



## APPENDIX A

Ornithological consultation meeting minutes

## Minutes

Present : Kate Tibble (Airtricity), Lucy Greenhill (JNCC), Rob Staniland (Royal Haskoning), Katie Hillyer (Royal Haskoning) & Peter Gaches (Royal Haskoning)

Absent :  
Date : 15.05.2009  
Copy :  
Our reference : 9V2964/C00001/303424/1

**Subject : Greater Gabbard Extension Project - Ornithological survey requirements**

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Initial	Comment	Action
RS	Rob clarified Airtricity's work to date and why it was felt that this was sufficient to serve as GG2 EIA baseline in light of GG1 construction and the latest ROC banding proposals as set out in the recent Government budget	
LG	Felt she understood the situation much more clearly following receipt of the briefing note and conversations with RS. Asked what the plan was for marine mammals baseline following internal discussions with a colleague (Sonja Mendez).	
RS	Pointed out that incidental sightings have recorded during the bird survey work and therefore, there is a similar temporal amount of data available on this subject.	
LG	Requested that the annual report needs to include the marine mammals findings as well.	
KT	A discussion on the initial results of the annual marine mammal observations would also be included in the briefing note	PG to update proposal and briefing note accordingly
RS & KT	The existing survey extent covers more than enough to encompass any future changes to the GG2 site following any Crown Estate announcement	
LG	Pointed out the need for statistical analysis of results. Natural England will also be providing comment on the reports given the proximity to the 12nm zone.	
KH	Confirmed statistical analysis will be undertaken by ESS and will be included in the annual report.	
LG	Asked if there will be a one year gap between GG1 construction and commencement of GG2 construction to allow for FEPA pre-construction monitoring	
RS & KT	Indicated that this would most likely be the case.	

Initial	Comment	Action
LG	Pointed out that JNCC would have concerns on disturbance offence grounds of concurrent build programme.	
RS	Suggested that an open approach to assuming that if a marine mammal could be present then appropriate mitigation to prevent injury would be applied from the outset within the ES	
LG	Felt that that would not be sufficient to directly mitigate the disturbance concerns and therefore, a years gap between construction phases was still needed.	
RS	Pointed that it would be difficult to define the importance of an area based on incidental sightings.	
RS & KH	Indicated that the area is unlikely to represent an important population centre for marine mammals and that surrounding inshore waters support more numbers.	
KT	The annual report will justify the importance of the area for marine mammals	Royal Haskoning to ensure marine mammals are suitably discussed in annual reports
LG	Noted that some of the Red throated diver counts still looked quite high, but not compared to the wider area, so this was unlikely to be of major concern.	
LG	Confirmed that 'in principal' she was happy with the approach that Airtricity propose, but that it will need more scientific basis than the initial briefing note provided.	
PG	The note was produce in advance of the statistics being made available and that the annual report will provide the more scientific justification.	
KT	Airtricity will re-issue the briefing note with marine mammal information included.	Royal Haskoning to update briefing note accordingly
LG	Wants to see GG1 and GG2 annual reports submitted together	
KT	Confirmed Mays surveys have been completed and that The Crown Estate should make their announcement on Extension Zones in one months time.	

# Minutes

Present : SSER: Kate Tibble (KT)  
 Royal Haskoning: Peter T Gaches (PTG), Rob Staniland (RS),  
 Katie Hillyer (KH, by telephone)  
 JNCC: Lucy Greenhill (LG), Sophy Allen (SA), Holly Niner (HN,  
 part attendance)  
 Natural England: Alexandra Fawcett (AF)

Date : 06.07.2010

**Subject : Ornithology – GG and Galloper Wind Farm Projects**  
 Related documents Galloper Wind Farm Technical Reporting, Greater Gabbard  
 Reporting and Galloper WF Technical Report SoW

## Greater Gabbard Offshore Wind Farm (GGOWF)

Agenda Item	Detail	Action
1.	<p><b>Concern over numbers of Gannet and Lesser Black-backed Gull (LBBG) that have been observed at collision risk height</b></p> <p>It was agreed that GGOWL will continue to monitor flight heights, in line with FEPA license conditions. The monitoring will continue to be led by the data and output requirements and may need to be adapted during the operational stage including a review of any necessary modelling, assessment etc.</p> <p>RS highlighted that we might want to re-evaluate survey methods in the future in light of monitored flight heights. Survey techniques are changing and becoming more efficient, in the future it may be useful to target monitoring for key species and seasonal activity.</p> <p>KH outlined the format of the collision risk data to be presented in the next annual report will be graphical as opposed to statistical comparison of baseline, pre-construction and during construction data. It was highlighted that birds currently considered as 'at risk' more conservative in the monitoring (+20m), relative to the ES (+30m). It was agreed that the ES data should be presented with that of the appropriate assessment, noting the differences.</p>	<p>KH - Graphical comparison of % at risk of collision between the ES data and monitoring data.</p> <p>KH to check the figures for anticipated collision risk that were included in the Appropriate Assessment.</p>
2.	<p><b>Construction activity impact on densities</b></p> <p>It was noted that there are number of construction activities that are being undertaken at the same point in time across the study area, but that there was a break in piling operations due to the piling restriction in the FEPA consent.</p> <p>It was agreed that this activity should be documented and it made clear what works are ongoing in addition to piling and that it would be difficult to draw conclusions in relation to any one specific activity. This should also make reference to the operation of the sunk TSS.</p> <p>General density changes should be presented in relation to ongoing construction and related to the predictions made in the ES. Marine mammal behaviour in relation to piling activity and cessation should also be considered.</p>	<p>Annual report to document construction and general effects on birds and marine mammals.</p>

Agenda Item	Detail	Action
3.	<p><b>Control site and buffer effectiveness</b></p> <p>Haskoning believe that the control site and buffers are effective in terms of monitoring. KH outlined the differing densities of sensitive species away from the wind farm site. This information will be presented by a series of graphs for key species.</p> <p>JNCC will review once the annual report has been issued.</p>	KH to present data in annual report.
4.	<p><b>Change of transects due to sunk TSS</b></p> <p>PG summarised the alteration to the survey transects, following the operation of the TSS. The transects were shortened in the north western and south western corner to prevent overlap with the TSS. The orientation of the transects was also changed, so that the vessel crossed the TSS appropriately in line with COLREGS. These changes were made following the request of the MCA and agreed with JNCC, NE and MMO.</p> <p>Data collection on the actual site has not been reduced due to the revised transects.</p> <p>SA questioned the comparability of the data collected by means of the new transects. It was agreed that ESS should submit a short justification of how the data will be comparable and any effects as a result.</p> <p>SA highlighted that a change in orientation may result in a change in environmental factors, such as bathymetry, which may affect the data. RS clarified that transects have not been set in a particular orientation due to environmental factors.</p>	<p>KH to submit a discussion of any impacts on the data as a result of the transect changes from ESS.</p> <p>KH to ensure that reference is made to the alteration in transects in the annual report</p>
5.	<p><b>Power and BACI analysis of data</b></p> <p>The approach to the power analysis of the data was discussed. SA outlined the merits of setting a power and determining the level of change detectable at the given power, with a set or range of given statistical significance.</p> <p>It was agreed that this was a useful approach and that ESS should submit a brief method statement outlining their proposed approach to the power and BACI analysis, with a timeframe, for JNCC/NE's review.</p>	<p>SA to send an e-mail to clarify the approach.</p> <p>KH submit ESS' approach to the analysis, with timescales for NE/JNCC review</p>
6.	<p><b>LBBG</b></p> <p>RS stated that it is likely that there will be higher numbers of LBBGs during construction as they are attracted to the construction vessels.</p>	
7.	<p><b>Annual report</b></p>	KH to provide timescales for submitting the GG annual report.

### Galloper Wind Farm Project (GWF)

1	<p><b>Baseline – impacted and unimpacted</b></p> <p>Baseline data collected at the GWF study area to date was discussed. This includes a significant portion of the site covered by baseline GGOWF surveys (2004-2006). As well as one complete year of un-impacted</p>	KH to present charts comparing data for distribution, number and
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	<p>baseline data and a second year, which was collected during construction at GGOWF and as such is considered impacted.</p> <p>The suitability of the second year of monitoring data was discussed. It was agreed that in order for JNCC/NE to pass judgement on the suitability of the use of the second years data to inform the ES, a summary of the distributions of key species should be submitted. It was agreed that these should comprise quarterly distribution plots for the key species for the GGOWF ES baseline period (2004-2006), the GWF un-impacted baseline period (2008-2009) and the GWF impacted baseline period (2009-2010).</p>	<p>density for key species</p> <p>PG to check if the technical report scope covers options for undertaking the assessment with and without impacted baseline.</p>
2	<p><b>Marine mammals</b></p> <p>Marine mammal use of the GWF study area was discussed. RS highlighted that marine mammal use of the area may be increased due to individuals being displaced from within GGOWF into GWF during its construction.</p> <p>Large numbers of harbour porpoise were recently recorded in the area.</p> <p>It was agreed that the impact and baseline sections of the technical report would be informed by the ongoing monitoring, and will include reference to noise monitoring undertaken at GGOWF, noise attenuation and any effects on marine mammals within GWF as a result, including when piling was stopped, during piling halt.</p>	<p>PG/KH to ensure that the ES includes the relevant information collected during monitoring of GGOWF and GWF</p>
3	<p><b>Cumulative assessment</b></p> <p>Agreement that R2.5 and R3 should be excluded from the cumulative assessment due to lack of data, but if GWF is delayed then this will need to be reviewed. Both phases of London Array should be assessed.</p> <p>RS highlighted that there is likely to be an issue with the comparability of the data collected in the Thames region due to the different contractors. SA stressed that the most recent relevant data should be used and that contractors should consider carefully the best approach.</p>	<p>Technical report author to produce a list of what data is going to be included after a review of all available data.</p>
4	<p><b>LBBGs</b></p> <p>SA stated that the assumption will need to be that all the LBBGs come from the Alde-Ore SPA due to there not being any tracking data. This represents the worst-case for the Appropriate Assessment. The JNCC and NE are happy for this to be disproved, but evidence will be required to justify, for instance by research which included information on LBBGs foraging ranges.</p>	<p>Technical report author to look at ways to disprove this.</p>
5	<p><b>Post consent monitoring</b></p>	

	<p>RS raised the issue of post consent monitoring. He noted that order for the monitoring to be most up to date, focussed and efficient, this should be agreed in consultation with the regulators post-submission. The ES will however provide suggested approaches to key issues raised by the ES.</p> <p>It was agreed that the impact assessment within the ES should be informed by lessons learnt at GGOWF and the on-going monitoring.</p>	
6	<p><b>Collision risk assessment</b></p> <p>The approach to the CRA was discussed. It was agreed that initially the CRA should be based on only the first year of un-impacted baseline data.</p> <p>Avoidance rates are currently under review, however the rates used within the assessment will be agreed in consultation with JNCC/NE.</p>	<p>Appointed sub-contractor to agree CRA approach with JNCC/NE</p>
	<p><b>Scope of work document</b></p> <p>The Scope of Work document was issued to JNCC/NE for their comment. This will be issued to potential sub-contractors prior to comment by JNCC/NE. Should any significant comments be raised on the scope then these can be discussed with the appointed sub-contractor in due course.</p>	

# Minutes

Present : Airtricity: Kate Tibble (KT)  
 Royal Haskoning: Peter T Gaches (PTG), Katie Hillyer (KH)  
 JNCC: Lucy Greenhill (LG), Andy Webb (AW)  
 Natural England: Alexandra Fawcett (AF)  
 ESS Ecology: Paul Gill (PG)  
 BIOSS: David Elston (DE), Stephen Catterall (SC)

Absent : Ross Hodson (MFA), Amy Crossley (RSPB)

Date : 17.11.2009

**Subject : Ornithology – GG and GG Extension Projects**

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Agenda Item	Detail	Action
1.	<p><b>Survey Overview</b></p> <p>PTG described surveys undertaken to date at Greater Gabbard (GGOWF) and Greater Gabbard Extension (GG Ext) sites.</p> <p>AW highlighted that it was beneficial that the aerial surveys had been undertaken over the winter months and that the two key issues for GGOWF/GG Ext are the lesser black-backed gulls found at the Alde-Ore SPA and red-throated divers at the over-wintering Outer Thames Estuary pSPA. Consequently, good data in the mid winter period was seen as crucial.</p> <p>AW stated that boat and aerial surveys methods are the most appropriate in this case for data collection.</p>	
2.	<p><b>Site location</b></p> <p>PTG clarified that transects were established in 2007 in consultation with JNCC based on original GG Ext site boundary and that this extension area has since changed shape and will do so again following stakeholder consultation.</p> <p>LG asked if original site area and a refined map could be included.</p> <p>LG had no comments regarding what areas to remove/reduce, but suggested that removed areas could make-up the control site.</p> <p>PG highlighted that the area to the West of the site has the most data collected for GGOWF and would therefore be suitable as a control site and the same was true of the area to SW of GG Ext.</p> <p>LG commented that this is understandable from a size perspective, but not certain the areas would be reflective of the whole site, potentially due to red throated divers.</p> <p>PTG suggested that there could potential be more than 1 control site.</p> <p>LG suggested that more than 1 site would be better, but either</p>	<p>Haskoning to revise diagram and circulate.</p> <p>PG to circulate reference to the gradient approach from the Journal of Applied Ecology</p> <p>AW to review the gradient approach in more detail.          PG to apply rationale for choosing a control site.          Following this clarification it should be possible to identify an area/areas.</p> <p>PG to provide clarification on Control and Reference sites.</p>



Agenda Item	Detail	Action
	<p>way more evidence was required.  DE highlighted that small control areas are not as suitable from a statistical perspective.  PG highlighted that the buffers on GG Ext were problematic due to the forthcoming boundary change, but AW stressed the need to ensure coverage is suitable.  PG highlighted that there is a fundamental difference between 'Control' and 'Reference' sites and that in this instance we need to be establishing 'Reference' sites, which may not necessarily contain identical characteristics as the site (in terms of bird assemblages) but will be suitable for establishing natural variation in populations which is critical for the BACI studies.  Given the size of the project (and the variation contained within it) establishing a 'Control' site in its true sense would be almost impossible. LG wanted clarification over the terminology 'Control' and 'Reference'.</p>	
3.	<p><b>GG and GG Ext comparison</b></p> <p>LG highlighted it is useful to have a GGOWF total as well as Inner Gabbard and Galloper totals in technical reports.  LG would like to see more of a comparison of the similarities between GGOWF and GG Ext.</p>	<p>KT to request that David Sales completes a comparison and will circulate a submission date.</p>
4.	<p><b>Suitability of current data collected for GG Ext</b></p> <p>KT stated that offshore construction for GG Ext is currently expected to start at end of 2013.  AF highlighted that the ornithology data would not only support the ES, but would also be used for AA and therefore, needed to be of a suitable level of detail to achieve this.  LG stated that 1 year of data is only acceptable if it is proven that it is suitable. This has not happened yet. It will also set a precedence and therefore it needs to be thoroughly considered.  Particular area of concern was for the eastern extents of the GG Ext site where there is no overlap between latest (2008/2009) and historical (2004-2006) boat based data. KT &amp; PTG pointed out that this may not be such an issue as site boundaries would be modified which may reduce the areas with only one year of boat based data coverage.</p> <p>Andy agreed with PG that the data could be half one summer breeding season in one year and the other half in the subsequent year (i.e. Late June 2008 through to early June 2010).</p> <p>It is clear that two options exist:</p> <ol style="list-style-type: none"> <li>1) Use existing un-impacted data to inform the ES. This is only likely to be possible if JNCC and NE can be reassured that the data coverage across the whole site is sufficient.</li> <li>2) Continue surveying the GG Ext site through 2009 and up to an including early June in 2010 and accept that the 2<sup>nd</sup> years data will represent an impacted baseline for much of the GG Ext site.</li> </ol>	<p>PG and PTG to review the boat based data coverage following project boundary modification by KT and re-consult JNCC and NE at that juncture.</p>

Agenda Item	Detail	Action
	<p>Based on the current GG Ext site boundaries and associated data coverage, JNCC &amp; NE confirmed post-meeting (email from Lucy Greenhill on 18.11.2009) that they wish to see Option 2 taken forward for this project.</p>	
5.	<p><b>Technical Report and Collision Risk</b></p> <p>AW stated that in post March the peak numbers of divers are gone. Jan + Feb are peak months.</p> <p>AW questioned whether we have assumed the largest size of birds and the flight height in relation to the wind direction. DE not sure that there is the ability to look at flight height with regards to wind direction. More cautious approach applied and therefore figures from the model need to be interpreted.</p> <p>LG believes that proposed key species for collision risk is acceptable and that there should be a range of avoidance rates considered in the EIA (95%+). Degree tilt not seen to be material.</p> <p>AW believes that there is little research with regards to flight speed.</p>	<p>DE to compare proportion of juveniles in May/June and July/Aug and establish potential patterns.</p> <p>SC/DE to interpret figures from the model.</p> <p>KT to send AF and LG the IPC route map.</p> <p>PG and DE to review and include the COWRIE BTO report "A review of Assessment methodologies for Offshore Wind Farms" – especially recommendations 20 and 11</p> <p>SC to calculate collision risk for 3.6MW and 7MW turbine layout.</p> <p>PG to establish what was undertaken, with respect to collision risk, for GGOWF during night time</p> <p>DE to e-mail a list of parameters for JNCC, RSPB and NE's consideration, such as, flight speed, avoidance rate, height above highest astronomical tide, day length etc. Also need to include proposed methodology for missing/delayed months.</p> <p>LG to circulate in combination and cumulative definitions</p> <p>PTG to forward aggregate extraction areas to PG.</p>
6.	<p><b>Implications of GGOWF on GG Ext</b></p> <p>PTG summarised that the key issues were:</p> <ol style="list-style-type: none"> <li>1) Implication of the inability to acquire 2yrs un-impacted boat based baseline (and implications for the GG Ext EIA)</li> <li>2) Future monitoring implications for GG Ext posed by presence of GGOWF</li> </ol> <p>The impact of GGOWF construction on any 2<sup>nd</sup> year of GG Ext data collection was acknowledged. Establishing the displaced</p>	<p>PG to write-up approach to displacement effects – splitting the GGOWF + GG Ext sites in 2 with a vertical line and then contrast the two sets of buffer zones. Also include what was said about displacement in GGOWF ES.</p>

Agenda Item	Detail	Action
	<p>birds from GGOWF into the GG Ext area during the 2<sup>nd</sup> year of data collection will be important consideration.</p> <p>It was recognised by all that the presence of GG Ext next to GGOWF will complicate a monitoring plan based on current best practice (i.e. standard buffer zones). Therefore, a novel approach will be required to establish how the monitoring can be implemented successfully.</p>	
7.	<p><b>Implications of GG Ext on GGOWF</b></p> <p>PTG summarised that the key issues were:</p> <ul style="list-style-type: none"> <li>3) Implications of the interruption of BACI studies through overlapping timescales of the GGOWF monitoring and GG Ext construction</li> <li>4) Implications of the loss of the existing GGOWF control site and some buffer areas to GG Ext</li> </ul> <p>The overlap between GGOWF monitoring and GG Ext construction timing issue is only likely, at worst to be a couple of months and therefore, LG agreed that this did not represent a significant concern.</p> <p>Defer buffer decision until the drafting of the development order (i.e. consent conditions) commences.</p>	

## **Galloper Wind Farm Meeting Notes (NE)**

### **January 18<sup>th</sup> Ornithology Meeting**

**Time and location: 13:30 at Hercules House, London**

The purpose of the meeting is to agree key points relating to the scope of the ornithological studies for the Galloper Wind Farm (GWF). Many of these arise from comments received in the scoping opinion (please refer to attached position paper). The project wishes to resolve these as soon as possible in order to be able to complete EIA studies.

<b>No.</b>	<b>Agenda Item</b>
1	Welcome / fire exits etc (Natural England)
2	Introductions
3	Galloper Wind Farm Project update (AP)
4	Aim of the meeting (AP)
5	Agreement on species for inclusion in collision risk modelling (RPS / Group discussion)
6	Agreement on approach to Appropriate Assessment for lesser black-backed gulls (RPS / Group discussion)
7	Agreement on assessment approach for SPA-related red-throated divers (RPS / Group discussion)
8	Agreement on scope of a Cumulative Impact Assessment (RPS / Group discussion).
9	Any further comments on the issues discussed (JNCC / Natural England)
10	Summary of points agreed and any outstanding actions (AP)
11	AOB

### **Attendees: In person, TC and VC**

**NE:** (Chris Williams, Jo Watson, Richard Caldow).

**JNCC:** (Sophy Allen; Holly Niner- via VC)

**SSER/RWE:** Pharaoh, A (Offshore Consents Manger for GWF)

**RH:** Gaches, P.T. (EIA Manger for GWF), Snowball, J.A. (Ornithological EIA lead for GWF)

**RPS:** Rafe Dewar, Joris Driessen (Simon Zisman and Rhys Bullman - via telephone)

**Meeting Notes:**

**Table**

Item	Detail	Action
1.	<b>Welcome and HSE (fire exits) (JW)</b>	--
2.	<b>Introductions</b>	--
3.	<p><b>Galloper Project Update</b></p> <p>AP: Update on Galloper: in process of ES drafting, final ES by June 2011. Submission to IPC in Summer 2011. Technical studies as main focus.</p> <p>Construction scheduled to start 2014. Operations shortly after in 2015.</p> <p>Galloper is essentially an extension to the Greater Gabbard OWF (GGOWF), although it is being treated as a project in its own right.</p> <p>GGOWF construction update: all foundations installed. Approx half of Wind Turbine Generators (WTGs) installed. First power generated in January 2011.</p>	<p>CW (NE) to circulate electronic notes from meeting</p> <p>SSER/RWE to update and circulate final minutes.</p>
4.	<p><b>Aims of the meeting</b></p> <p>Aims this meeting; 4 technical issues, raised within the Scoping Opinion (SO), are in need of clarification / agreement with The Regulators.</p> <p>PG: This meeting is a good opportunity for the project team to clarify the role of the new subcontractor (RPS) and seek guidance on the issues highlighted in the position paper (SSER/RWE, dated 12<sup>th</sup> January 2011) in order to refine the scope of work for technical assessment as part of the Galloper ES.</p> <p>JW: She is familiar with the SO and has read the SSER/RWE position paper.</p> <p>RC: Had not contributed to the SO but had read the SSER/RWE position paper.</p>	--
5a.	<p><b>POINT 5: Species for inclusion in collision risk modelling</b></p> <p>RD: Boat-based visual sighting data suggests that there are a small number of spp present in high numbers relevant to regional, national and international populations which have</p>	PG to consult previous minutes re. agreed

Item	Detail	Action
	<p>potential for risk of collision mortality.</p> <p>.</p> <p>The position paper identifies six species to be included within the Collision Risk Modeling (CRM):</p> <ul style="list-style-type: none"> <li>• Lesser black-backed gull;</li> <li>• Great black-backed gull;</li> <li>• Northern gannet;</li> <li>• Red-throated diver;</li> <li>• Great skua; and</li> <li>• Arctic skua.</li> </ul> <p>SSER/RWE wishes to seek The Regulators opinion on the focus of these spp. within CRM.</p> <p>RC/SA: Choice for six species has not been clarified in relation to numbers / thresholds – i.e. lacking in position paper. How do the species chosen relate to the Greater Gabbard EIA?</p> <p>RC: What are the collision risks at Galloper vs GGOWF site in terms of observed flight behaviour?</p> <p>RD: Broadly the same.</p> <p>JNCC: A list of sensitive spp was a good starting point. However, there needs to be more transparency of how this shortlist was compiled, with more evidence that the focal spp. are informed by the data collected at the site. JNCC will require access to information on population estimates and flight height estimates to inform thoughts on collision risks. Numbers at the site need to relate to regional, national and international populations.</p> <p>RD: SSER/RWE will provide those details, scoping through proportions of birds in flight at collision risk height (&gt; 20m) (for example, auk and fulmar: very few birds at collision height in transit).</p> <p>RC: spp can be excluded once coherent arguments, backed by data, are provided. Decision on spp needs to be discussed and viewed by JNCC and NE before agreement.</p> <p>For migratory species SSER/RWE will have to consider scaling up species numbers to the potential extent of the migration period for these species (e.g. skuas). The list should also take account of migratory species. Daily snapshot counts are not effective in doing this; another approach will need to be</p>	<p>approach for CRM with Lucy Greenhill/ Alex Fawcett</p> <p>SSER/RWE to provide a note: will include summary table and available data to justify selection of 6 spp as part of CRM. Note to be sent to Holly, Sophie (JNCC) and Joanna (NE).</p> <p>NE / JNCC to respond to the note within 2-3 wks (mid Feb turnaround)</p>

Item	Detail	Action
	<p>investigated by SSER/RWE to ensure that the total number of birds passing through the site during the migratory window is considered.</p> <p>In relation to scoping in / out species RC warned to not draw the net too tightly as the risk of erroneously scoping out species increases</p> <p>RD: Takes the point that this will need to be scaled up for migrants. Flight height data is available from GGOWF Annual Report (June 2008-May 2010) Data review / information can be updated. Presented in tabular form – what is NE / JNCC turnaround time?</p> <p>JNCC/NE: The Regulators would be able to respond to further information in 2-3 weeks.</p> <p>Suggest including ALL potential effect including displacement and collision risk.</p> <p>AP: many years of survey data, all effects will be considered, collision risk identified as suitable for particular attention.</p> <p>RC: justification for 6 spp being taken forward and explained in tabular form. Do not want to omit spp for which there might be an impact.</p> <p>RC/RD – 2008-09 and 2009-10 flight data could be cross-referenced to the 2004-2006 data to get a handle on inter-annual variation in flight patterns.</p> <p>*Degree of urgency from developers point of view is noted.*</p> <p>JS: summary table data from GGOWF, entire survey area incl Galloper. Annual report and comments from MMO and analysis of assemblage of spp and differentiation between pre and during construction showing spatial distribution of spp. Could this data be reviewed and presented? Spp recorded in flight and at a height of above 20m.</p> <p>RC: GGOWF 2<sup>nd</sup> Annual Report – huge variation of birds (monthly) flying at turbine height. Change of methodology? Change is assessment? Thresholds need to be reviewed. Month-month less useful compared to overall view.</p> <p>JS: The Appropriate Assessment (AA) captured collision risk for birds between 30m and 130m. Actual turbine is 22m above sea</p>	

Item	Detail	Action
	<p>level. Therefore, all assessment of flight behaviour in terms of potential collision risk has been considered for all birds observed between 20m-180m.</p> <p>RC: exact comparison to previous methodology. (20-30m height band) is this data compatible?</p> <p>JS: Yes. Band between 20 and 30m – RPS have this data available. Qualitative analysis of GGOWF flight height data (GGOWF 2<sup>nd</sup> Annual Report. Nov 2010) indicates that there may be a ‘hyper band’ of flight activity (notably for LBBG, GBBG) between 20-30m that was not picked up in the original AA.</p> <p>JNCC: It is not unsurprising to see a lot of flight activity between 20m-40m.</p> <p>The Regulators would like to seek clarification of temporal and spatial coverage of datasets to inform GWF ES.</p> <p>PG: collision risk modelling based on: pre-construction June 2008 – May 2009 boat-based survey data (1 year of data). Surveys covered the entire Galloper site and were not affected by construction activity at GGOWF (which commenced on 29<sup>th</sup> July 2009).</p> <p>This point was mentioned in previous consultations with NE/JNCC (i.e. agreed 1 yr ‘un-impacted’ survey data was acceptable).</p> <p>JNCC: Data should be used to inform data estimates for entire region. See comments in Scoping response. Do not recall the agreement to 1 years data use.</p> <p>It is currently unclear for the JNCC whether one year of data would be acceptable for analysis as the Position Paper does not refer to numbers or flight height distributions</p> <p>PG: for the wider EIA <u>ALL</u> data will be used, including that within the original GGOWF ES. SSWER/RWE is proposing to use 1 year of data for CRM and cross reference with previous un-impacted data.</p> <p>RC: ES needs to capture peak migratory periods. A single year’s worth of data (2008-2009) should be cross-referenced with 2004-2006 (pre-construction data) in order to compare interannual variation.</p>	



Item	Detail	Action
	<p>JNCC: confirms that population modelling needs to assess inter-annual variation and demonstrate no concern.</p> <p>RD: Noted. SSER/RWE is planning to compare density estimates from '04 and 06' although he is unsure of conclusion based on only part of the site.</p> <p>AP: asked RPS to confirm the spatial overlap of 2004-2006 surveys with Galloper site? Re-iterates SSER/RWE's intention to use all of data (incl GGOWF) that they have access to. Need to confirm actual overlap.</p> <p>JD: Limited overlaps may not provide sufficient confidence in our ability to compare between sites due to the spatial scale of transect lengths.</p> <p>JNCC: data needs to assess inter-annual variation for site.</p> <p>RC: calculating numbers at risk – 1% threshold for consideration in collision risk modelling. There is slight challenge with migratory species. CRM will need to reflect birds that are only using the site on passage (e.g. migratory waterfowl) not just a peak count or particular survey day – then these spp needs to be identified and drawn attention to. Variability in flight height is another issue.</p> <p>JNCC: may need more than 1 year data for collision risk modelling – requires larger assessment for the rest of the site.</p> <p>AP: Noted. This will be investigated.</p>	
5b.	<p><b>Technical approach to CRM</b></p> <p>RD: looking at input into stage 1 of band model process based on MacLean <i>et al.</i> (2009) guidance stating birds on the water and in flight should be used to determine mean density. However, aerial surveys only cover part of the year and don't coincide with the boat surveys. Solution: SSER/RWE is proposing to use the snapshot counts of birds in flight and boat based data to calculate mean density.</p> <p>RC: discusses the rationale for MacLean <i>et al</i> (2009). Issue of boat presence, flushing birds into air or attracting them. Influence on bird flight behaviour. It is likely that the boat-based surveys will lead to an over-estimation of numbers in flight and therefore represents a precautionary approach.</p>	

Item	Detail	Action
	<p>RD: Boat based survey covers whole extent of Galloper site surveyed every month – aerial surveys only conducted in winter months. Different spp may be used, eg those present in winter months, but not for spp present all year,</p> <p>JNCC: difficult to differentiate between gull spp. ‘Flushing’ could lead to overestimation – but preferable to aerial data in combination with boat based data.</p> <p>RD: positive ID as gulls within windfarm area. Would prefer not to use aerial data at all for any species.</p> <p>JNCC: Collision height – height bands and rotor diameter – concerns as to how this will be applied in practice?</p> <p>RD: survey bands for birds in flight. 22-104m. Assumption that flights recorded within bands are equally distributed across all heights within that band, proportional factor i.e. if rotor is 10m more then # of birds multiplied by 1.1 to account for it (accepted by SNH for onshore wind farms).</p> <p>JNCC: equal distribution is a big assumption to make. The likelihood is that birds are more likely to be flying lower within the 20-180m flight height band. Could be an issue of concern. Boat surveys could / would confirm that birds in lower flight bracket form majority – i.e. of higher significance. This would challenge the assumption of distribution.</p> <p>RD: SSER/RWE will look into evidence for uneven distribution within height band</p> <p>RC: once this distribution is known it can be corrected for.</p> <p>2.5 subsection 4: collision height at other wind farms. Number could vary from place to place, rather than using mean value. i.e. precautionary view rather than mean value. Evidence from GGOWF suggests marked variability in flight height between surveys- likely as a result of low numbers in certain seasons skewing the results.</p> <p>Flight height varies – suggested approach put to RD (see point 4 in <b>Item 9</b>).</p>	
<b>5c.</b>	<p><b>Overlapping rotors</b></p> <p>RG: seeks advice from the group on how to integrate overlapping rotors within the directional band model. He asks</p>	<p>JNCC to speak to SNH about approach to</p>

Item	Detail	Action
	<p>JNCC/NE if they have experience where this has been taken into account, in particular, does it have a bearing on results? Collision risk numbers need to be presented with 1 or 2 examples with percentage overlap to show model can be sensitive to that parameter.</p> <p>JNCC: Dan Chamberlain <i>et al</i> (2005) concluded that it would be very difficult to apply correction factors for overlapping WTG. Potential for use of complex Montecarlo analysis?</p> <p>RC: enquires what MacLean <i>et al</i> (2009) suggests?</p> <p>RD: The Maclean guidance does not go into detail on this issue. To his knowledge, no one has come up with a satisfactory solution. Without applying correction factor the predicted mortality is highly precautionary.</p> <p>JNCC: May be value in re-visiting this if mortality estimates come up with significant numbers</p> <p>Recommendations from Chamberlain <i>et al</i> review should be noted. Seeks clarification that the proposed CRM will make use of the latest SNH band model (spreadsheet updated to include 'in-flight direction', etc)</p> <p>RD: Noted. SSER/RWE will make sure they are using the latest model.</p>	overlapping rotors
5d.	<p><b>Approach for factoring in nocturnal rates</b></p> <p>RD: SSER/RWE propose to use the index described in Garthe and Hüppop (2004)</p> <p>RC / JNCC: JNCC considered it a good idea to use Garthe and Huppops (2004) nocturnal activity index and allocate percentage levels to it so as to enable a level of quantification in the assessment.</p> <p>JW: Additional comments from RC will be submitted to the group in email form (see <b>Item 9</b>)</p>	
6.	<p><b>Appropriate Assessment LBBG – Auld Ore SPA</b></p> <p>A broad agreement among all parties that some connectivity with the Alde-Ore SPA is certain given the species' foraging range.</p>	Written confirmation from NE (RC to send to JW) and JNCC re. the

Item	Detail	Action
	<p>RD: Breeding season population estimates for LBBG recorded at Galloper are high relative to SPA population. Will an AA be required? What proportion of birds would be considered part of SPA? (100%)?</p> <p>NE: Gull colony movement and numbers – NL and FR to be related to movements associated w fishing vessels – to establish % from SPA and non-SPA birds?</p> <p>Has LSE been identified? AA was undertaken for GGOWF. Connectivity to SPA as precursor – has this been done? NO</p> <p>LBBG – GGOWF seen as issue. 25-30km distance, within foraging range of LBBG – argument same as why AA was necessary for GGOWF.</p> <p>JNCC: LSE test would require population estimates for site.</p> <p>RD: Population counts / estimates to be provided to JNCC and Natural England/JNCC as part of SSER/RWE note.</p> <p>PG: All consultation to date suggests that an AA would be required. SSER/RWE would like written confirmation from NE (RC to send to JW) and JNCC on this.</p> <p><b><i>Precautionary – assume 100% from local SPA, check for other breeding pops within foraging range of Galloper (JNCC)</i></b></p> <p>JD: LBBG – is tracking work ongoing at AO SPA? Tracking work is ongoing in Holland</p> <p>JNCC: Tracking project due to take place at the Auld-Ore SPA, DECC funded in collaboration with BTO and RSPB.</p> <p>RD: SSER/RWE have chased up colony count data for Auld-Ore SPA. Latest counts available (through National Trust) are from 2003.</p> <p>JNCC: JNCC has colony data up to 2010</p> <p>JNCC recommended bringing the HRA screening process forward</p> <p>RC: considerations for AA -collision mortality, barrier effects, (cumulative) displacement to be included.</p>	<p>requirement for an AA</p> <p>JNCC to investigate status of tracking studies at Auld Ore SPA and Dutch SPAs</p> <p>JNCC to investigate if more recent colony data is available for Auld Ore SPA</p> <p>SSER/RWE to provide population counts/ estimates for LBBG at GWF within note</p>

Item	Detail	Action
	<p>JS &amp; JD: surveys record vessel associations across the entire study area. Potential here for looking at overflight data for the region to investigate possible spatial trends for areas of high fishing activity and vessel associations of LBBG.</p>	
<p><b>7.</b></p>	<p><b>HRA issues involving red-throated diver (RTD)</b></p> <p>No formal screening provided to date.</p> <p>RD: Will an AA be required for RTD? If so, what would the scope be?</p> <p>The Galloper site is offshore and at sub-optimal foraging depths for RTD. Peak counts – 91 birds (p.60 GGOWL, Nov 2010).</p> <p>SA/RC: Need to see the information (numbers and flight behaviour) pre-judgement. Start formal screening process for the RTD. Summary data needed to decide on LSE.</p> <p>Displacement on SPA (Outer Thames SPA) population is not a conclusion that can be reached, data is necessary for NE and JNCC – displacement from GGOWF site is a potential issue.</p> <p>Characterising the study area in terms of function / status is important i.e. is the study area used as a transit area (peaks during migration)? Is the bathymetry within the optimal foraging habitat scope, presence of shipping channels etc.?</p> <p>RD: Data from GGOWF 2<sup>nd</sup> Annual Report (GGOWL, Nov, 2010) suggest 4% of RTD at potential collision risk height (flying&gt;20m).</p> <p>RD: position paper – peak counts 45 birds (0.7% of SPA population). Data will be forwarded to JNCC in order to start the screening, including estimates, behaviour etc.</p>	<p>Screening (including population estimates and flight behaviour) to be submitted to NE and JNCC as part of SSER/RWE note.</p>
<p><b>8.</b></p>	<p><b>Cumulative Impact Assessment</b></p> <p>RD: Which regulated non-wind farm activities should be included?</p> <p>CW/SA: aggregate extraction activities of particular importance</p> <p>CW: the NE marine conservation team for East England should be able to provide information on commercial fisheries</p>	<p>JNCC/NE to inform SSER/RWE which wind farm sites should be investigated as part of the CIA</p>

Item	Detail	Action
	<p>PG: SSER/RWE cannot carry out a meaningful assessment using R3 work due to the paucity of data for these sites.</p> <p>Round 2.5- Kentish Flats extension will come into play. Round 3 (NE approval) cannot be assessed in EIA due to insufficient data. London Array Phase 2 will be included.</p> <p>JW: Appreciates that it is not reasonable to include sites with no information. However, if timescales for Galloper slip then sites such as EAOne will need to be included. London Array Phase 2 should be included in CIA (as consented).</p> <p>CW: bird count data is available for London Array.</p> <p>SA: JNCC will take NE lead on inclusion of London Array. Although subsequent discussion with NE needed for issues of consistency.</p> <p>AP: all available info will be used in the application.</p> <p>PG: Quality and quantity of that data needs confirming before we can commit to using it.</p> <p>RC: All RTD within proximity of Outer Thames SPA (and Scroby Sands) overwintering populations. Spp e.g. Gannets / breeding colonies. Need to determine patterns of usage.</p> <p>RD: Confirms that the ES will look at Scroby Sands. MacLean guidance suggests limiting the zone of effect to the Greater Thames Area.</p> <p>JNCC request summary data and population estimates to inform decisions on cumulative impacts.</p>	
9.	<p><b>RC thoughts on doc below: for consideration / possible inclusion in SSER/RWE note:</b></p> <ol style="list-style-type: none"> <li>1. 2.3 Are we happy with the list of 6 species?</li> <li>2. 2.4 Are we happy with the evidence on low numbers on which it has been decided that CRM will not be needed for any other species?</li> <li>3. 2.5(3) presumably this plan to use aerial survey values of % in flight is primarily aimed at RT diver, and will markedly reduce the %flying value used in CRM. Probably a fair enough plan.</li> <li>4. 2.5(4) % at PCH. Rather than simply using a single</li> </ol>	

Item	Detail	Action
	<p>mean value of % at PCH for each species derived from many studies, there may be value in acknowledging and exploring the uncertainty in these values and perhaps using an upper 95% CI to explore a more precautionary scenario.</p> <ol style="list-style-type: none"> <li>5. 2.5(8) Use of a non-precautionary longest distance route would require clear evidence of a consistent flight direction over more than one year – in case birds flight lines change with wind direction. Perhaps an analysis of the influence of wind strength and direction on birds flight directions would be worth exploring.</li> <li>6. 2.5(13) Incorporating turbine downtime is not precautionary.</li> <li>7. 3.7 Rules out exploring (alone or in combo) either habitat loss or displacement effects on LBBG on basis that species is wide ranging. Probably OK, but LBBG has shown some evidence of displacement now from Greater Gabbard itself, Lynn &amp; Inner Dowsing and maybe Kentish Flats. So perhaps there could be a cumulative displacement effect that requires attention.</li> <li>8. 3.8 While evidence of birds originating from sites other than the Alde-Ore SPA would reduce the predicted impact of collisions on that SPA population, some assessment ought perhaps to be made of the likelihood that these other birds might also originate from other more distant SPAs in eg NW France, Belgium, Netherlands etc.</li> <li>9. 4.2 1<sup>st</sup> bullet Just because Galloper is outside the SPA boundary it does not follow that displacement from that area cannot have an effect on the SPA population. On what basis is it assumed that indirect d-d effects are not predicted to be significant?</li> <li>10. 4.2 2<sup>nd</sup> bullet – what does all the existing survey data show regarding diver usage of the Galloper area, if the water is 30+m deep then there should be next to no birds.</li> <li>11. 4.3 I think that an AA looking at the cumulative/in combo assessment (of displacement) on the RTD population will be necessary.</li> <li>12. 5.2 How do you define the “spatial extent of the possible zone of influence” for eg gannet, Arctic skua, Great skua &amp; GBB gull?</li> <li>13. 5.3(1) both skua species will be passage birds and for these (at least), species selection against thresholds must be based on an estimate of the total number of birds passing through during the migration windows, not on peak daily counts.</li> </ol>	

Item	Detail	Action
	14. For skuas & gannets perhaps the geographic scale for CIA needs to be the whole east coast of the UK, not just the Greater Wash.	
10.	<p><b>SUMMARY OF ACTIONS</b></p> <ul style="list-style-type: none"> <li>• SSER/RWE to update and circulate final minutes to the attendees;</li> <li>• SSER/RWE to provide NE/JNCC with a note justifying approach to EIA, including: <ul style="list-style-type: none"> <li>○ Spatial/temporal coverage of datasets to inform EIA (including assessment of inter-annual variability);</li> <li>○ Approach to CRM;</li> <li>○ HRA Screening: Population counts/ estimates and flight behaviour for LBBG at GWF; and</li> <li>○ HRA Screening: Population counts/ estimates and flight behaviour for RTD at GWF</li> </ul> </li> <li>• PG to consult previous minutes re. agreed approach for CRM with Lucy Greenhill/ Alex Fawcett. Append relevant minutes to note.</li> </ul> <p>JNCC/NE</p> <ul style="list-style-type: none"> <li>• CW to forward NE notes to SSER/RWE for inclusion within the final minutes;</li> <li>• JNCC/NE to respond to SSER/RWE note within 2-3 weeks;</li> <li>• JNCC to speak to SNH about approach to overlapping rotors;</li> <li>• JNCC to investigate the status of tracking studies at Auld Ore SPA and Dutch SPAs;</li> <li>• JNCC to investigate the temporal coverage of LBBG colony data for Auld Ore SPA; and</li> <li>• JNCC/NE to inform SSER/RWE which wind farm sites should be investigated as part of the CIA</li> </ul>	--
11.	AOB	--



## Minutes of Meeting

Date : 15 April 2011  
In Attendance : Kate Tibble (KT) and Adam Pharaoh (AP)- GWFL  
Jen Snowball (JS)- Royal Haskoning (telecon)  
Rhys Bullman (RB) and Rafe Dewar (RD)- RPS  
Finlay Bennet (FB), Sophy Allen (SA) and Holly Niner (HN)-JNCC  
Joanna Watson (JW)- Natural England (telecon)

Apologies : Chris Williams (NE)  
Richard Caldow (NE)

Venue : JNCC Offices, Aberdeen (11.30am)

**Subject** : GWF Ornithology

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The information provided below provides an overview of what was discussed at the meeting. Actions are identified in blue at the bottom of each section.

These minutes also capture all post-meeting feedback from the JNCC and NE, received by GWFL in an email from Holly Niner on 13<sup>th</sup> June 2011

Item	Details	Person(s)
1	<p><b>Introductions and project update</b></p> <ul style="list-style-type: none"><li>GWFL are aiming to submit the Preliminary Environmental Report (PER) by the end of May, with a view to DCO application / ES submission in Q3 2011</li><li>As such, all supporting technical studies (including the ornithological assessment) are complete or nearing completion</li><li>The budget spent on the GWF ornithology scope, to date, stands at approximately 2 million GBP</li><li>GWFL have met with the JNCC and NE approximately every six months since May 2009 and are keen to agree on all outstanding technical issues in order to complete the assessment as soon as possible</li><li>AP provided a summary of the technical and consultation documents provided to the JNCC and NE to date. Particular note was made of the position paper provided in advance of the last meeting on 18 Jan 2011, the EIA ornithological briefing note (including Appendix A: minutes of meetings to date) and the draft HRA screening ornithological technical report)</li></ul>	AP/ KT
2	<p><b>The aims and objectives of the meeting</b></p> <p>1. Agree on all outstanding technical issues with reference to the previously submitted Technical Briefing Note in order to complete the assessment as soon as possible.</p>	JS

Item	Details	Person(s)
	<p>2. Provide the SNCBs with an update as to how and which data will be used in the assessment.</p> <p>3. A discussion of the preliminary CRM results.</p> <p>4. Update and discussion on HRA screening.</p> <p>GWFL are keen to resolve the issues raised by the JNCC so as to align our technical studies and reporting for the PER/ES.</p>	
3	<p><b>Follow on comments from RPS</b></p> <p>Worst-case scenario of peak monthly population estimate over the two years will be used for GWF impact assessment (rather than averaging between years) – note that in some cases, monthly totals were higher in the second year</p> <p>Gradient analysis within the GWF footprint only is not considered to be able to produce reliable results to show displacement effects. Previous attempts to show any species-specific patterns in distribution within compartments (e.g. kernel analysis) have proved inconclusive, particularly due to the ephemeral and localised flocking behaviour of many species, both tolerant of wind farms (e.g. gulls) and more sensitive (auks), in response to food sources and/or fishing vessels. Large aggregations of birds away from turbine areas may exist, which are unrelated to construction activities.</p> <p>[Post meeting note: A Jacobs' Selectivity Index analysis, which aimed to determine whether components of the GWF study area were more or less attractive to birds than would be expected if homogenous, produced variable and inconclusive results due to the small sample size in a number of cases, or the skewed results of large (sometimes mixed species) flocks in particular months.]</p> <p>Birds were no more, or no less likely to be found within wind farm areas where construction was taking place, compared to the wider GWF survey area (including some parts 'distant' to the wind farm areas).</p> <p>If it was concluded by JNCC/Natural England that construction impacts would affect numbers, the 2<sup>nd</sup> year of survey data would arguably present a more realistic baseline to inform the ES, following the recommended precautionary assumption that birds would be displaced over the long-term by the GGOWF, within up to 4km.</p> <p>Following on from this, and where it is stated by JNCC/Natural England, that displacement might "be likely to extend over at least part of the proposed Galloper site", it would therefore follow that only the GWF wind farm and buffer areas that do not overlap with the GGOWF footprint and buffer should be used to estimate baseline populations, if it is assumed that the constructed GGOWF may displace birds up to 4km (which would be lost to the population). Baseline numbers within the GWF study area would therefore be lower in the future, at the time of construction, than during 2008-10 surveys. Should a range of population estimates therefore be quoted?</p> <p><b>Action</b></p>	RD/RB

Item	Details	Person(s)
	<ul style="list-style-type: none"><li data-bbox="381 212 1208 310">• GWFL to show clarity on how the issue of inter-annual variability has been dealt with in the EIA methodology presented in the PER and subsequent ES</li></ul>	

<p>4</p>	<p><b>Question 1 from the Technical Briefing Note:</b>  <b>Based on the information provided in Section 2.1, do you agree that SSER and RWE NRL can utilise the full 2008-2010 datasets to inform the EIA?</b></p> <p>Summary:</p> <ul style="list-style-type: none"> <li>• The 'Impacted' dataset is less than 1 year - breeding season will be un-impacted by construction, allowing for direct comparison. This is important for breeding lesser black-backed gulls from the SPA.</li> <li>• Birds displaced by localised construction activities are likely to remain in the GWF study area.</li> <li>• Construction activity took place at one turbine location on any given day, and so disturbance effects are likely to be localised and not affect the whole GWF study area. Construction within the Galloper Extension turbine area (&gt;8km from the Inner Gabbard Ext.) only commenced in January 2010.</li> <li>• Over and above the information provided above, it was agreed that, based on the limitations of the dataset, it is difficult to extrapolate for certain that any inter-annual differences in populations are due to construction activities or just natural variation.</li> </ul> <p><b>Actions</b></p> <ul style="list-style-type: none"> <li>• JNCC advised GWFL to check whether GWF population estimates in 2008/09 and 2009/10 are within the range of inter-annual variation of GGOWF data and aerial survey data.</li> <li>• For any months where construction activity was concurrent with surveys (October –May), the worst-case monthly population estimate from either of the survey years will be used for the impact assessment. Where it can be justified that there were no construction impacts, an average of the two years will be presented. The range of population size will also be presented (in parenthesis).</li> </ul>	<p>RD</p>
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5	<p><b>Question 2 from the Technical Briefing Note: Based on the information presented in Section 3, do you agree with the list of species to be addressed within the EIA?</b></p> <p>Based on information provided in Appendix 1 of the Technical Briefing Note, the list of species to include in the CRM was discussed and agreed previously. After discussions with JNCC/NE on 18<sup>th</sup> January, further clarity on the justification for the final species list (in terms of their relative abundance within the site, flight behaviour and sensitivity (cf Maclean <i>et al</i>) was provided in the Technical Briefing Note.</p> <p>Natural England have now requested for certain migrant species to also be included (notes PFG, DBBG, common scoter, etc).</p> <p><b>Actions</b></p> <ul style="list-style-type: none"> <li>• Within the EIA, GWFL are to provide a table showing the number of birds in transect within the wind farm, for all species mentioned by the JNCC in relation to potential collision risk. The assessment should determine if the impact of collision mortalities for these species will be negligible within the context of regional and national populations, and provide evidence that no further species warrant inclusion in the assessment.</li> </ul>	RD
6	<p><b>Question 3 from the Technical Briefing Note: Based on the information presented in Section 4, do you agree with the list of species to be assessed with the Collision Risk Modelling?</b></p> <p>No pink-footed geese were recorded within snapshot and so collision risk would be negligible. Only one brent goose flight was recorded within snapshot, which is considered to pose a negligible risk compared to the total regional population. Similarly the low number of common scoter snapshot counts would result in low mortality compared to the regional wintering population, especially since an average of only 4-5% of flights were recorded at collision height over 2008-10 and 2004-06 survey periods.</p> <p>GWFL are therefore of the opinion that no additional species need to be included in the CRM.</p> <p><b>Actions</b></p> <ul style="list-style-type: none"> <li>• Within the EIA, GWFL are to provide a table showing the number of birds per species in snapshot within the wind farm, for all species mentioned by the JNCC in relation to potential collision risk. The assessment should determine if the impact of annual and breeding season collision mortalities for these species will be negligible within the context of regional and national populations, and provide evidence that no further species warrant inclusion in the assessment.</li> </ul>	RD
7	<p><b>HRA screening document – timescales for reporting</b></p> <p>The HRA screening ornithological technical report will be submitted to IPC as an appendix to the HRA screening report for the project, which is a preliminary assessment of likely significant effect (LSE) on European Sites.</p>	AP

	<p>Note that the HRA screening report covers all European sites and not just SPAs / those with an ornithological interest.</p> <p>JNCC &amp; NE have been provided with the draft HRA screening ornithological technical report and initial feedback (received prior to the meeting) is that JNCC have strong concerns in relation to the results of the CRM for LBBG.</p> <p>GWFL is to submit the HRA screening report (and ornithological technical report) for JNCC and NE to provide formal comment prior to submission of the final document to the IPC. JNCC highlighted that they will require sufficient time to review this document.</p> <p>JNCC highlighted that the conclusion of 'Likely Significant Effect, but no adverse impact on Conservation Objectives' is a misinterpretation of the HRA requirements and that a conclusion of Likely Significant Effect cannot be reached without requiring an Appropriate Assessment against the Conservation Objectives for the site in question.</p>	
8	<p><b>HRA screening – species of concern</b></p> <p>The JNCC and NE are concerned that (i) red-throated divers may be displaced by the GWF wind farm into the Outer Thames SPA, creating pressure on SPA population, and (ii) the current collision risk mortalities may present a significant adverse impact on the lesser black-backed gull population at the Alde-Ore SPA which has suffered a significant decline and now features approx 1600 breeding pairs.</p> <p>The preliminary CRM and assessment indicates a potential adverse effect on the SPA LBBG population.</p> <p>GWFL noted that the current CRM had assumed 99.5% avoidance rates and that 98% should now be applied. GWFL/JNCC discussed the possibility of using other sources of data to support an increase in avoidance rates as well as targeting biometrics, age structure and flight heights. These will be investigated to ensure that the CRM is not over-precautious.</p> <p>The group discussed various approaches that may be required, including PVA.</p> <p>The JNCC noted that barrier effects should not be an issue.</p> <p>JNCC requested that interactions (e.g. indirect effects through prey species) are discussed in the EIA. AP confirmed that this will be the case.</p> <p><b>Actions</b></p> <ul style="list-style-type: none"> <li>• GWFL to demonstrate within the HRA technical note whether there are likely to be any density-dependent impacts on SPA species.</li> <li>• GWFL to include avoidance rates of 98% in the CRM</li> <li>• GWFL to liaise further with JNCC as to their approach to CRM</li> </ul>	RD/JS
9	<p><b>CRM results for LBBG</b></p> <p>Lesser black-backed gull – predicted mortality of up to 411 birds per year at an avoidance rate of 99.5%. JNCC highlighted that an avoidance rate of 98%</p>	RD/JS

	<p>should be applied.</p> <p>GWFL noted that this is likely to be an overestimate of actual mortality for a variety of reasons (as outlined in Technical Briefing Note). A full discussion of these will be included in the final assessment.</p> <p>There was a group discussion around the possibility of reduced fishing activity in the vicinity of the operational wind farm reducing activity and mortality levels. This will also be explored in the final assessment.</p> <p><b>Mitigation</b></p> <p>GWFL are aware that there is a significant bank of local knowledge and maintenance effort at the Alde-Ore SPA from the National Trust and RSPB Officers. GWFL would seek to work closely with these agents to ensure that a feasible suite of mitigation, for example, in the form of habitat restoration, is managed at the site. GWFL to further investigate potential mitigation</p> <p>JNCC offered to further assist in efforts to refine the assumptions presented in the CRM. Should CRM show that mitigation efforts may be successful, appropriate mitigation measures and/or compensation should be further discussed with SNCBs.</p> <p>[Post meeting note – the issue of compensation vs mitigation requires further discussion with the SNCBs at the appropriate juncture]</p> <p>RSPB have information on predator and vegetation control programmes at Orford Ness (implemented by National Trust)</p> <p><b>Actions</b></p> <ul style="list-style-type: none"> <li>• Further discussion is required between GWFL, SNCBs and regulators in relation to the appropriateness of mitigation at the Alde-Ore site.</li> <li>• GWFL to liaise with JNCC as to their approach to CRM</li> <li>• [Post meeting note: GWFL have now submitted their Preliminary Environmental Report and are intending to meet with JNCC &amp; NE again in early July to review the CRM results and wider assessment, which will be provided in advance of any meeting]</li> </ul>	
10	<p><b>AOB</b></p> <p>None</p>	

# Minutes

Present : Holly Niner (HN), Sophy Allen (SA)- JNCC  
 Richard Caldwell (RC), Sam Stewart (SS)-Natural  
 England  
 Peter Rafferty (PR), Kate Tibble (KT), Adam Pharaoh  
 (AP)- GWFL  
 Jen Snowball (JS)-RH  
 Simon Zisman (SZ), Rafe Dewar (RD)-RPS  
 Tim Norman (TN)-NIRAS

Absent :  
 Date : 12<sup>th</sup> July 2011

**Subject** : GWF Meeting Minutes

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These minutes also capture all post-meeting feedback from the JNCC and NE, received by GWFL in an email from Holly Niner on 26<sup>th</sup> July 2011, and summarised in Table 2 at the end of this document.

Item	Details	Lead	Action
1	<b>Introductions</b>	--	--
2	<p><b>GWF Project Update</b></p> <p>PER submitted in June and S42 consultation period closing 14th July.</p> <p>Community (S47) consultation undertaken in parallel.</p> <p>Working towards DCO application later this year.</p> <p>Post application / consent consultation with relevant stakeholders, statutory bodies, the licensing authority and the IPC will follow.</p> <p>Greater Gabbard Offshore Wind Farm under construction (2/3 export cables and ~40 turbines generating).</p> <p>Introduction of TN as a new member of the ornithological monitoring team- provides independent support to the detailed work being undertaken by RPS.</p>	AP	--
3	<p><b>Ornithological Assessment – progress to date</b></p> <p>Objective of the RH/RPS/NIRAS presentation is to provide an overview of the progress made since the last meeting in ongoing ornithological technical issues.</p> <p>Update on datasets and analysis will provide a platform for more detailed presentation on results of the CRM lead by RD and TN.</p>	JS	1



Item	Details	Lead	Action
	<p>Slide 7 and 8 provide an overview of how the ongoing consultation has informed EIA technical studies and draft HRA screening to date.</p> <p><b>Vantage Point Surveys: update</b></p> <p>The vantage point (VP) survey programme around operational turbines at Greater Gabbard OWF may enable a better understanding of the behaviour of lesser black-backed gull (LBBG) around operational wind turbines- notably in regard to assessing avoidance behaviour.</p> <p>Full details of the rationale for the VP surveys and sampling protocol can be found in the Methods Statement (dated 13<sup>th</sup> June 2011).</p> <p>Successful mobilisations have been completed on 1st June, 20th June and 3rd July. With the aim of undertaking a fourth mobilisation in mid-July = 36 hours of VP survey effort during the core breeding season.</p> <p>These surveys are unlikely to detect actual collision events but they may provide further evidence of the amount of time LBBG spend at PCH and how they move through/around operational turbines.</p> <p>The approach for if/how these survey outputs can be reconciled with the input parameters of the Band model are still in development.</p> <p>Based on the survey limitations highlighted in the Methods Statement and echoed in the recent response from the SNCBs- the development of the survey protocol has been an iterative process.</p> <p>Given the need to ensure that the data is representative of the actual level of flight activity within the viewshed, GWFL have worked with their ornithological advisors to refine the sampling protocol in a number of ways, for example:</p> <ul style="list-style-type: none"> <li>- A variable viewshed (to prevent the likelihood of underestimating flight activity during periods of high gull density); and</li> <li>- Behavioural codes to better capture evidence of 'micro', 'macro' avoidance and 'risky flight' behaviour (<a href="#">SNCB FEEDBACK: Table 2, Item 1</a>)</li> </ul> <p>SZ: There is also potential for RPS to supplement the VP data with observations of LBBG flight activity at one of their onshore project sites in Scotland.</p> <p>The first 36 hours of processed data from surveys conducted from early June-mid July are due from ESS by 31<sup>st</sup> July.</p>		
4	<p><b>Collision Risk Modelling: refinements to input parameters</b></p> <p>As outlined in the CRM note compiled by RPS and submitted to the SNCBs on 29<sup>th</sup> June 2011, recent technical work has included:</p> <ol style="list-style-type: none"> <li>1. Establish the mortality rate of adult SPA birds that are found</li> </ol>	RD/SZ	--

Item	Details	Lead	Action
	<p>foraging within the GWF site, and the resulting level of impact on the SPA population;</p> <ol style="list-style-type: none"> <li>2. Review and establish an accurate avoidance rate for LBBG; and</li> <li>3. Determine whether this level of additional mortality will result in an adverse impact on the Conservation Objectives of the SPA.</li> </ol> <p>RD goes on to describe how the CRM is adapted from the Band model and defines some of input parameters in relation to the worst case turbine layout input</p> <p>Estimates are based on the average density from snapshot surveys during the boat-based monitoring. Aerial data was not included due to paucity of temporal coverage over the summer period and inconsistent spatial coverage with the GWF study area.</p> <p>Density is the mean number of birds recorded in snapshot x % at collision height (17%), which then can be translated to a flux rate.</p> <p>The latest refinements made to the input parameters are as follows:</p> <ul style="list-style-type: none"> <li>• Temporal period of risk</li> <li>• Age structure</li> <li>• Provenance of birds</li> <li>• Association with fishing activities and relocation of foraging resource during operational periods (<a href="#">SNCB FEEDBACK: Table 2, Item 2</a>)</li> </ul> <p><b>Temporal period of risk</b>  Period of risk likely to be March to August, based on ringing, winter counts and radio-tagging evidence at SPA (BTO/UvA) and Dutch colonies (e.g. Camphuysen, 2011).</p> <p>RD presented flight distribution of 11 tagged birds at Texel, 2007-2011, and major colonies. Raw tracks appear to support the theory that birds only present within GWF study are between March-August.</p> <p>Evidence suggests that the vast majority of SPA birds will migrate to southern Europe over winter and be outside of GWF risk zone for this period.</p> <p>Local wind speed data and turbine specifications (cut-in/out speeds) used to work out monthly % time operational, and therefore probability of collision.</p> <p>RC asked if any of the birds were failed breeders given the wide foraging range apparent from the tag data</p> <p>RD/SZ agreed that this was probable. If possible, the raw tag data could be re-presented to show seasonal variances between breeders/failed breeders</p> <p>RD: described how a range of realistic avoidance rates were then considered, based on empirical evidence, to give monthly mortality rates. These avoidance rates would be discussed in more detail later in the</p>		

Item	Details	Lead	Action
	<p>presentation.</p> <p><b>Age structure</b>  RD: To be part of SPA breeding population, birds must be of adult age (4+ years). Average monthly % of sub-adults calculated from boat surveys and removed from CRM.</p> <p>SA: Sought clarification that mortality estimates are calculated month by month.</p> <p>RD: confirmed they are.</p> <p>RC: based on data provided in the PER, he would recommend that the breeding season is taken from February</p> <p>TN: this does not agree with the standard practice for seasonal surveys of summer breeders i.e. we would normally be focussed on spp. such as RTD over this period.</p> <p>SZ: concurs with TN</p> <p>RD: Although a small number of SPA birds may be present in February and throughout winter, the resultant risks during these months will be outweighed by the inclusion of larger numbers of migrating non-SPA birds in CRM collisions in March and August.</p> <p><b>Provenance of seabirds</b>  RD: LBBG core range &lt;40km, but can forage regularly within 80km and up to at least 100km, particularly when following fishing vessels.</p> <p>Conservative estimate of 5% of birds at GWF likely to be from other colonies during the breeding season</p> <p>SA: sought clarification that at this point the density calculations had undergone two corrections 1) non-breeders and 2) provenance of birds</p> <p>RD: confirmed that it had.</p> <p><b>Association with relocated fishery vessels</b> (<a href="#">SNCB Feedback: Table 2, Item 3</a>)  RD: 15% of LBBG records during GWF boat surveys were associated – likely to be an underestimate due to limitations of boat-based survey methods</p> <p>Discards from fishing will be displaced from areas outside the wind farm, therefore a reduction of mortality rates by 15% due to redistribution seen as precautionary.</p> <p>No objection from the group on this assumption</p> <p>SZ: To sum up, the refinements made to the input parameters will provide a more accurate/ realistic estimate of collision mortality.</p>		

Item	Details	Lead	Action
	The next stage of discussions is to look at the results of the CRM and examine the evidence of avoidance rates used from LBBG monitoring studies at other wind farms.		
5	<p><b>Results of CRM</b> RD: 'Medium' avoidance rate of 99.90% considered realistic</p> <p>Using 99.90% the 2009 breeding season mortality (March-August) would be 12 birds, which would equate to a 3.8% increase in mortality rate of current SPA population or 2.5% increase for total number of SPA adults.</p>	RD	--
6	<p><b>Cumulative Collision Mortality</b> RD: Core LBBG foraging range is 40km, which would take in GWF, Greater Gabbard, London Array, Gunfleet Sands and East Anglia ONE (no CRM data available to date).</p> <p>Upper regular foraging range of 80km would include Kentish Flats, Thanet and Scroby Sands – unlikely to have any significant effect on SPA (&lt;1 SPA bird per year) due to greater distances and small sizes.</p> <p>Gunfleet Sands &lt;1 individual per year predicted in monitoring reports.</p> <p>Due to the differences in assessment methodology, comparable quantitative information is only available for Greater Gabbard and Thanet.</p> <p>Estimates calculated from data provided in Environmental Statements for GWF, Greater Gabbard and Thanet combined.</p> <p>London Array may create small amount of additional mortality on SPA pop., but numbers were relatively low in breeding season compared to GWF site.</p> <p>Using 99.90% the cumulative breeding season mortality would be 17, which would equate to a 5.4% increase in mortality rate of current SPA population or 3.6% increase for total number of SPA adults.</p> <p>SA: Referring back to the avoidance rates cited from the reference list- JNCC advises that these rates may be misleading. (SNCB FEEDBACK: Table 2, Item 4) More transparency is required in the methods and calculations used in these post-construction monitoring surveys to derive their avoidance rates for LBBG.</p> <p>SZ: Agreed that this could be looked at but noted that there were more studies on the reference list than for most other species. We can be confident that avoidance rates are likely to be higher than the precautionary 98%.</p> <p>SZ: There is increasing recognition that birds have evolved not to fly into things- LBBG is a highly mobile, manoeuvrable opportunistic species- often found foraging or associated with landfills, piggeries, fishing boats, etc.</p> <p>SA: Certain spp. groups not as prone to collision e.g. geese. But gulls do</p>	RD/SZ	2

Item	Details	Lead	Action
	<p>feature as a large proportion of species found in carcass surveys</p> <p>TN: which is likely to be due to the fact that they are found in higher densities</p> <p>SZ: LBBG data from the Netherlands available in October. Alde-Ore tag data is still being processed. No release date available, although 1<sup>st</sup> year report to DECC is overdue.</p> <p>JS: with so much variability in the behaviour of individual birds there needs to be some caution with how the data from a few animals is interpreted- especially in relation to dynamic of an SPA. At this late stage of the project there is a need to maintain focus on what our key questions are- if we are confident in our ability to characterise trends from the data we have then the value of seeking/ pulling apart further datasets of this nature should be justified</p> <p>KT: There is always going to be new data from other studies coming available and a pragmatic decision is required on its inclusion in the application documents.</p> <p>The group confirmed the need to be pragmatic on what data should/could be sought at this late stage of the project</p> <p>RC: Re. CIA, can we get better data from London Array and Kentish Flat?</p> <p>KT: GWFL have been trying to get the raw data for the last 2.5 years.</p> <p>TN gives an overview of previous approaches to assessing collision risk within other ES from the outer Thames, notably the approach of Percival for the London Array ES.</p> <p>SA: sought clarification that GWFL has also requested sight of the raw data for these sites, which theoretically could undergo the same treatment as the GWF data</p> <p>JS: requested clarification on whether this would require GWFL to take the raw snapshot counts from the other developers and run it through the CRM</p> <p>SA: yes</p> <p>JS: Projects like EAOne may be reluctant to release their first year of boat-based data to GWFL- with a view to GWFL running it through their own CRM in order to make a pre-judgement on risk to spp. on their site</p> <p>KT: In order for other developers to release their data, pressure needs to come from the SNCBs</p> <p>TN: In terms of cumulative effects from operational sites, there is a suggestion that the effects have already been integrated into baseline e.g. Scroby Sands.</p>		
7	<b>Next Steps</b>	TN	3, 4

Item	Details	Lead	Action
	<p>TN: Continue Vantage Point counts, monitoring patterns of flight heights, near turbine and far turbine avoidance behaviours as Greater Gabbard is built. Evaluate survey methods and results, feed into CRM evaluations, and also use in the design of appropriate post-construction monitoring regime.</p> <p>TN: In his experience on other projects, it is difficult to define the parameters of a PVA for an open population. At the first step there is a need to focus on the objective of PVA not the methodology</p> <p>RC: Without going down the route of complex (and potentially cumbersome) PVA, can our assessment be captured in a coarse model to better quantify how an SPA population would be effected by changed in mortality levels.</p> <p>TN: Agrees that is a sensible approach. Need to establish trigger levels i.e. if numbers look like XX, the SNCBs would require GWFL to look at this in more detail.</p> <p>RC/SA: it will be necessary to make some assumptions in order to do a basic model- these could assessed in a step-wise process</p> <p>TN: there is a need to take account of EU-funded management measures within the SPA, which aim to reduce predation, disturbance and improve habitat quality (population decline likely to be halted by time wind farm is operational as a result).</p> <p>SZ: with reference to the project website: package of measures in place at Alde-Ore, not targeted at gulls bit a simple PVA-type approach could account for the predicted upward trajectory of the Alde-Ore population should the management effort be effective</p> <p>RC: agrees that the SNCBs would like to see more exploration of the implications for EU funding on LBBG numbers in the context of the estimated collision risk mortality as a result of the GWF</p> <p>KT: GWFL will investigate this work package further</p> <p>Group agreement that note on proposed PVA methodology will be sent to SNCBs prior to modelling.</p>		
8	<p><b>HRA Screening</b></p> <p>AP: indicated that GWFL were keen to resolve comments that came from the SNCBs on the draft HRA screening- with a focus on apparent issues raised in relation to:</p> <ul style="list-style-type: none"> <li>• LBBG (displacement, collision)</li> <li>• RTD (displacement, disturbance &amp; collision)</li> <li>• Gannet (collision)</li> </ul> <p>LBBG already covered in previous discussions on the agenda.</p> <p>Re. RTD, the question remains if there a functional link between the GWF</p>	AP	5

Item	Details	Lead	Action
	<p>and Outer Thames SPA population.</p> <p>RD: unrealistic to think there would be a LSE for RTD from Outer Thames Estuary – individuals recorded in reasonable numbers only during brief periods on spring migration, suggesting these birds do not overwinter in SPA.</p> <p>RC: More detail needed in relation to RTD movements within the outer Thames- GWF may indeed represent important habitat</p> <p>TN: question this suggestion given that any 'prime habitat' would have been captured in the boundaries of the Outer Thames SPA</p> <p>RC: Countered that there was potential for birds to be displaced from GWF into the Outer Thames SPA, resulting in unsustainable pressure on resources.</p>		
9	<p><b>AOB</b></p> <p>KT: requested a clarification from the JNCC on their turnaround on comments on statutory PER by deadline of 14<sup>th</sup> July</p> <p>HN: JNCC are not going to meet the deadline for comments on 14<sup>th</sup> July.</p> <p>As an aside: JS/SA/RD/SZ ran through some of the preliminary results from the VP survey conducted on the 3<sup>rd</sup> July.</p>	KT	

**Table 1: Key Actions**

Action	Description	By when
1	GWFL to look at <b>avoidance rates</b> cited from other wind farm studies (as presented in slide 23) in more detail and communicate findings to JNCC/NE	Tues 26 <sup>th</sup> July
2	GWFL to resolve the quantity and quality of LBBG density estimates and/or processed CRM data from the wind farms named in slide 21 for <b>cumulative/in combination assessment</b> . Finalise a way forward to make collision risk estimates comparable across projects.	Ongoing
3	Next step for <b>PVA</b> : Produce a draft proposal to investigate a basic step-wise model- will include ongoing work from RPS to include assumptions so SNCBs can see what model is built from.	Fri 15 <sup>th</sup> July
4	GWFL to decide how the <b>VP survey</b> outputs can be used to inform the assessment.	Ongoing
5	Subject to actions 1-4, the <b>HRA Screening Report</b> is to be amended and re-submitted to the SNCBs.	Fri 22 <sup>nd</sup> July

**Table 2: SNCB Feedback**

Item	Note	GWFL response
1	We would recommend that this technical information should not be included in the minutes (HN).	GWFL would seek to include all relevant data/ information which formed the basis of discussions and/or subsequent actions.
2	We would recommend that this technical information should not be included in the minutes (HN).	As above.
3	<p>Further information pertaining to overfishing effort is required – within GWFL’s PER it states that there has been no indication in the fishing fleet that they will avoid the area (HN).</p> <p>Whilst we may not have ‘objected’ to this assumption during the presentation, all of these assumptions require full and detailed consideration. The assumption regarding a reduction in fishing activity seems pretty weak at this stage, but we look forward to seeing further explanation of this (SA).</p>	<p>While there may not be a current plan for fisheries to avoid the turbine areas, there will be a safety exclusion of 50m around turbines – the PER also suggests that trawlers may not use the WF area due to issues with their gear getting tangled / increased likelihood of collision with fixed structures and other vessels. Activity likely to be reduced within and LBBG collision risk reduced due to displacement of activities away from turbines and out of risk zone.</p>
4	I believe I also outlined, why I thought they were misleading (i.e. not calculated with band model) and that I believed most of the ‘avoidance rates’ quoted would be lower (i.e. closer to 98%) if calculated correctly. I also highlighted that it might be necessary to request raw data from several of these studies (SA).	Information will be reviewed to make results from other wind farms compatible with Band model. This will be enhanced from VP surveys currently underway at GGOWF and onshore.