fencing has been used at this site. Released birds were protected from predators by electrified poultry netting 112cm high, with an electrified stand-off wire 20cm off the ground and 30cm from the netting. Each netting section had a length of 50m, and, on recommendation of the supplier, we used three joule energisers to power units of 12 sections.

This fencing allows a large area to be fenced quickly and effectively, but also temporarily and unobtrusively. Its use made it much easier to trial a release area in 2011, and it also has significant benefits in bird management. Small areas can be lowered during the day to allow bustards to walk into and out of the fenced area, avoiding the problems of bustards pacing fence lines, which has been experienced at site 1.

The release site should not be understood simply as the fenced area. In fact, the surrounding area and its suitability for bustards is equally important, and our input into the management of this area will also be considered.
Release area habitat management

By the end of August 2012, we had been able to establish nectar flower mixture, fallow and oil seed rape plots in a one hectare strip along one edge of the field in which the bustard management area would be. The winter barley crop from the field had been harvested, and was left as stubble within the new bustard management area. Within this stubble, we had also ploughed and sown a one hectare plot of oil seed rape. Stubble turnips were sown in the south-eastern half of the field where normal farm management continued. A stone-curlew plot, which had been in the field for many years, overlapped the two parts of the field.

Further habitat management was avoided during the release period, both because the existing habitat was ideally suited to great bustards, and to minimise disturbance to newly released birds. When the site was vacated in early December it became possible to create additional bare ground for the following spring by ploughing.

In July 2013 we topped a large area to recreate some open habitat, as the vegetation on the site had largely become too high for great bustards. In August a larger area was topped, and soon afterwards ploughed, to prepare the site for the grassland and crop establishment planned during the autumn. This large scale work was carried out by contractors with equipment more suited to the task. Table 1 shows the habitat management work which we carried out at this site during year 3.

Table 1: Habitat management at the release site during year 3 (area numbers are those shown in Figure 1).

<table>
<thead>
<tr>
<th>Date</th>
<th>Area(s)</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/2012</td>
<td>1</td>
<td>Ploughed</td>
</tr>
<tr>
<td>12/2012</td>
<td>5</td>
<td>North-eastern section ploughed</td>
</tr>
<tr>
<td>04/07/2013</td>
<td>1, 2, 5 (part), 8 (part)</td>
<td>Topped</td>
</tr>
<tr>
<td>19/08/2013</td>
<td>2, 4, 5, 6, 7, 8</td>
<td>Topped</td>
</tr>
<tr>
<td>21/08/2013</td>
<td>1, 2, 4, 5 (part), 6, 8 (part)</td>
<td>Ploughed</td>
</tr>
</tbody>
</table>

We reported in the year 2 report that the ten hectare release area was scheduled to become part of a new Higher Level Stewardship (HLS) agreement on the farm, starting on 1st October 2012. This date was significantly delayed, but the farm did finally enter HLS on 1st September 2013. The whole area will be managed to fit HLS options, some of which have already been established. This should provide a useful model for future great bustard release sites and management areas. Under the agreement, the release area is divided into eight sections as shown in Figure 4 below. Areas 1 to 4, each of one hectare, will rotate through three years of wild bird seed mixes (HF12), involving winter barley and oil seed rape, and one year of fallow (HF13). Area 5 is a two hectare fallow plot for ground nesting birds (HF13), aimed at stone-curlew but suitable for bustards too. Area 6 is a one hectare block of nectar flower mixture (EF4), including lucerne and a variety of clovers. Area 7 will be field corner management (EF1), providing some cover from a track and fence lines. Area 8 will be grass, created and managed for great bustards (HK17).
In August 2013, areas 2, 3 and 4 had been established as fallow, winter barley and oil seed rape respectively. Area 5 was already established as a stone-curlew plot, and the majority of area 6 had been established as a nectar flower mixture. Table 2 shows the planned management required to fulfil the remaining parts of the HLS agreement.

<table>
<thead>
<tr>
<th>Date</th>
<th>Area(s)</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>09/2013</td>
<td>1, 2, 5 (part), 6 (part), 8</td>
<td>Cultivating</td>
</tr>
<tr>
<td>10/2013</td>
<td>1</td>
<td>Broadcasting winter barley wild bird seed mix, then cultivating and rolling</td>
</tr>
<tr>
<td>11/2013</td>
<td>8</td>
<td>Broadcasting grass and wildflower seed mix, then rolling</td>
</tr>
<tr>
<td>12/2013</td>
<td>6 (part), 7 (part)</td>
<td>Topping</td>
</tr>
</tbody>
</table>

### Fence maintenance

The electrified netting described in the introduction was installed around the 2012 release field during August 2012. It was left in the arrangement shown in Figure 2 until early December 2012, when the grazier needed to move his sheep into the stubble turnips. At this point the fence was moved to the boundary of the release site itself, and it was removed once the bustards were no longer being seen in the area. It is expected that it will not be used again until the 2014 release. The fence was inspected regularly, to check and replace the batteries powering the fence, and to check the fence itself for any damage or earthing points. Only three fencing units and batteries were required - one 220AH battery attached to a solar panel operated throughout the period. These checks were not recorded as they had been the year before, so information is not available on how long the smaller batteries lasted, or whether they were replaced in time. This recording will be restored in 2014.
Summary

Animal casualties were caused by the fence again during this year. The majority were hares, which became entangled in the fence. At least 12 hares were killed by the fence during the year, an unacceptable number which will need to be addressed during 2014. One roe deer was also killed by becoming entangled in the fence. Problems caused by bustards pacing the outside of the fence in 2011 were addressed from the first day of releases in 2012. A short length of fencing, adjacent to the release pens, was left open during the day to allow birds to walk back into the release field if they flew out. Few problems were encountered with bustards pacing fence lines, although it was observed occasionally, as shown in the image in Figure 2.

![Image of released great bustard pacing outside fence line of release site, 4th October 2012.](image)

*Figure 5: Released great bustard pacing outside fence line of release site, 4th October 2012.*

The surroundings of the release area

The farm around the release area entered a new HLS agreement on 1st September 2013. This was in many ways a continuation of the preceding ten year Countryside Stewardship agreement. Beside the great bustard management area described above, two main features of the agreement are directly advantageous to great bustards: four 2ha stone-curlew fallow plots, and around 40ha of chalk grassland, reverted from arable in a previous agreement.

Neighbouring farms have committed to farmland wildlife conservation on different levels. A farm to the north east of the release area has an HLS agreement which includes two stone-curlew plots and two large areas of chalk grassland. A farm to the west also has an HLS agreement, with two stone-curlew plots. This estate has been approached with a view to modifying their HLS agreement to enhance the benefits it provides to great bustards, but is not currently interested in any such changes. Another farm to the south was considering an HLS application and invited input from the project, but has ultimately decided not to submit an application. This farm will certainly be approached by the project again in the future, when the new environmental land management scheme becomes available (for more on this, see the year 3 report on action C6). Habitat management for great bustards on farms surrounding the release sites is described in much more detail in the year 3 report for action B2.
Constraints

The situation with fox control on this site has been described in detail in the past. We do consider that the fox population at the release site is much lower than that at site 1 (see the year 3 report on action C5), but the restrictions imposed on our ability to carry out fox control on the site mean we cannot do everything we would like to help released and breeding bustards.

As at site 1, there are nesting stone-curlews within the new great bustard management area. In 2013, one pair bred on the stone-curlew plot. Management of the fallow areas within the area for bustards will provide suitable nesting habitat for stone-curlews, but it is important that the location of stone-curlew eggs or chicks is known before any management is carried out. The presence of breeding stone-curlew, a Schedule 1 species, also places limitations on the acceptable level of disturbance caused by habitat management, even when bustards are not present.

The project has one tractor, and over the period covered by this report had only one skilled operator, a regular volunteer. The times where habitat management is not possible concentrate this management into relatively short periods. This situation, combined with the fact that the project is now managing two sites, did at times mean that we were unable to carry out as much habitat management as we would have liked. This will be rectified for year 4, as four project members will have undertaken a tractor driving training course.

Tractor equipment remains a concern. A rotavator owned by the Great Bustard Group was stolen in early 2013, and replaced in September 2013 by a spring tine cultivator. The project does not currently have the equipment to spread seed or to spray for weed control mechanically. The plan for the autumn of 2013 was to broadcast seed by hand, but this is not particularly well suited to the scale on which the project is operating.

Great bustard outcomes

The release phase of the single release in 2012 was extremely successful. Just six young great bustards were released on 10th September, having spent the previous week in a soft release pen within the same field. Survival was 100% for the first 90 days after release, far higher than had ever been achieved by the project before. Nevertheless, this high initial survival was once again followed by dispersal. All six birds disappeared during the first week of December, five of them on the same day. Two were found dead in locations as far apart as Somerset and Brittany, and the outcome for the remainder was unknown. There was no recruitment to the adult population.

The habitat provided for release worked superbly. Scattered volunteer oil seed rape plants grew in the barley stubble, and the birds also had larger areas of rape available to them which they used occasionally, and could graze along the edge of the stubble turnips. We encouraged the birds to remain in the release field by providing supplementary food twice each day, and they roosted within the release field almost every night until they left the site.
LIFE+ Project “Reintroducing the Great Bustard Otis tarda to Southern England” (LIFE09/NAT/UK/020) Year 3

Summary

The successful release phase can also be attributed to the fact that the release site attracted a group of four adult bustards, which arrived at the site while the young bustards were in soft release pens, and remained until the beginning of December, when their departure may have prompted the dispersal of the young birds a week later. Two of these adults, BK09 and T5, were released at this site in 2011, and the other two were older males released at site 1, P5 and PK2. Their extended presence is a good sign in terms of suitability of the habitat.

After 8th December, there were no further records of bustards at the site until 11th April, from which date O15 and Y22, two adult females, were present until the end of April. O15 became very elusive from that date for the remainder of the breeding season. On 1st May Y22 was joined by BK17, a younger female, and a few days later PK2, a third year male, was seen displaying to both females. This was the first time any of these three birds had been seen at the new site and is the first time a male bustard has been seen displaying away from the vicinity of site 1, and is a very encouraging sign for the future.

On 30th August, only a few days different to the same movement in 2012, a group of six adult bustards moved from site 1 to site 2. The same four birds as in 2012 (P5, PK2, BK09 and T5) were involved, joined on this occasion by two more second year birds, BK17 and BK20. This is another sign that the two sites are becoming the two most favoured areas for the great bustard population, and bodes well for future releases at the new site in 2014 and 2015.

Actions for year 4

- During the release period, open short lengths of fencing in areas used frequently by released bustards to avoid any danger of entanglement in the netting. Ensure these lengths are closed, and the fence is fully electrified, at night.
- Check the fence line and record status of batteries at least once every two days, or invest in solar systems to save damaging fields/tracks.
- If snow covers all oil seed rape, clear an area, either at the release site or in a nearby field, to make it accessible to bustards, and provide supplementary food at the release site.
- Record the use of different areas of the enclosure by great bustards, in order to analyse their use of the site and inform further improvements to it.
- Consider options for improving ability to monitor the site.
C5: Protect bustards and their nests from direct threats

Fox census work

1. Introduction

The red fox poses a serious threat to the survival of released and breeding bustards and has been proven to be a major factor in the success of bustard reintroduction. At the time of writing, foxes can be controlled legally all year round using shooting, snaring and bolting foxes with single dogs from below ground. These are efficient methods for removing foxes from specific areas, when used appropriately according to the time of year, growth of vegetation and fox ecology. However, despite these techniques fox numbers remain relatively stable nationally and are arguably at their highest density since records began.

Targeted predator control can seek to reduce fox numbers in certain circumstances. However, it is a time-consuming exercise requiring a great deal of dedication and skill to perform effectively. When carried out on a regular basis over a large enough area, benefits can be seen in the reduction of fox numbers. However, even intensive predator control has little impact on foxes in areas where high levels of immigration occur. In this situation fox culling only creates voids for other animals to fill. This is especially the case in the autumn and winter when foxes move large distances seeking territories or mates. This particularly applies to juveniles of the year who will be looking for territories to occupy. Fox culling in the spring and summer is far more efficient and has the longest benefit and greatest impact on fox presence. At this time of year foxes hold and defend territories and move around relatively little. Areas from which foxes are removed at this time of year are likely to remain vacant for longer than in the winter.

Areas with naturally low densities of foxes are preferred for the release of bustards. The greatest impact of fox control on the local population can be achieved when fox densities are low, as lower immigration of new animals occurs. To find areas with low densities census work must be undertaken. A proven technique for measuring fox density is recording the sighting rate. This involves counting foxes at night by driving a predetermined route and recording their presence on a map. To maintain consistency, transects need to be similar lengths and a similar amount of time needs to be spent on each one. Large fluctuations in weather conditions should also be avoided as this may have an impact on the activity of foxes. This technique lends itself to measuring on a local scale and gives little understanding of the population in the wider area. As a result, the extent to which immigration may occur would be hard to determine.

2. Application of the method

On the nights of the 4th, 5th and 6th February 2013, the two bustard sites managed by the Great Bustard LIFE Project were surveyed for foxes. Site 1 has been abandoned as a release site due to the high level of predation, so surveying here gave the observers an indication of a fox density which when combined with other factors at the site such as topography and fences, produced
unacceptable levels of predation. Survival has been much better at site 2 with little proven direct fox predation encountered by bustards to date.

To ensure fairness in the test, transects of similar length were chosen (10km) and it was envisaged that they would take similar times to complete. However, in practise the site 2 transect took between 1 hour 14 minutes and 1 hour 39 minutes, whereas the site 1 transect took between 48 minutes and 1 hour 30 minutes. This difference was largely due to the terrain and variations in driving speed.

Surveying was carried out on the aforementioned dates due to the presence of little moon. This is believed to make animal eye shine easier to see and observing and recording foxes easier. The low light levels also enable the lamp to work at greater distances, increasing the range at which foxes could be sighted.

On each night the starting site was alternated and the transect was reversed from the previous night to make the recording more random.

3. Results

Table 1: Results of site 2 census (10.59 km)

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Foxes seen</th>
<th>Number/hour</th>
<th>Number/km</th>
</tr>
</thead>
<tbody>
<tr>
<td>04/02/13</td>
<td>1hr 18 minutes</td>
<td>1</td>
<td>0.769</td>
<td>0.009</td>
</tr>
<tr>
<td>05/02/13</td>
<td>1hr 14 minutes</td>
<td>2</td>
<td>1.621</td>
<td>0.188</td>
</tr>
<tr>
<td>06/02/13</td>
<td>1hr 39 minutes</td>
<td>5</td>
<td>3.03</td>
<td>0.472</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>1hr 23 minutes</strong></td>
<td><strong>2.66</strong></td>
<td><strong>1.80</strong></td>
<td><strong>0.223</strong></td>
</tr>
</tbody>
</table>

Table 2: Results of site 1 census (10.81 km)

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Foxes seen</th>
<th>Number/hour</th>
<th>Number/km</th>
</tr>
</thead>
<tbody>
<tr>
<td>04/02/13</td>
<td>48 minutes</td>
<td>3</td>
<td>3.75</td>
<td>0.277</td>
</tr>
<tr>
<td>05/02/13</td>
<td>1hr 6 minutes</td>
<td>9</td>
<td>8.18</td>
<td>0.832</td>
</tr>
<tr>
<td>06/02/13</td>
<td>1hr 30 minutes</td>
<td>8</td>
<td>5.33</td>
<td>0.740</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>1hr 8 minutes</strong></td>
<td><strong>6.6</strong></td>
<td><strong>5.75</strong></td>
<td><strong>0.616</strong></td>
</tr>
</tbody>
</table>

The results, as shown in Tables 1 and 2, indicated strongly that site 1 held higher densities of foxes than site 2 over the dates when the survey was carried out. Predator control is carried out intensively on site 1 mostly by shooting at night by the farming tenants who also hold the sporting rights. In fact, while the census was being carried out the owner had been lamping and shot a vixen. Despite this, the census team still counted nine foxes on the 10km transect on the same night. By comparison very little control is carried out on site 2 and this is mostly done around harvest time when cubs make up a high percentage of the animals encountered. Many of
these die of natural causes throughout the autumn and so relatively few of these animals reach breeding age. Culling these animals has little population impact.

The contrast in culling efforts and the number of animals recorded during the census gives further strength to the difference in fox density between the two sites. However, on the last census night five foxes were encountered at site 2 indicating that under certain conditions (for example a vixen in season) a relatively large number of foxes can still be encountered on this site. Overall the number of foxes encountered at site 2 during the census combined with the number of foxes culled over the course of a year indicates a low number of foxes. Certainly game bird releasing has a known impact on fox densities and when the pheasant and partridge numbers are high in the autumn and early winter more food will be available in the area making it more of a draw. Also, at site 2 very few rabbits were seen during the census. These are an important food source for foxes throughout the year. This may be another reason for the low number of foxes. By comparison, a large number of rabbits were seen during the site 1 census, this combined with the large grassland areas with high densities of other small rodents and relatively little access for fox control could be the reason for the large number of foxes residing in this area.

This census method will be used in future to assess new release sites and provide a means of comparing them to existing sites.

**Predator control**

Predator control is described in detail in the year 2 report, which covers methods, specific information on the existing release sites, non-lethal methods for reducing the impact of predators and future plans for new release sites.

The project carried out no active predator control during year 3, for the reasons noted in the year 2 report. This did not appear to have any adverse effect on the release at site 2 – no released birds were killed by predators in the 2012 release.

Our project officer specialising in predator control left the project in March 2013. He was replaced on a part time basis in August 2013 by a new project officer without the same specialism, but who will be licensed to use firearms to carry out predator control in 2014.

The project remains able to carry out predator control, and expects this to be possible at a new release site. Any active predator control will be described in the year 4 report.

**Nest Protection**

In 2013, four female bustards were of breeding age. Two of these, Yellow 22 and T5, were confirmed as nesting. The project carried out nest protection activities at all confirmed and suspected nest sites.
C6: Promote existing and develop new agri-environment options

Introduction

This is the description of the LIFE+ action:

The Rural Development Programme for England (RDPE) includes two main agri-environment schemes: the Entry-Level Scheme (ELS) and the Higher-Level Scheme (HLS). Both incorporate extensive suites of environmentally beneficial land management options, with ELS options being relatively ‘basic’ or ‘general’ and HLS options being more directly targeted at specific species or habitats. The suites have been developed over a number of years, with input from Natural England, the RSPB and others, and include several options targeted at farmland birds – including range-restricted species such as stone curlews *Burhinus oedicnemus*.

Some of these latter options have the potential to make a significant contribution to great bustard conservation in the wider countryside. Throughout the project, therefore, we will promote the most relevant options in the few key areas where bustards already occur or are likely to occur. Some agri-environmental advisory work already occurs in the region (as in the rest of the UK), funded through the RDPE. However, this work is limited in scope and very ‘thinly spread’, and it will be essential for us to do much more through the project if we are to have the desired impact on great bustards. In particular, it will be necessary for us to provide detailed, targeted advice rather than the much more general advice that is currently available.

In addition to promoting existing options, we will develop new or revised options targeted specifically at great bustards and designed to ensure that these birds are offered the best possible opportunities for feeding, resting and breeding. Information gathered through the conservation monitoring work described under Action E2 will be essential in informing the development of the new options.

Promotion and development of agri-environment options will be a vitally important part of the project, as it will greatly facilitate the spread of great bustards into the wider countryside around the immediate project area and the continued growth of the bustard population after the project ends. Therefore, we plan to recruit an experienced agri-environment adviser to work full-time on the project. By doing this, we will maximise the number of options that are promoted and developed and the number of land managers that receive advice about them.

Development of new options will be carried out in close consultation with Natural England, which plays a central role in shaping the RDPE. The Declaration of Support from Natural England provided in Section A8 includes a statement indicating that it will work to ensure that new options developed during the project are incorporated into the RDPE at the earliest possible opportunity.
Implementation of this action will be very usefully informed by experience gained by the RSPB and Natural England during the stone curlew recovery programme that they have been running for many years in and around the project area. The model of developing suitable management options within agri-environment schemes, and then working very closely with key farmers and landowners to encourage the uptake of these options, has been highly successful in this programme. We will apply lessons learned from the stone curlew work to the proposed great bustard project, and will benefit greatly from the fact that we already have established relationships with many of the major farmers and landowners in the area.

We will take care to coordinate the advisory work we carry out for great bustards with that already underway for stone curlews and other farmland birds such as grey partridges *Perdix perdix* and corn buntings *Miliaria calandra*. This ongoing work includes an advisory programme called the Southwest Farmland Bird Initiative, which is being led by Natural England and the RSPB and is scheduled to continue at least until March 2011.

In coordinating our bustard work with other efforts, we will ensure that it forms part of a comprehensive, coherent, area-wide programme of agri-environment outreach, and that we and the other teams involved are able to take full advantage of opportunities for synergy and cross-fertilisation among the various schemes. Development and maintenance of a coordinated approach will require close collaboration with the Wiltshire Natural England team and other local advisers, and discussions have already started to agree the best way forward on this.

These are the expected results of the action:

Implementation of this action will lead to a package of ELS and HLS measures providing suitable habitats for great bustards being made available to and taken up by land managers within key areas. The advisory work we carry out for great bustards will be integrated into the wider programme of agri-environment delivery within the region.

We estimate that we will provide basic information and advice on management for great bustards to approximately 200 farmers and landowners in total. In addition, we expect that, as we identify key areas where bustards are concentrating, and learn more about the specific habitat they are using, we will work more closely with a subset of 50–70 individuals. We will aim to ensure that all of these farmers and landowners are in Environmental Stewardship (i.e. ELS and/or HLS) and include bustard-friendly management options within their agreements. In some cases, existing agreements will need to be amended, and in others (an estimated maximum of 20), completely new agreements will be needed.

**Context**

The status of the Environmental Stewardship scheme in England has been described in previous reports. The situation developed during year 3 in the following ways:

- Applications for new HLS agreements under the old Rural Development Programme closed in June 2013.
- The new Rural Development Programme for England will not start until 2015.
No firm decision on the funding or structure of the New Environmental Land Management Scheme will be made until 2014. A public consultation on this subject is currently in progress. It is likely that the first available start date for new schemes will be 1st January 2016.

There is some funding available to provide HLS agreements to those with classic Countryside Stewardship agreements expiring in 2014 who are eligible for HLS. This funding is limited and will be heavily targeted.

Given the status of the project it has only been possible to justify habitat provision for great bustards through HLS in special cases, in the close vicinity of project release sites. It remains the case that a wider approach is neither viable given the status of the schemes nor justifiable in the immediate future by the movements of the existing bustard population.

However, with releases planned at two sites in 2014, and grounds for optimism that survival of released birds should be much higher, by the beginning of 2015 it could be possible to plan for bustard habitat provision over a much wider area. This fits well with the expected start date for the first agreements in the new environmental land management scheme, and is likely to be a priority for the project adviser during 2015. In this period progress towards the original target of up to 20 new agreements could be made. This will depend on the location of expiring agreements, which will be investigated by the project during year 4. It would also be appropriate to revisit the possibility of amending key agreements when the bustard population is higher.

**Development of habitat advice for great bustards**

The initial phase of this work was carried out during years 1 and 2. The habitat advice leaflet developed in year 1 will be updated during year 5, based on the experiences of the project, and distributed widely to local farmers and landowners once again. A few key themes are likely to emerge in this updated leaflet, which it is worthwhile to note at this point.

- In the wider landscape, where bustards occur but sporadically and unpredictably, the favoured habitat type which is most obviously in short supply is fallow areas. These are largely provided as fallow plots for ground nesting birds through Environmental Stewardship, and in Wiltshire are normally targeted at stone-curlews. The project will continue to work closely with the RSPB Wessex Stone-curlew Project to ensure that great bustards are considered in the location and management of fallow plots. Plots adjacent to semi-natural grassland are particularly attractive to great bustards, and this fits well with the aims of the stone-curlew project.

- There is no reason to believe that there is any shortage of habitat for the year-round survival of great bustards in Wiltshire. Their favoured winter food source of oil seed rape means that winter food options need not be considered at all, and summer feeding appears to be almost as straightforward in grassland areas and on fallow plots. Successful breeding is a much greater concern and should be the focus of habitat provision under the new environmental land management scheme. In this context, the combination of several stewardship options in the same field has proved attractive and should be promoted.
Habitat advice provided

By the end of year 3 a new HLS agreement finally started at the farm hosting the release site. This included almost 60 hectares of high quality bustard habitat, including the ten hectare release site. The LIFE Project Adviser was involved throughout the agreement process, and ensured that options were directly targeted at great bustards where possible. The detail of the agreement in terms of habitat for farmland birds did not change from that described in the year 2 report.

The focus of the work of the project adviser during year 3 was to provide basic advice on habitat management to a much larger number of landowners outside the highest priority areas for the project. This took place alongside the search for a new release site, and data collection on the fine-scale habitat use of great bustards for a report due to be produced by March 2014.

- At the end of August 2013, 75 farmers and landowners had received basic advice from the project. This covers a total of 41,000 hectares.
- Of these, the project has worked more closely with 15 individuals, most with landholdings close to the two release sites used during the first three years of the LIFE project.
- Of the 75 farmers and landowners, 53 are located within the project area and have a stewardship agreement of some kind. This is not the total number of stewardship agreements in place within the project area, only those where we know some of the details of the agreement.
- Of the 53 farms above, 44 have bustard-friendly options.
- No amendments have been made to agreements to make them more bustard-friendly.
- During the LIFE project, two HLS agreements have been completed with options targeted at great bustards. In combination across the two agreements, 66 hectares of options are directly suited to great bustards.

The project is closer to achieving some of these targets than others. As mentioned in the context section above, the expectation that an increased number of bustards will be released from 2014, including at least one new release site, and that survival rates will improve, will increase the rate of progress towards all the targets.

Based on the present status of the project, with only one active release site, only one neighbouring existing agreement requires amendment and one neighbouring new agreement is required. Both have been approached without success as detailed in Action B2. Release Site 3, once confirmed, will bring a new set of surrounding farms into the equation, but these have not yet been investigated. It is very difficult to say how a higher number of released birds surviving will affect the number of amendments and new agreements required. This will not start to become clear until spring 2015, when survival rates and movements are known.

As mentioned above, the project works very closely with the Wessex Stone-curlew Project, which has a much wider reach, dictated by the more extensive range of stone-curlew in southern England. This brings several benefits for great bustard habitat provision. The project
has provided training to advisers working within the stone-curlew project, who are able to disseminate habitat advice for great bustards using our leaflet and their own knowledge. We have also advised on management of existing stone-curlew plots for great bustards, and on the location of new plots since the beginning of the project. The location and number of stone-curlew plots within and around the project area is shown in Figure 4.

**Actions for year 4**

- Run a demonstration day for farmers and landowners around a new release site. Also offer to visit all invitees individually, and seek to establish relationships on which the project can build in year 5 when stewardship applications should become possible once again.
- Attend events held by local farmland bird advisers, to meet farmers and promote the project and great bustard habitat management in the surroundings of the project area.
- Obtain a list of agreements which will expire between 2014 and 2016, and which could therefore be involved in the first agreements under the new environmental land management scheme. Work closely with other local farmland bird advisers to ensure that the needs of great bustards are well represented in these agreements. Follow developments around the new environmental land management scheme closely.
- Continue to offer basic advice and information to farmers and landowners who report great bustards from their farm.
C7: Work to secure improved management of MoD land

Introduction

The successful implementation of Action C7 should result in full recognition of great bustard conservation issues by the Ministry of Defence (MoD) and Defence Estates; in the management plans used on Salisbury Plain incorporating prescriptions for great bustards; and in key sites within the 19,700ha of Salisbury Plain being managed for this species.

It is important to note that great bustards on Salisbury Plain use the farmed land on the edge of the training estate much more than the core grassland training area. This land is owned by the MoD, but managed by tenant farmers. These farmers should be engaged through Action C6 and a range of D actions, and not through action C7.

The project team has an excellent working relationship with the MoD, which is maintained by regular contact with the Defence Estates Natural Environment Team. That team has faced significant government budget cuts since the LIFE action was written, and therefore has much more limited capacity than was anticipated to take on new work concerning great bustards.

As the great bustard LIFE project has progressed, its commitment to working on and around MoD land has gradually fallen. There is much more information on this in the reports on other actions, but a brief summary is appropriate here. Great bustards were released on private farmland for the first time in 2011, and this release was significantly more successful than that at the original project release site on tenanted MoD land. The success of the trial led us to establish a new release site for at least the duration of the LIFE project, and in January 2012 we decided that the original release site would not be used again.

There are two main reasons for the relative success of releasing bustards on private farmland rather than on MoD land. The most important factor when considering where to release juvenile great bustards is the fox population, and therefore the likelihood of predation. We have both direct and circumstantial evidence that the area around the original project release site has a particularly high fox population. No systematic fox control takes place on MoD managed areas, and it is difficult to obtain permission to carry out fox control on this land. Private farmland, with a background level of fox control which we can supplement where necessary, is much more attractive and much more sustainable in the long term.

The other main attraction of private farmland is centred on habitat. Bustards have been shown to spend much more of their time on arable land than on grassland. Although they do use grassland, especially during the summer, releasing them into an area which is primarily grass is not ideal – it is in fact a primarily arable landscape which would be most appropriate.

With only one active release site during year 3, away from MoD owned land, habitat management of MoD land for great bustards was a low priority for the project. This situation
will change during year 4, thanks to the expected establishment of a second new release site on private farmland, but much closer to MoD land.

Project activities under this action

During year 3, as in previous years, we held regular meetings with a representative of Defence Estates whose responsibilities include ensuring that the conservation requirements of stone-curlews on Salisbury Plain are met. The Plain is a Special Protection Area (SPA) under the Birds Directive, designated for its breeding population of stone-curlews and its wintering population of hen harriers. The maintenance of this contact ensures that there is a good understanding of the habitat requirements of great bustards within the most important part of Defence Estates, and a willingness to support the project where possible.

Several actions beneficial to bustards have been agreed. Stone-curlew fallow plots managed by the MoD around the great bustard release site are left with weedy growth for as long as possible through the winter to provide food and cover for bustards, before being prepared for stone-curlews in the breeding season. These plots are used throughout the year by great bustards.

The highest conservation priority for Defence Estates is breeding stone-curlew. Thirty-seven tilled plots and seven chalk scrapes are managed directly by the MoD for stone-curlews, and great bustards show a strong preference for this habitat, especially during the summer. Management of fallow for stone-curlews is beneficial for great bustards. Although limited by resources and suitable locations – ploughing in the SSSI chalk grassland is neither possible nor appropriate – further plots are likely to be created in the future, especially towards the western end of the Plain where significant range expansion is occurring. The great bustard LIFE project will work closely with the Wessex Stone-curlew Project where opportunities for new plots arise, to ensure suitability for bustards as well as stone-curlews.

As mentioned in the introduction, further work under this action will be required as a result of the expected establishment of an additional release site close to the southern boundary of Salisbury Plain. Negotiations on this site should be concluded by the end of 2013, allowing for discussions with the MoD in advance of the first release of great bustards at the site in 2014.

Action for year 4

- With the new release site close to MoD boundary in mind, arrange to meet with Defence Estates environment advisers to keep them informed of the progress of the project. Discuss opportunities to involve bustard habitat management in existing farm management plans, particularly in the vicinity of the new release site.
D1: Create and maintain project website

The LIFE+ Project website is accessed via the main Great Bustard Group website; http://greatbustard.org/life_project. The 'News' page is updated at least monthly with new and interesting stories plus relevant pictures and web links. All previous news is archived but can be accessed. There are links to the EU LIFE website and Natura 2000. We have an ongoing error with the stated number of hits on the website; this we think stems from the fact that it is linked to the GBG website. However, the web company suggests the total of hits should say at least 5,000. We hope to have uploaded the many LIFE products drafted by end of 2013. We are also creating a Sponsors page to thank companies who have helped the project free of charge. We are also investigating whether the D6 film can be added to the website (see D6).

D4: Produce leaflet for local farmers and landowners

The design of a leaflet for local farmers and landowners was completed in August 2011, with a print run of 1000 copies, as specified in the action. The intention is to produce a second leaflet in Q1 of the final year of the project, once the detail of the New Environmental Land Management Scheme becomes available.
D5: Produce promotional flyer for the general public

The first promotional flyer was produced in July 2011 with a print run of 2,500 copies. Due to the first print-run being later than originally planned (due to start date of project staff), a further batch of the same flyer was distributed in July 2012. The flyer was updated and a second print-run of 5,000 produced in January 2013. The RSPB regional office assisted with the distribution, which went to RSPB reserve shops in the South West region, South East region and Midlands region. Leaflets were also sent to the RSPB members groups in the South West region, and 24 Tourist Information Centres throughout the counties of Wiltshire, Hampshire, Dorset, Somerset, Devon and Cornwall.
D6: Update film on great bustard reintroduction

Filming for the update to the original GBG DVD to include new footage on the LIFE project was completed to agreed schedule. Final editing and a print-run of 500 copies was completed in January 2013. We are currently investigating the possibility of uploading this to the website. The DVD will be played at the Bustard Bothy at Birdworld and is also shown to visitors at the Great Bustard Group visitor centre.
D7: Carry out programme of media work

This action requires at least one press release per year (in Q3) with a target of eight in total. The third press release was planned for Q4 2012. This action is behind schedule due to sensitivities over breeding failure, poor survival and location of release sites.

The GBG has continued to keep local radio and press content with regular updates to maintain its membership. In addition in August 2013 the project was visited by the TV celebrity Ray Mears for his series Wild Britain. The programme called ‘Salisbury Plain’ featured David Waters of GBG and footage of great bustards. The programme was broadcast on ITV in January 2013. Nationally the GBG has also reported on the project for BBC Radio 4 ‘Open Country’ programme.

Following the incredible 100% survival rate at the new release site we planned a press release; however, all six Russian birds left the release site in mid-December. One bird was found dead beneath a power line in France on 1 January 2013 – this was the first record of a male crossing the Channel – and another was found dead in Somerset in March. There have been no reports of the other four birds. Due to migration, our best survival statistics quickly became our worst.

The University of Bath was able to issue a press release on its work on bustard diet and faecal analyses in early 2013.

The LIFE project manager and other staff were interviewed during the summer by the editor of Wiltshire View magazine. The article was published in the October edition of the magazine which reaches 20,000 readers in Wiltshire and Hampshire. The article can be seen here through a series of photographs.

We hope we can issue a press release in summer 2014 regarding Spanish bustards.
Update -- a new LIFE for great bustards

David Kjær, photographer and project volunteer, and Trace Williams, LIFE+ project manager, bring the story of Whitehill’s great bustards up to date.

In 2009 the EJFH joined forces with the group and was rewarded in 2010 for its efforts with a LIFE+ award for a three-year project working with partner Great Bustard Project, based in the University of York. With the exception of a few individuals and additional funding that the LIFE+ project was able to bring to the table, the project would not have happened were it not for the excellent support of Whitehill. The initiative has found a second adoring home, and enabling riders and conservationists identify new types of data that have significance to national and international conservation. For the first time ever, the project has a chance to study national factors affecting our national. We surveyed the equivalent of a 200-acre site in the University of York’s Great Bustard Project, but in the conclusion, the initiative’s increasing success is due to the national and local support of Whitehill.

View joins the Great Bustard on Salisbury Plain, meeting members and finding out how the reintroduction of this extraordinary bird is progressing.

Photography by David Kjær

With a magnificent sweeping vista after a hard day’s work, a great bursting cloud of the clouds burst from the horizon, filling the scene with a dense, almost smothering mist. The sky is a deep, dark blue, and the clouds are a lighter shade, creating a contrast that is almost artistic. The mist is thick and heavy, almost suffocating, and the clouds are a lighter shade, creating a contrast that is almost artistic. The mist is thick and heavy, almost suffocating, and the clouds are a lighter shade, creating a contrast that is almost artistic. The mist is thick and heavy, almost suffocating, and the clouds are a lighter shade, creating a contrast that is almost artistic. The mist is thick and heavy, almost suffocating, and the clouds are a lighter shade, creating a contrast that is almost artistic.
D8: Run project demonstration days

Introduction

This action requires project staff to organise and run four demonstration days in each year of the project. These days should be aimed at key stakeholder groups such as farmers, landowners, government officials and conservation practitioners from the UK and elsewhere. They allow first-hand sharing of information and experience with selected key stakeholders, allowing staff to interact with groups who have the potential to influence great bustard conservation beyond the scope of the project.

Demonstration days held during year 3

The table below gives a summary of the demonstration days which were held. More information on the content and value of each day follows. Eight demonstration days had been held during years 1 and 2, therefore the two held during year 3 brings the total to 10.

<table>
<thead>
<tr>
<th>Date</th>
<th>Visitors</th>
<th>Attendees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuesday 12th March</td>
<td>RSPB South-west Conservation Team</td>
<td>17</td>
</tr>
<tr>
<td>Sunday 14th July</td>
<td>Larkhill and Westdown MoD Conservation Group</td>
<td>18</td>
</tr>
</tbody>
</table>

*RSPB South-west Conservation Team*

This team is responsible for all the off-reserve conservation activities of the RSPB in south-western England. As such the great bustard reintroduction project is of direct relevance to them, and it is important for them to be kept up to date about the progress of the project. The individuals involved were well-qualified to offer advice on a variety of aspects of the project, particularly in the post-release phase – habitat management, Environmental Stewardship and nest protection and monitoring. We were also keen to take the opportunity to enthuse them about the progress of the project, and on the subject of farmland wildlife conservation in Wiltshire more generally.

This demonstration day took the form of a tour. The group gathered at a meeting point on Salisbury Plain and was split into several vehicles, each with a driver/guide. The sites visited included site 1 of the great bustard project, the RSPB's Normanton Down nature reserve, the wintering location of two great bustards (O15 and Y22), several stone-curlew plots on Salisbury Plain, and Cholderton Estate. Thoughts from the separate vehicles were collated at the end of the day.

*Larkhill and Westdown MoD Conservation Group*

As noted in the year 2 report, a previous demonstration day aimed at MoD staff was poorly attended. We decided that hosting a visit by one of the MoD conservation groups would be a
good way to engage people involved with the MoD. This group is focused on the conservation of the central area of Salisbury Plain. Their engagement will be particularly beneficial in terms of monitoring, as the project lacks information on the way the bustards use this area, and these individuals all have access rights which go beyond normal public access. The visitors were given a talk about the progress of the project, and a tour of the area around site 1, which included the opportunity to view some great bustards and to ask a wide range of questions about the project.

**Demonstration days planned for year 4**

One date has been agreed for a demonstration day during year 4, and three further events are planned but have not yet been finalised. We intend to schedule one further event during the year, with the visitors and subject still to be determined. It would be appropriate to invite members of the other MoD conservation groups.

<table>
<thead>
<tr>
<th>Date</th>
<th>Visitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wednesday 11th Sept 2013</td>
<td>Wiltshire Wildlife Trust</td>
</tr>
<tr>
<td>Feb/Mar 2014</td>
<td>Technical Working Group No. 3: Rearing techniques</td>
</tr>
<tr>
<td>Feb/Mar 2014</td>
<td>Farmers, landowners and gamekeepers around new release site, once finalised</td>
</tr>
<tr>
<td>Jun 2014</td>
<td>RSPB Nature Recovery Unit</td>
</tr>
</tbody>
</table>

**Demonstration days planned for year 5**

In addition to the end of project conference, three demonstration days will take place in year 5. One, a demonstration of bustard habitat management to farmers, is already planned, as the habitat at site 2 will have developed sufficiently to be used, and the new environmental land management scheme should start to become available during 2015. The visitors and subject for the remaining two have not yet been determined.

<table>
<thead>
<tr>
<th>Date</th>
<th>Visitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan/Feb 2015</td>
<td>Farmers and landowners, to discuss great bustard habitat at site 2</td>
</tr>
</tbody>
</table>
D9: Implement a programme of public engagement

The Great Bustard Group runs and advertises visits to the project site. In year 3 a total of 1,097 people visited the project, during 205 visits. The number of visitors to the site is on schedule, with 6243 up to the end of year 3 (target 2000 per year).

Visits and talks given by the Great Bustard Group total 790 people at local or regional events; this is on schedule to reach the target of 1,000.

Educational activities are behind schedule; actual 305 (target 200 per year). Visits to the site are more suited to adult visitors and there are no facilities for children. Requests for talks are always from adult interest groups. In addition, the project has no dedicated staff for an educational role.
E2: Carry out essential conservation monitoring

Year 3 Monitoring Report December 2012 – December 2013

Monitoring released birds in Year 3 of the LIFE+ project was carried out by the LIFE+ team, including the Monitoring Officer and Research Assistant at the University of Bath, the RSPB Monitoring Officer, RSPB and GBG project staff, and several monitoring volunteers. Around the project sites monitoring was carried out up to five days a week, depending on season, with volunteers and staff available to follow up re-sighting reports. We would like to thank all volunteers contributing to the monitoring in Year 3.

The University of Bath employed Scott Gooch, a volunteer working on the project since April 2012, as a part-time Research Assistant. His main responsibility is the completion of a dietary study from behavioural observations and faecal analysis to contribute to the project’s knowledge of the diet and nutrition of Great bustards released in the UK. His contract began on the 12th August 2012 and will last for one year.

Population status

Of the six Russia-hatched birds released in 2012, two have been confirmed dead (one collision, one unknown cause of death) and the remaining four have not been re-sighted since December 2012 (Table 1). As discussed in the Year 2 E2 report, post-release survival for this cohort of birds was 100% to 90 days post-release; the first year where this has been achieved.

The five UK-hatched chicks were not released with the Russia-hatched chicks due to poor feather development and were kept to overwinter at site 1. From January 2012, these birds began to be able to fly and after one of the birds was killed outside the fenced area by a dog in February 2012, the other birds were returned to soft release conditions until their feather development was sufficient for them to be able to fly well. In July 2013, the remaining four birds were allowed to leave soft release at site 1, as opposed to site 2, as the majority of the Great bustard population was around site 1 and it was considered more beneficial to release birds where they had the opportunity to mix with older birds. However, since this time two further birds have been predated close to the release pen (Table 1).

<table>
<thead>
<tr>
<th>Bird ID</th>
<th>Sex</th>
<th>Status</th>
<th>Hatch location</th>
<th>Last recorded</th>
<th>Cause of death</th>
<th>Last recorded location</th>
</tr>
</thead>
<tbody>
<tr>
<td>L02</td>
<td>M</td>
<td>Dead</td>
<td>Russia</td>
<td>08/09/2012</td>
<td>Broken leg in soft release</td>
<td>Never released</td>
</tr>
<tr>
<td>L03</td>
<td>M</td>
<td>Unknown</td>
<td>Russia</td>
<td>08/12/2012</td>
<td>-</td>
<td>Site 2</td>
</tr>
<tr>
<td>L04</td>
<td>M</td>
<td>Dead</td>
<td>Russia</td>
<td>01/01/2013</td>
<td>Collision with overhead wires</td>
<td>Gourleo, Quimper, France</td>
</tr>
<tr>
<td>L05</td>
<td>M</td>
<td>Captive</td>
<td>Russia</td>
<td>-</td>
<td>-</td>
<td>Site 1</td>
</tr>
<tr>
<td>L06</td>
<td>M</td>
<td>Dead</td>
<td>Russia</td>
<td>08/12/2012</td>
<td>Unknown</td>
<td>Pawleett Hams,</td>
</tr>
</tbody>
</table>
The total number of free-ranging Great bustards in the UK re-sighted in the last three months totals ten birds; six females and four males (Table 2). Of these four birds are more than three years old and three females have made breeding attempts.

Table 2. Great bustards re-sighted in the last three months.

<table>
<thead>
<tr>
<th>Bird ID</th>
<th>Sex</th>
<th>Status</th>
<th>Year hatched</th>
<th>Monitoring device fitted</th>
<th>Last recorded location</th>
<th>Breeding history</th>
</tr>
</thead>
<tbody>
<tr>
<td>L25</td>
<td>F</td>
<td>Alive</td>
<td>2012</td>
<td>Leg-rings</td>
<td>Site 1</td>
<td>-</td>
</tr>
<tr>
<td>L26</td>
<td>F</td>
<td>Alive</td>
<td>2012</td>
<td>Leg-rings</td>
<td>Site 1</td>
<td>-</td>
</tr>
<tr>
<td>L05</td>
<td>M</td>
<td>Dead</td>
<td>2012</td>
<td>Leg-rings</td>
<td>Captive, site 1</td>
<td>-</td>
</tr>
<tr>
<td>BK09</td>
<td>M</td>
<td>Dead</td>
<td>2011</td>
<td>Wing-tags</td>
<td>Site 1</td>
<td>Displaying male</td>
</tr>
<tr>
<td>BK17</td>
<td>F</td>
<td>Dead</td>
<td>2011</td>
<td>Wing-tags</td>
<td>Site 1</td>
<td>-</td>
</tr>
<tr>
<td>BK20</td>
<td>M</td>
<td>Dead</td>
<td>2011</td>
<td>Wing-tag/Unmarked</td>
<td>Site 1</td>
<td>Displaying male</td>
</tr>
<tr>
<td>T5</td>
<td>F</td>
<td>Dead</td>
<td>2011</td>
<td>Unmarked</td>
<td>Site 1</td>
<td>Nested in 2012</td>
</tr>
<tr>
<td>PK2</td>
<td>M</td>
<td>Dead</td>
<td>2010</td>
<td>Wing-tags</td>
<td>Site 1</td>
<td>Displaying male</td>
</tr>
<tr>
<td>PK5</td>
<td>M</td>
<td>Dead</td>
<td>2010</td>
<td>Wing-tags</td>
<td>Captive, site 1</td>
<td>-</td>
</tr>
<tr>
<td>P5</td>
<td>M</td>
<td>Dead</td>
<td>2007</td>
<td>Wing-tags</td>
<td>Site 1</td>
<td>Displaying male</td>
</tr>
<tr>
<td>Y22</td>
<td>F</td>
<td>Dead</td>
<td>2005</td>
<td>Radio necklace</td>
<td>Site 2</td>
<td>Four breeding attempts – no chicks fledged</td>
</tr>
<tr>
<td>O15</td>
<td>F</td>
<td>Dead</td>
<td>2004</td>
<td>Wing-tags</td>
<td>Site 2</td>
<td>Nested in 2012</td>
</tr>
</tbody>
</table>

Dispersal

Of six birds released in 2012, five remained around the release area until the beginning of December 2012. One female travelled to Les Sables d’Olonne, France in early November, where she was taken into captivity due to health concerns and transported to the UK and re-released with her cohort by late November. A few days after the older birds left the release site in early December, all newly-released birds dispersed from the site. One of the six birds was recovered in Gourleo, France, after a collision with overhead wires. In March 2013, a skeletal leg with leg-ring was recovered in Somerset; both the date and cause of death are unknown. There have been no confirmed sightings of the remaining four birds since the beginning of December 2012.
As none of the birds released in 2012 were fitted with tracking devices, it was challenging to locate them once they had left the vicinity of the release area.

A second-year female (BK17), released at site 1 in 2011, was recorded at La Trancardiere, Regneville-sur-Mer, France in November 2012, and further south in the Nature Reserve of St Denis du Payre in December 2012 (854 kilometres away from her release site). A second-year male (BK20), also released at site 1, was recorded in Suffolk (> 200 miles from his release site) in April 2013. Both of these birds have since returned successfully to their release site.

**Breeding productivity**

In 2013 we recorded two females attempting to breed: a two-year old female, T5, and Yellow 22, an eight-year old female. Neither nesting attempt was successful.

**Monitoring Great bustards**

Lime-coloured leg-rings were fitted to released birds in 2012 to allow identification of individuals; however, due to their position just above the foot, they were very difficult to see, particularly as there are few instances when birds are walking in non-vegetated areas. Furthermore, in the rare sightings of the leg-rings of free-ranging birds, the individual number on it was too small to record. We recommend that if leg rings are used in subsequent years, individual colour combinations are used, which may be more easily recorded during monitoring than ring numbers.

In addition, no tracking devices were fitted to birds, and in consequence, we have very little information as to the location and status of birds which dispersed from the release site. Therefore, in subsequent release years, we suggest a change in the marking method to enable more effective post-release monitoring.

Monitoring devices are invaluable for providing information on individual survival, dispersal and breeding, and have been repeatedly evaluated in the LIFE+ project. Here we summarise the salient information on monitoring devices, according to our research: 1) VHF and radio download transmitters, which allow researchers to locate individuals if they are within a couple of kilometres proximity of a tracked individual; 2) data loggers such as geolocators, which require the individual to be recaptured to retrieve the data; and 3) GPS/GSM and satellite telemetry devices, which may both allow individuals to be tracked remotely. In the Great bustard project, we would suggest that devices that can be accessed remotely would be preferred, given their large dispersal distances (maximum known distance travelled from release site = 920km), and fitted to either a leg-ring or necklace (only for females). However, smaller GPS loggers fitted to leg-rings may give us data from ring recoveries.

In future releases we hope to be releasing birds from Spain, as opposed to Russia; individuals from Spain have been found to be variable in their movements, with marked differences between populations, ranging from partial migrants to sedentary individuals (Alonso, Palacín, Alonso, & Martín, 2009; Martín, Alonso, Morales, & Lane, 2001). We hope that individuals will remain more local to the release site than in previous releases; data from monitoring devices will still be invaluable for locating and monitoring released individuals.
Table 3 shows devices where data can be remotely downloaded, whereas Table 4 gives examples of GPS devices which store data, and in some cases may be downloaded via radio or base station.

Table 3. Satellite telemetry and GPS/GSM devices, where data may be remotely downloaded without recapture or tracking birds in the field.

<table>
<thead>
<tr>
<th>Model</th>
<th>Weight (g)</th>
<th>Range (m)</th>
<th>Dimensions (mm)</th>
<th>Battery Usage</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microwave Telemetry Solar PTT</td>
<td>5g, 9.5g, 12g upwards</td>
<td>Remote data download</td>
<td>24 x 14 x 7.5 for 5g transmitter; 38 x 17 x 12 for 9.5g transmitter (antenna = 213mm)</td>
<td>None. Up to 2 years operating lifespan.</td>
<td>5g – Marbled Murrelets, Amur Falcon; 9.5g – Hen Harrier, Whimbrel</td>
</tr>
<tr>
<td>EcoTone GSM-UHF</td>
<td>17 – 19g</td>
<td>Remote data download and UHF radio download (4 – 6km)</td>
<td>-</td>
<td>Solar charging – 1 min direct sunlight, 15 mins bright sky</td>
<td>Swans, geese</td>
</tr>
<tr>
<td>Northstar 9.5 GS solar PTT</td>
<td>9.5g</td>
<td>Remote download</td>
<td>42 x 16.5 x 11.4 (antenna = 196mm)</td>
<td>Solar charging, 2-5+ yrs operational life</td>
<td></td>
</tr>
<tr>
<td>Cellular Tracking Technologies</td>
<td>20 – 35g</td>
<td>Remote download</td>
<td>26 x 49 x 18</td>
<td>Solar charging</td>
<td>Waterfowl, cranes</td>
</tr>
<tr>
<td>Silva GPS-GSM</td>
<td>Base unit = 13g</td>
<td>Remote download</td>
<td>65 x 30 x 10</td>
<td>Battery: 13/21g</td>
<td>Little bustards</td>
</tr>
</tbody>
</table>

Table 4. GPS loggers storing location data, and in some cases, allowing radio download of data.

<table>
<thead>
<tr>
<th>Model</th>
<th>Weight (g)</th>
<th>Range (m)</th>
<th>Dimensions (mm)</th>
<th>Battery Usage</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>TechnoSmArt GyPSy Remote L</td>
<td>17g with battery, solar cells and epoxy waterproof encapsulation</td>
<td>Remote downloading from up to 2km in line of sight</td>
<td>42 x 30 x 10</td>
<td>Battery with solar cells; lighter model without battery also</td>
<td>Atlantic Puffins (Harris, Bogdanova, Daunt, &amp; Wanless, 2012)</td>
</tr>
<tr>
<td>TechnoSmArt GyPSy 4</td>
<td>1.4g without battery</td>
<td>No remote download</td>
<td>20 x 13.5 x 4 with whip antenna</td>
<td>Battery 1.1g – 22.7g depending on requirements</td>
<td></td>
</tr>
<tr>
<td>UvA Bird Tracking System</td>
<td>12 – 19g (new system at 5.8g)</td>
<td>Requires base station and one or more relay stations. Data</td>
<td>-</td>
<td>Solar powered with rechargeable battery</td>
<td>Griffon Vultures (Monsarrat et al, 2013), Oystercatcher</td>
</tr>
</tbody>
</table>
**Habitat preferences of Great bustards in the UK**

Species distribution models were created using presence locations of Great bustards in southwest England to identify preferred areas across Great Britain for potential new release sites. This analysis was primarily carried out to assist in the formation of documentation for action A3. Several datasets were used to model habitat preferences and preferred habitat to reflect differences between sexes and ages: male and female data outside a 2-kilometre radius from the release sites from release onwards, and male and female data outside a 2-kilometre radius of the release sites more than 182 days post-release. Outside Salisbury Plain, the areas predicted to be preferred by most models, and particularly models for males and females more than 182 days post-release, were the Yorkshire and Lincolnshire Wolds. These are both areas where bustards have formerly bred and are not traversed by high-voltage power lines. Although East Anglia is considered to be a former stronghold of Great bustards, this area was not predicted to have large areas of contiguous preferred habitat. From species distribution models, further investigation of the Yorkshire and Lincolnshire Wolds for potential new release sites is recommended.

In a previous study, discussed in the Year 2 report, the key variables found to influence Great bustard distributions in the UK were distance to roads and settlements, and land-use type, consistent with wild populations studied elsewhere. Habitat preferences were sex-specific, as expected in a species with the largest sexual size dimorphism of any bird species. This analysis utilised broad-scale habitat data in order to be able to predict preferred habitat across southwest England. In August 2012, the collection of fine-scale habitat data from birds more than 182 days post-release commenced, with the aim of determining the most important vegetation types and structures used by Great bustards in the UK and how this differs between seasons.

**Dietary selection, foraging behaviour and nutritional intake of Great bustards in South-West England**

In June 2012, a project investigating the seasonal dietary preferences and nutritional intake of free-ranging Great bustards in the UK was formerly initiated. The project was carried out by Scott Gooch, a volunteer who was employed part-time for the LIFE+ project in August 2013. In July 2012, October 2012, May 2013 and November 2013, sampling periods consisting of dawn-to-dusk behavioural observations, and faecal and vegetation sampling were carried out.

Great bustards demonstrated extensive dietary plasticity, altering their compositional intake in response to shifts in the distribution and phonological stage of the potential food sources.
In the spring, when the landscape was dominated by new vegetative growth low in digestion-resistant fibres and compounds, the birds consumed mainly Forbs (58.9%). Forbs encompass all herbaceous flowering plants (wild flowers and weeds) and emergent Crops. Crop intake remained relatively constant throughout the year but the composition switched from spring cereals (24.1%) to summer mustard (22.3%) and then back to autumn cereals (20.3%), all young green foods. Intake of rape was only important in autumn (39.7%), after plant senescence (about mid-September). Shortly thereafter pellets emerged as an important component (31.0%), becoming the primary food choice by the time when the birds dispersed (66.2%), supplemented by pumpkin (7.2%). Thus, at the point of dispersal of adult and newly-released bustards from the release site in December 2012 only 26.6% of the uncorrected diet was obtained from the landscape. Few invertebrates were found in the diet, and only in spring and summer samples. Further sampling periods will be undertaken in Year 4 to understand whether there are differences in diet between years and determine what the birds eat in the autumn and winter when not provided with supplemental food. In addition, nutritional analysis of the seasonal diets will be conducted in order to form a reference dietary profile and identify potential dietary shortfalls.

**Impacts of body condition on post-release survival**

During the pre-release captive period, bustards are subject to the stress of being kept in an artificial physical and social environment, reared on an artificial diet and also handled for transport and veterinary purposes. Therefore, it is unlikely that their body condition and feather development on release are comparable to a wild-reared chick of the same age. From the 2011 release, photographs of the wing and tail feathers of released birds were taken in addition to standardised biometric data. The aim of this project is to evaluate the impacts of
body and feather condition on post-release survival and dispersal, in order to be able to produce a standardised release protocol based on these parameters.

**Estimating flight performance of released Great bustards**

Collisions are a major cause of mortality in wild bustard populations; however, captive-reared individuals may be particularly vulnerable, due to poor feather condition and behavioural naivety. This handicap may make released birds more vulnerable to collision and predation than wild birds. A literature review of flight performance studies in birds was carried out in order to determine a methodology for assessing and comparing the flight performance of released Great bustards in the field.

**Undergraduate student projects**

From October 2012 to December 2012, the Monitoring Officer supervised three undergraduate students undertaking projects on the Great Bustard reintroduction project. Joy Millican undertook a project investigating the impact of feather condition on post-release survival; the results from this project suggested that birds with good quality flight feather condition survived for longer than birds with a poorer quality flight feather condition. These preliminary results have formed the basis of a more detailed analysis, discussed above. Ryan Burrell carried out a project investigating the roosting habitat preferences of Great bustards in the UK from satellite telemetry data. This project showed that habitat preferences differed between day and night and males travelled greater distances between 12am and 6am than females. Another project was carried out by Katharine Huzzey; however this was supervised outside LIFE+ hours, as the project used data from Russia. Katharine’s project was concerned with investigating the spatial distribution of eggs collected in Russia for the UK reintroduction project.
E3: Network with other projects

German great bustard project, Brandenburg

9th to 12th September 2013

By Louise Jane, Great Bustard Monitoring Officer

On 9th September 2013, Louise Jane from the UK Great Bustard project left for a four-day autumn visit to the German great bustard project. Over these four days some interesting observations, useful information and valuable insights into different ways of releasing birds were gained. The visit also provided an opportunity to talk through rearing methods, which has given us some interesting new points to consider.

During the visit, three bustard sites were visited: Buckow; where birds are hatched and reared, Fiener Bruch and Baitz; where they are released.

At Baitz, there was an opportunity to join the project as they walked this year’s reared birds. The young birds’ walk took them to an oilseed rape field and through grass fields. On the walk, short flights were made and the birds fed in the different habitats walked through. At this stage of the release process the majority of the birds at this site were still returning to the person walking the birds and therefore spending the night in the enclosure. This differs to the way we have been releasing birds in the UK as at this stage of their release the birds are felt to be independent with only two visits from a suited person each day. In a second walk, the young birds met up with some of the older birds, along with a bird from this year’s release that had joined the older birds last week. The young birds interacted with the adults briefly then separated out into their own distinct groups. Unfortunately at this point the more adventurous young female from the previous week returned to the young birds’ group.

This was interesting to observe and several of the German project staff feel that the young birds will only truly join the older wilder birds if they are outnumbered by the wilder birds. This theory would explain for example the interaction between our released birds of 2012 and the
older birds. The young 2012 birds (numbering six) appeared to interact with the adults at the release site (numbering four), however, when the adult birds left the young birds remained at the release site.

If this theory can be supported, this could influence the number of young birds we release at a site at any one particular time. Fewer young birds released into a greater number of adults could help the younger birds integrate into a wilder, older bird population. However, at this moment in time we are limited by the number of adult birds, making this a potentially useful insight for future years.

At Fiener Bruch, this year’s released birds had behaved slightly differently to the Baitz birds and had decided it was time for them to go off on their own and not return to the walker. While visiting this site, insight into the methods used to locate birds in Germany was gained. The Germans had radio tagged a number of their birds which meant that even though this year’s birds had flown the furthest ever recorded from their release field, by Wednesday morning, only one outstanding group of four birds were still unaccounted for. By the end of the day all birds had been located, even though the remaining group was a long way from its release site and out of sight from any tracks, the radio signal made it easier to locate them.

The German project like the UK project also has issues with predators. However, Germany has more predators of concern for bustards than the UK does. A large amount of the winter in the German project is dedicated to predator control. However, in Germany not all the predators can be legally controlled. To help the released birds deal with predators, any found in dangerous locations are recaptured and taken to be re-released in a safe place. The degree to which this was done in Germany varied significantly between areas. From the short time spent with these birds it did appear that a difference occurred between the sites in the tameness of the released birds. Where the interventional approach was regularly adopted the older birds appeared less wary. At sites where intervention was only carried out in extreme case the birds were very cautious, even of a person wearing the suit used in their rearing.

At Buckow, rearing and incubating of the birds was discussed. This site provided a lot of information on reared birds and has given us some useful pointers to consider for our rearing process next year. By visiting this site the people who carry out the rearing had the opportunity to not only explain what they were doing but also demonstrate what they were talking about, by showing what size food containers were given to different aged birds (Figure 1), how much food they would put into the container, and the ratio of vegetation to insects.
Figure 1: Dishes used to feed great bustards from hatching onwards
Corncrake reintroduction project

RSPB Nene Washes, Cambridgeshire – 04/09/2013

By Andrew Taylor, LIFE Project Advisor

On 4th September 2013 three members of the Great Bustard LIFE project team visited the RSPB reserve on the Nene Washes, which hosts a corncrake reintroduction project. While there are big differences between great bustards and corncrakes, it was interesting to compare the two projects and to look for general principles which could be applied to both.

Crane translocation project

Somerset Levels – 11/11/2013

By Andrew Taylor, LIFE Project Adviser

On 11th November 2013 a group of nine members of the project team, including staff and volunteers from the RSPB, Great Bustard Group and the University of Bath, gathered on the Somerset Levels to visit the Great Crane Project.

A small group of project staff had visited this project in year 1 of the LIFE+ project, but being both the closest and the translocation project in the UK most similar to the great bustard reintroduction, it was thought appropriate for a wider group to have the opportunity to visit.

We spent the day with the crane project manager, discussing the project and visiting both the release aviaries and the wild flock of cranes nearby.