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By email only: navitusbay@infrastructure.gsi.gov.uk

Dear Ms Wood

Application by Navitus Bay Development Limited for an Order Granting Development Consent for the Navitus Bay Wind Park, PINS reference EN 010024

RSPB reference number 10029429

Introduction

Following the Issue-Specific Hearings held in November 2014, the RSPB submitted a further representation at Deadline IV. This highlighted that the principal outstanding issue for the RSPB was the Applicant's approach to assessing impacts on gannet and their use of population viability analysis (PVA).

During the Issue-Specific Hearing on 20 November 2014, the Applicant characterised the RSPB position with respect to PVA as one essentially involving a different presentation of common results. We disputed this characterisation in our Deadline IV representation and now set out in this response, to supplement our earlier statements, further detail on the need, rationale and approach to what we consider to be the only robust method of PVA to be adopted in this case.

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The RSPB is part of BirdLife International
a partnership of conservation organisations
working to give nature a home around the world.

Our concerns regarding gannet result from information recording the use of the application area by the species during all seasons but especially during the breeding season and their known sensitivity to offshore wind farms in terms of collision risk and displacement.

Additionally, independent research involving satellite-tagging of gannet undertaken by the University of Liverpool, Alderney Wildlife Trust and the BTO has revealed that gannet from Alderney breeding colonies are using the application area¹. Breeding gannet form designated features of the Alderney West Coast and Burhou Islands Ramsar site, a site of international nature conservation importance. Assessment of potential impacts on this Ramsar site needs to be undertaken as a matter of UK policy. We set out below in detail the approach we advocate to undertake the PVA element of this assessment.

Ornithological issues

Population Viability Analysis - what it is and what it does

Population Viability Analysis (PVA) is a demographic modelling tool that encompasses a range of population modelling and estimation methods. It can be used to predict the future population levels of an animal species and as such, it can assess the impact of additional mortality on a population. A PVA assessment of impact will take account of the effect on population size of the additional mortality caused by a project for those species predicted to be affected, under different scenarios.

The method has been tested and validated in a number of cases and is one of the most widespread means of answering questions of impacts in a population context, including impacts of wind farms on birds. There is a suite of modelling techniques used under the name PVA, but the most relevant to this situation are the deterministic Leslie Matrix Models (as used by the WWT gannet PVA²), although there are other modelling techniques which could be applied. This application of PVA is

¹ Soanes, L.M., Atkinson, P.W., Gauvain, R.D. & Green, J.A. (2012) Individual consistency in the foraging behaviour of Northern Gannets: Implications for interactions with offshore renewable energy developments. *Marine Policy* **38**, 507–514. doi: 10.1016/j.marpol.2012.08.006

² WWT Consulting, RPS & MacArther Green Ltd. (2012) *Gannet Population Viability Analysis*. Strategic Ornithological Support Services (SOSS) project number: SOSS-04. WWT Consulting, RPS, and MacArther Green Ltd. report on behalf of The Crown Estate for Strategic Ornithological Support Services (SOSS), Slimbridge, UK.

particularly suitable for Habitats Regulation assessments (HRA) of breeding seabird features because:

1. It requires no assumptions to be made about future demographic rates (if the density-independent version is used).
2. Conservation objectives for designated bird features refer to population sizes, not population multiplication rates.
3. It is a specific application of PVA population modelling, which is widely understood and robustly tested, including in the peer-reviewed, scientific literature, and therefore represents “the best scientific knowledge in the field”.

Projections from a well-conducted PVA population simulation could provide the type of quantitative information on future population trend required for an informed and qualitative HRA of the effects of an intervention. This is exactly what is needed to evaluate the impact of an intervention on the conservation status of an animal population at a designated site because the *counterfactual* – what would happen with and without the intervention - can be estimated, along with the relative scale of change.

Population Viability Analysis – the Applicant’s approach and why we disagree

The implications of the revised approach to collision risk modelling (CRM) include a reduction in the predicted breeding season mortality for gannet associated with the Alderney colonies. However, the predicted increase in mortality at these colonies is still calculated to be considerably higher than 1% of background mortality (the threshold commonly used to indicate likely significant effects) both for the project alone and in combination with the Rampion Offshore Wind Park (Appendix 5.6 Navitus Bay Development Limited and Natural England Statement of Common Ground, page 22). Therefore it is appropriate to use PVA to examine the possible outcomes of the predicted mortality from this proposal both alone and in-combination with other projects.

Whilst the Applicant has used PVA to examine the impact of wind farm related mortality on this gannet population, it is unclear exactly how the mortality threshold has been derived, other than that the UK gannet PVA (WWT, 2012) was used to generate it. It seems likely that the derived threshold is simply a proportion of the total mortality threshold for the UK population (as presented in the report (WWT, 2012)) based on the size of the colonies (now) relative to the UK population (then). It is unlikely that this threshold represents an accurate reflection of the level of acceptable mortality for these colonies, as demographic rates for the UK population as a whole are unlikely to

be representative for an individual colony, and there have been recent changes in the size of both the UK population (the PVA being based on 1998-2000 data) and these particular colonies. In addition, the most informative output - the “*counterfactual of population size*” (described below) - requires a site specific PVA to be run with and without the additional mortality associated with the project.

Population Viability Analysis – what we recommend and why it is the correct approach

It is the RSPB’s opinion that the only robust approach to determining the potential effects of the project alone and in combination with other proposals (including Rampion Offshore Wind Park) on the Alderney colonies is to carry out a site-specific PVA calculating the “*Counterfactual of Population Size*” as detailed in our Written Representation (paragraphs 4.3 to 4.17). In short, we propose that the most appropriate method to inform assessment of the effects of the proposed development is to use PVA to compare expected bird population sizes, however, a standard PVA produces probabilities of specified decreases in population, which can be difficult to interpret. Therefore, we recommend modelling the future population trend with and without additional mortality attributable to the project, both alone and in-combination with other projects, at the end of the expected life of the project. We refer to this output of PVA modelling as the “*Counterfactual of Population Size*”. This metric can be calculated readily from a Leslie matrix (or similar) model with or without density dependence.

The key advantage of this approach is that such a comparison assumes comparable conditions in all respects between the population trajectory with and without the wind farm, with the exception of the additional mortality attributable to the proposed development. So it is akin to an experiment in which you hold all the factors constant except for the parameter under test – the project specific impacts.

Population Viability Analysis – how to do it

Introduction

Deterministic models, which can be either density dependent or density independent, essentially predict a future population size based on the current population size and the population growth rate. The growth rate is calculated from the demographic rates, usually via a projection matrix (such as the Leslie Matrix Model), and additional mortality, or changes in other demographic rates such as chick survival, can also be incorporated. As such, it is possible to compare expected bird population sizes with and without additional mortality, particularly that attributable to the project, at the end of the expected life of the project (i.e. 25 years).

The following colony information and demographic data are required for PVA model of the breeding colony:

Population estimate for gannet in starting year (including age distribution);

Age of first breeding;

Survival rates for various age classes; and

Estimates of breeding productivity

The survival and fecundity rates are referred to as demographic rates, and may vary according to age class within the model, where there is evidence for this. Demographic rates also may vary among individuals of a given age class, as well as in different years. The influence of external variables on demographic rates can be extremely hard to predict, notably where these influences are of anthropogenic origin, such as climate change and the influence of legislation, for example, on fisheries' discard policy. However, it may be reasonable to assume that these likely variations will apply to modelled populations equally in the presence and absence of the proposed development.

Models can be designed to include or exclude density dependence. Density dependence occurs when the population growth rate or demographic rates vary causally with population size or density. When population density is high, increased competition for resources – food, nest sites, mates etc, tends to slow or halt population growth, whilst at lower population densities competition tends to be reduced, leading to increases in population growth rates. While the inclusion of density dependence in a model can therefore be seen as desirable, the values of parameters that determine the strength and form of the density dependence are usually unknown, and there is generally a lack of empirical evidence for density dependence in seabird populations. The inclusion of density dependence can therefore increase uncertainty. As the Alderney colonies have been growing quickly over the past few years it would be safe to assume that the population is currently not density dependant, although there are indications that the rate of growth might slow as the availability of new nest locations becomes constrained.

Population estimates for the Alderney colonies

Colony size at the time of designation was 5,950 pairs based on 2000/2001 counts [HRA screening report, section 10.1.13]. This consists of 2,500 pairs at Ortac and 3,450 pairs at Les Etacs (Gannet PVA report - WWT, 2012). In 2004/2005 JNCC carried out a count and found 7,409 pairs of gannet [HRA screening report, section 10.1.13]. In 2011 Alderney Wildlife Trust counted the birds and

recorded 7,885 pairs [HRA screening report, section 10.1.13]. In other words, both colonies have been growing over the last 50+ years, and probably continue to grow, although the rate of growth may have slowed as space has become limited (Roland Gauvain, Alderney Wildlife Trust, pers. comm.).

The number of juveniles is estimated to be approximately one third of the total population = 6,626 individuals [HRA screening report 10.1.19], giving a total population in the region of 22,396 individuals. However, this figure does not include non-breeding birds. Table C1 – Designation Information [HRA screening report p.175] reports 1,000 birds in this class at designation (6% of the population) equivalent to 1,344 birds in 2011. Therefore the 2011 population stands in the region of 23,740 birds.

Survival rates for various age classes

The HRA screening report (section 10.1.19) reports that adult mortality for gannet is 8.1% per annum, whilst juvenile mortality is 70% within the first four years of life (Robinson, 2005³). However, a more detailed assessment of survival rates can be found in the gannet PVA (WWT, 2012, section 3.6), from which it is clear that there is a degree of variability in gannet survival between both colonies and seasons.

Estimates of breeding productivity and age of first breeding

No figures for breeding productivity at the Alderney West Coast and Burhou Islands Ramsar site are available in the information presented by the Applicant. Mean breeding success is reported to be 0.698 chicks raised per apparently occupied nest (WWT, 2012), but again there is a fair degree of variability between sites and from year to year. Age of first breeding is commonly accepted to be five years of age (WWT, 2012, section 3.7), although a few four year olds may also breed.

Conclusions

Sufficient data exists to carry out a site specific PVA for from the Alderney West Coast and Burhou Islands Ramsar site, and therefore it is straightforward to calculate the “*Counterfactual of Population Size*” for these colonies. There is sufficient data available on the size and age distribution

³ Robinson, R.A. (2005) *BirdFacts: profiles of birds occurring in Britain & Ireland* (BTO Research Report 407). BTO, Thetford (<http://www.bto.org/birdfacts>).

of the gannet population at these specific colonies. There may be some site specific data on productivity and survival rates available, but if such data do not exist there is a wealth of information from other sites, that may be used instead.

Monitoring

We were aware from considering the audio recording of the Issue-Specific Hearing on 20 November 2014 that the Applicant proposed discussions with the Alderney Wildlife Trust relating to monitoring of the Alderney gannet colonies. We understand that discussions have commenced.

In the light of the information on the use of the Application Area by gannet and evidence that this includes gannet associated with Alderney colonies, we consider it highly desirable to develop a monitoring programme for gannet. Such a programme should be secured by planning condition.

We recommend that monitoring at **both** the colonies and at sea (including the Application Area) will give the clearest picture of how gannet interact in and around the proposed wind park and to provide a clear understanding of any effects. The following includes parameters that should form part of a monitoring programme.

Colony based monitoring

The following parameters should be monitored within the colonies:

- Breeding birds – annual counts of Apparently Occupied Nests (AON);
- Non-breeding birds – annual estimate derived from counts;
- Productivity – annual estimates of fledging success rates; and
- Adult survival – ringing study using mark-recapture/observation of colour ringed birds [preferable to metal rings as observations can be made from a greater distance].

As the colonies are visited regularly, measurement of all of the parameters listed above is feasible, although disturbance should be minimised wherever possible. The monitoring programme will provide detailed information on changes in the key parameters (adult survival, productivity, colony size and ratio of breeding to non-breeding birds). Of course it will not give any information on causes of any changes which might be observed. For that reason it should be carried out in conjunction with a parallel *at sea* monitoring programme.

At sea (site based) monitoring

- Tagging gannet from the colonies to detect changes in behaviour

Satellite tags come with the advantage of not needing to re-capture birds or get close enough to download data, but provide too coarse a resolution for the purpose of investigating behaviour in relation to the wind park. GPS tags on the other hand, can be used to provide high resolution information on bird movements at sea, and can be used to detect macro and micro-avoidance of offshore wind farms but birds will need to be recaptured (or be in close proximity) to download data.

Neither system will give information if birds fail to return to the colonies (although satellite tags could possibly provide some useful information on fate). For this reason tagging should be undertaken in conjunction with

- ORJIP⁴ style within wind farm monitoring

The use of radar and cameras within the wind park can give valuable information on collision and avoidance of wind turbines at the micro-scale. Cameras should be able to identify gannet in a high proportion of observations and radar can be used to provide information on fluxes and more general movements in and around the wind park. Both of these technologies will provide useful information on a variety of behaviours, but radar in particular will require ground-truthing with visual or camera observations, although some information can be gained by analysing wing beat patterns. Within wind park monitoring will also give some insight into general bird movements in and around the wind park, which will be useful given the location of the site and concerns over migrating birds.

Gannet is an excellent study species for all of the techniques above. It is important that this opportunity is not lost to provide detailed information on the potential impacts on this charismatic and vulnerable species, a species for which the UK holds a key responsibility given the UK population represents over 60% of the worldwide population.

⁴ The Offshore Renewables Joint Industry Programme (ORJIP) is a joint industry project involving the Carbon Trust, the Department of Energy and Climate Change, Marine Scotland, The Crown Estate and offshore wind developers. It is currently funding a Bird Collision Avoidance Study using state of the art technology.

Overall conclusions

As we have argued in our representations throughout the Examination, the RSPB considers that the only robust way of determining potential impacts on gannet and the Alderney West Coast and Burhou Islands Ramsar site is by undertaking the PVA described above.

We also strongly recommend the development of a monitoring programme for gannet comprising land and sea based elements. This monitoring should be secured as a condition of any consent.

Yours sincerely

A handwritten signature in black ink, appearing to read 'R Henderson', with a long horizontal flourish extending to the right.

Renny Henderson

Conservation Officer