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Bhlaraidh Wind Farm extension Habitats Regulations Appraisal Appendix 6.4

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1 INTRODUCTION

MacArthur Green was commissioned by the Applicant to complete an ornithological assessment of the proposed Bhlaraidh Wind Farm extension (hereafter referred to as ‘the Proposed Development’), located on the Glenmoriston Estate, near Invermoriston, Highlands, as part of the Proposed Development’s Environmental Impact Assessment (EIA). During EIA consultation with NatureScot and RSPB Scotland, it was advised that there is potential connectivity between the Proposed Development and breeding Slavonian grebe *Podiceps auratus* populations which are qualifying features of Natura sites in the wider area (see **Table 6.1 of EIA Chapter 6: Ornithology** for details of consultation).

In Scotland, under the terms of the Habitats Regulations, a Habitats Regulations Appraisal (HRA) is therefore required in order for the competent authority to establish whether the Proposed Development would have a ‘likely significant effect’ on any Natura site, and if so, whether the proposals would have adverse effects on a Natura site’s integrity.

This report should be read in conjunction with Bhlaraidh Wind Farm extension EIA **Chapter 6: Ornithology**, and associated **Appendix 6.1, Confidential Appendix 6.2** and **Confidential Figure 6.2.2**.

2 THE HABITATS REGULATIONS PROCESS

Under the Conservation (Natural Habitats &c.) Regulations 1994 (as amended by the Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2012) (The Habitats Regulations), all competent authorities must consider whether any plan or project will have a ‘likely significant effect’ on a Natura site. In Scotland, Special Protection Areas (SPAs) are Natura sites for birds that are given legal protection by the Habitats Regulations.

The Habitats Regulations ensure that any plan or project that may damage a Natura site is assessed and can only go ahead if certain strict conditions are met, via an HRA.

If required, the competent authority must carry out an ‘appropriate assessment’ to decide whether there is enough evidence to conclude that the proposals will not have adverse effects on a Natura site’s integrity.

Regulation 48 of the Habitats Regulations indicates a number of steps to be taken by the competent authority before granting consent to a project. In order of application, the first four steps of the HRA process are:

- **Step 1.** Consider whether the project is directly connected to or necessary for the management of the designated site (Regulation 48 (1b)).
- If not, **Step 2.** Consider whether the project, alone or in combination, is likely to have a significant effect on the designated site (Regulation 48 (1a)).
- If so, **Step 3.** Make an Appropriate Assessment of the implications for the designated site in view of that designated site’s conservation objectives (Regulation 48 (1)).
- **Step 4.** Consider whether it can be ascertained that the proposal would not adversely affect the integrity of the designated site (‘Integrity Test’) having regard to the manner in which it is proposed to be carried out or to any conditions or restrictions subject to which they propose that the consent, permission or other authorisation should be given (Regulation 48 (5 & 6)).

It is straightforward to establish that the Proposed Development does not meet the criteria for Step 1. The Step 2 assessment of the likely significant effects on Natura sites in relation to the Proposed Development is presented in this report. Where likely significant effects are predicted, information to inform an appropriate assessment (Step 3) is then provided, along with consideration of whether the integrity of designated sites would be adversely affected (Step 4).

3 THE PROPOSED DEVELOPMENT

The assessment is based on the project description outlined in **Chapter 2: Proposed Development**. In relation to describing impacts on Slavonian grebe, the relevant specifications used to determine the ‘worst-case’ Proposed Development involve:

- 18 turbines with a maximum tip height of 180m and a maximum rotor diameter of 158m. Total generating capacity would be in excess of 50MW, with an indicative power output of 100.8MW.
- The construction period will last for up to 24 months, comprising a construction programme as described in **Chapter 2: Proposed Development**. The associated infrastructure will include: wind turbines, turbine foundations, crane hardstanding, access tracks, underground cabling, on-site substation and maintenance building, temporary construction compound, concrete batching plant, and permanent meteorological masts.
- Where possible, existing access roads, construction compounds and laydown areas which form part of the Operational Development would be reused, and former hydro borrow pits reopened.

4 DATA SOURCES

4.1 Desk-based Study

A desk-based study was undertaken in order to inform subsequent field surveys and constraint consideration with regards the presence of statutory designated sites and species of interest within the appropriate study area relevant to each ornithological feature (see EIA **Chapter 6: Ornithology** for details). Data sources obtained that are relevant to this HRA are:

- NatureScot Sitelink (<https://sitelink.nature.scot/home>) for designated sites;
- RSPB Scotland – provision of their Scottish Slavonian grebe breeding dataset (1970 to 2018);
- The Bhlaraidh Wind Farm (Operational Development) Environmental Statement (ES) (baseline survey data from 2009 to 2012), pre-construction survey report from 2015 and post-construction monitoring in 2018; and
- Relevant ornithological information presented in ESs, EIA Reports, Technical Reports etc. for other nearby wind farm projects.

4.2 Field Surveys

Ornithological fieldwork for the Proposed Development commenced in October 2018 and was completed in August 2020, and comprised the surveys listed below (see EIA **Appendix 6.1 Annex B** for methodologies and **Annex C** for survey effort details; and **Figure 6.5** for survey areas).

- Flight activity surveys: October 2018 to August 2020.

- Scarce breeding bird surveys: February to August 2019 and February to August 2020.
- Black grouse surveys: April/May 2019.
- Breeding bird surveys: April to July 2019 and May to July 2020.
- Winter walkover surveys: November and December 2018, February and November 2019, January and February 2020.

5 DETERMINATION OF LIKELY SIGNIFICANT EFFECTS

NatureScot guidance (SNH, 2016ⁱ) helps identify connectivity between development proposals and SPAs, and therefore determination of likely significant effects (following Step 2 of the HRA process outlined in section 2). It provides a method for removing from the HRA those Natura sites which clearly have no connectivity to a development, or those where it is very obvious that the conservation objectives for the site's qualifying interests will not be undermined despite a connection.

The process is based on consideration of the distances that some species may travel beyond the boundary of their SPAs for dispersal and foraging. Information is provided on key species' core and maximum foraging ranges, with the former value recommended for use in determining connectivity. Of the species listed, the largest core foraging range presented is for geese species during the non-breeding season, which can range 15-20km. As such, it was determined that screening for Natura sites for other species can be based on a 20km range from the Proposed Development Site.

Table 6.4.1 Determination of Likely Significant Effects based on foraging range connectivity

SPA	Distance to Site	Qualifying interests (all breeding)	Core foraging range (SNH, 2016 ⁱ)	Likely Significant Effect
Loch Knockie and Nearby Lochs	6.7km south	Slavonian grebe	Not given	Yes
		Common scoter	Not given	No
North Inverness Lochs	7.7km northwest	Slavonian grebe	Not given	Yes
Glen Affric to Strathconon	7.9km northwest	Golden eagle	6km	No
West Inverness-shire Lochs	15.4km west	Black-throated diver	<10km	No
		Common scoter	Not given	No
Loch Ruthven	19.7km east	Slavonian grebe	Not given	Yes

Based on the evidence presented, it can be reasonably concluded that there would be No Likely Significant Effects on the Glen Affric to Strathconon SPA (golden eagle population) or the West Inverness-shire Lochs SPA black-throated diver population.

Slavonian grebe is not included in the NatureScot guidance, but a Likely Significant Effect has been concluded for the Loch Knockie and Nearby Lochs SPA, North Inverness Lochs SPA and Loch Ruthven SPA based on consultation responses and what is known about the species' behaviour, where longer distance flights between breeding lochs and on migration may take place at particular times of the year (see Section 6.4 for details).

For common scoter, no ranging values are available. Evidence however suggests that there is no connectivity with the Proposed Development Site and the Loch Knockie and Nearby Lochs SPA and West Inverness-shire Lochs SPA populations for the following reasons:

¹ <https://www.nature.scot/sites/default/files/2017-07/A303080%20-20Bird%20Breeding%20Season%20Dates%20in%20Scotland.pdf>

- No records of common scoter were made within the Site or wider study areas (out to at least 4km in some previous years) during baseline surveys in 2018 to 2020, or during the baseline, pre-construction and operational monitoring surveys for the Operational Development, from 2009 to 2018.
- The species (at least females) has been shown to have high levels of site fidelity to breeding lochs (Carboneras and Kirwan, 2020ⁱⁱ), and with only a small number of known breeding sites in Scotland, it is unlikely that the Site currently, or in the recent past, has hosted any birds.
- Feeding during the breeding season is most likely to take place on breeding lochs, at least for females, and so breeding season flights are likely to be local to the nest site. With the closest SPA 6.7km away, this is likely to be beyond foraging range.
- With no records near the Site, it is very unlikely that migrating common scoters would be at risk of collisions or barrier effects due to the Proposed Development when heading to and from coasts at the start and end of the breeding season. Any long movements are likely to follow natural features such as Loch Ness rather than over hills.

6 INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT

6.1 Slavonian Grebe - Baseline Conditions

Slavonian grebe is a migratory species throughout its range, and in Scotland pairs breed on a wide variety of lochs in Scotland, from eutrophic lochs at lower altitudes to oligotrophic upland lochs (Summers *et al.* 2011ⁱⁱⁱ). Breeding distribution is mainly north and south of the Great Glen, with some pairs found in Strathspey. In winter birds leave their breeding lochs and are found around UK coasts with the Moray Firth, the Firth of Forth and the Clyde Estuary hosting important numbers. Within the context of the Proposed Development, risks to the species, and therefore SPA populations, exist during the breeding season only (May to mid-September, as per NatureScot guidance on breeding seasons¹) when birds may be present in the wider area.

As well as baseline survey results from 2019 and 2020, and Operational Development survey results from 2009 to 2018, information on Slavonian grebe was obtained from RSPB who provided a copy of their dataset on breeding locations across Scotland, from 1970 to 2018.

During baseline surveys in 2019, a Slavonian grebe pair (SZ_1) was recorded on a lochan outside of the Site but within the 2km study area (see **Confidential Figure 6.2.2** for details). One chick was successfully fledged. In 2020 the lochan was again occupied by a pair but it was likely that the breeding attempt failed.

A pair (SZ_2) was also recorded on a loch to the east, over 2km from the site in 2019. This site was not checked in 2020 as it was outside of the final study area.

A third loch (SZ_3) within the 2km study area buffer had a pair present in 2020, but breeding could not be confirmed.

In 2011, three pairs of Slavonian grebes were recorded nesting within the Operational Development's wider survey area. The nearest was around 2km from the Site, with another pair located on a loch close to that

occupied by SZ_2 in 2019, and a third around 8km from the Site. There were no records of the species during monitoring in 2015 or 2018.

The historic Slavonian grebe dataset provided by RSPB Scotland provided one further probable breeding location (from 2016) within the 2km study area buffer, and another one (from 2004) close to the location of the pair recorded at the 2km buffer distance in 2011. Probable breeding was also recorded in the area around SZ_2, in years up to and including 2018. When viewing the whole dataset in the wider Highlands area it is evident that breeding locations run in an arc from north of the site to the southeast of the site, with breeding records absent from the Site and to the west (**Confidential Figure 6.2.2**).

6.2 Identified Impacts

Based on the information on the Proposed Development presented in section 3, and the results of various surveys presented above, the following identified potential impacts on Slavonian grebe are:

- displacement/barrier effects – disruption to flights or avoidance of habitat due to the presence of operational turbines, causing increased energy expenditure and reduced fitness, survival or productivity;
- collision risk: death or injury through collision with turbines; and
- in-combination effects of the Proposed Development with other projects.

6.3 Conservation Objectives

In order to conduct the appropriate assessment under Step 3 of the HRA process, it is necessary to ascertain whether the Proposed Development would not adversely affect the integrity of a Natura site ('Integrity Test'). NatureScot advises that “*There are no concrete rules about what constitutes ‘no adverse effect on site integrity’.* Each case should be judged on its own merits”².

To establish the effect of the Proposed Development on the integrity of a Natura site, it is necessary to consider the relevant Conservation Objectives of the SPAs which may be affected:

1. To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
2. To ensure for the qualifying species that the following are maintained in the long term:
 - a. Population of the species as a viable component of the site;
 - b. Distribution of the species within site;
 - c. Distribution and extent of habitats supporting the species;
 - d. Structure, function and supporting processes of habitats supporting the species; and
 - e. No significant disturbance of the species.

As the Proposed Development does not overlap with any SPA, Conservation Objectives 2(b), 2(c) and 2(d) are not considered relevant. For objectives 1 and 2(e), whilst there is no possibility of ‘disturbance’ to breeding Slavonian grebes in a direct sense, this is covered by displacement or barrier effects relating to birds in flight to

and from SPAs. For objective 2(a), the effects on the SPA populations relate primarily to collision risks but may also include more subtle influences of displacement or barrier effects on productivity or survival rates.

6.4 Assessment of Impacts

6.4.1 Impact 1: Displacement and Barrier Effects

Slavonian grebes mainly nest on lochs where there are beds of bottle sedge *Carex rostrata*, and show preference for lochs with small fish, clear water, and shoreline trees (Summers *et al.* 2011ⁱⁱⁱ). Although some lochs are used each year (e.g., Loch Ruthven SPA), many are used only on occasion without any clear reasons why some are abandoned. No Slavonian grebes were observed using waterbodies within the Site during the baseline survey period, and no flights were recorded during any survey. When considering all historic data (**Confidential Figure 6.2.2**), the closest known breeding loch, which was active in 2019 and 2020, is approximately 650m from the nearest proposed infrastructure, and it is unlikely that under current conditions, any breeding would take place closer to, or within the Site in future years.

There is a lack of evidence to be able to determine at what distance Slavonian grebes may be subject to displacement from nest sites due to operational turbines or other infrastructure, but based on the estimated upper limit of human disturbance distances given by Ruddock & Whitfield (2007^{iv}) being 300m, and Summers *et al.* (2011ⁱⁱⁱ) recording a mean distance of occupied lochs from houses and roads of 450m and 375m respectively, it is can be reasonably concluded that no breeding Slavonian grebes would be affected by the presence of operational turbines if the closest loch is c.650m distant.

Although no nesting behaviour is likely to be affected, it was raised during consultation by RSPB and NatureScot (see **Table 6.1** of EIA **Chapter 6: Ornithology**) that there is a possibility that birds may on occasion fly across the Site, and as noted by RSPB, Slavonian grebes can move between lochs in March/April before they settle down on one to breed. It is also possible that birds may undertake more substantial movements from lochs after breeding has ceased.

Slavonian grebes fly relatively infrequently and at night and so it is very difficult from surveys to be able to accurately determine the level of activity across the Site. The most likely risk is that associated with collisions with turbines (see Impact 2: Collision Risk below) but it is also possible that displacement / barrier effects caused by the Proposed Development may exist. This would potentially increase the duration of individuals’ flights between lochs and impact on fitness. The RSPB Slavonian grebe dataset shows that the large majority of known nesting lochs are to the east of the Site (**Confidential Figure 6.2.2**), with those to the west and northwest showing no signs of occupancy in the 21st century, bar one around 10km west which was occupied in 2018. Based on the current distribution of breeding lochs in relation to the Site, it is therefore considered very unlikely that the Proposed Development would provide a substantial barrier to movement between lochs. In the unlikely event of a bird in flight being displaced around the turbines, in relation to the overall flight distance required to reach the nearest lochs to the west, the increase in overall duration would not be significant enough to affect fitness levels, particularly if only undertaken once or twice during the breeding season.

²<https://www.nature.scot/professional-advice/planning-and-development/environmental-assessment/habitats-regulations-appraisal-hra/habitats-regulations-appraisal-hra>

Overall, based on the available information, it can be reasonably concluded that Conservation Objectives 1 or 2(e) relating to disturbance to qualifying features would not be compromised and thus there would be no adverse effects on integrity of any SPA due to the presence of the Proposed Development.

6.4.2 Impact 2: Collision Risk

No Slavonian grebe flights were recorded during any surveys for the Proposed Development or the Operational Development, and consequently no CRM has been undertaken for this species. With the closest breeding loch likely to be around 650m from the nearest proposed turbine location, it is considered very unlikely that a collision risk exists for birds on short daily feeding flights to and from the nest. As suggested by consultees, any risk of collisions is likely to be restricted to when birds undertake longer flights either on migration to and from wintering areas, or at the start of the breeding season when birds may move between lochs prior to nesting. Although no flights were recorded during baseline surveys, this is not unexpected because movements are more likely to take place during hours of darkness, and coupled with the small size of birds, observations are unlikely. The risk of collisions must therefore be considered on a qualitative basis due to these survey limitations.

As discussed earlier, the Site lies at the western end of a part of the Highlands, around the Great Glen, which is a stronghold for the species, encompassing designated sites for the species such as Loch Knockie and Nearby Lochs SPA and North Inverness Lochs SPA. **Confidential Figure 6.2.2** shows that since 1970 there are only three known lochs to the west of the Site where birds have previously been recorded during surveys, one most recently in 2014, with the other two most recently occupied in 1985 (the closest being 10km away from the occupied loch SZ_1 in 2019 and 2020). This suggests that the frequency of early season flights between lochs that would cross the Site is likely to be very low, or zero.

Little is known about the migratory movements of the Slavonian grebe *arcticus* sub-species which breeds in northern Scotland (e.g., Wright *et al.* 2012^v) although the large majority of ringing recoveries in Scotland have been local to where most birds were ringed (Robinson *et al.* 2020^{vi}). The BTO Bird Atlas³ shows a winter distribution around much of Scotland's coastline but the BTO's Wetlands Bird Survey Report (Frost *et al.* 2020^{vii}) shows relatively high numbers in the Moray, Beaully and Cromarty Firths to the east of the Site, and it more likely the case that birds breeding within the Great Glen area move to these areas at least on the first stage of their migration route during winter, rather than heading west. If so, then the likelihood of migratory flights across the Site is low, with local birds also more likely to follow natural features such as river valleys and Loch Ness, rather than crossing more mountainous areas such as the Site.

Evidence therefore suggests that the annual frequency of flights through the Site is very low, if any do occur at all. If such flights did take place, scientific studies have shown that despite occurring in hours of darkness, the probability of collision is likely to be small because of the behaviour of the species in flight. A scientific expert review for the Druim Ba Wind Farm Environmental Statement (ES) suggested that Slavonian grebe flights are typically of low altitude, and it was shown that reported fatalities of grebes and morphologically similar species due to wind farms in Europe and North America were relatively rare.

ⁱ SNH (2016) Assessing Connectivity with Special Protection Areas (SPAs). Scottish Natural Heritage.

ⁱⁱ Carboneras, C. and G. M. Kirwan (2020). Common Scoter (*Melanitta nigra*), version 1.0. In *Birds of the World* (J. del Hoyo, A. Elliott, J. Sargatal, D. A. Christie, and E. de Juana, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bow.blksco1.01>

³ <https://app.bto.org/mapstore>

The Druim Ba Wind Farm lies within 2km of the North Inverness Lochs SPA, and centrally within the core breeding distribution of the Scottish Slavonian grebe population (**Confidential Figure 6.2.2**), rather than at the edge where the Proposed Development would be situated. As part of the ES, theoretical collision risk modelling undertaken specifically in relation to Slavonian grebes predicted that under the existing situation (in 2010) there would be no flights through the wind farm, and consequently the collision rate would be zero. A worst-case model, based on historic distribution, and an assumption that birds do not fly at random within the airspace, predicted at most one collision every 140 years.

As the Proposed Development Site lies in an area more sparsely populated by breeding Slavonian grebe than around Druim Ba Wind Farm, it can be reasonably concluded, that taking the results of the theoretical collision modelling for that project as a basis for understanding risks associated with the Proposed Development, it is very unlikely that there would be a collision during the lifespan of the wind farm.

As such, it can be reasonably concluded that there would be no adverse effects on integrity for any SPA population due to collision risk.

6.4.3 Impact 3: In-combination Effects

NatureScot advises that a plan or project should be considered “*in-combination with the effects of other plans and projects on the same Natura site. This is to check whether an effect that would not be significant, or likely, on its own might become significant, likely, or both when checked in combination with the effects of other proposals*”⁴.

This test must consider both:

- the potential effects of other plans published for consultation and projects seeking consent; and
- any ongoing negative effects of completed plans or projects.

In relation to the Proposed Development, the information presented above on displacement/barrier effects and collision risk suggests that the project would contribute a negligible, or no impact on the Slavonian grebe SPA populations, within an in-combination context with other wind farm developments. In most cases, wind farm projects are likely to be located in hilltop areas similar to the Proposed Development Site, and therefore away from natural features used by Slavonian grebes to navigate on longer flights. Because of this the in-combination effect of wind farms is unlikely to have an adverse effect on integrity of any Slavonian grebe SPA population.

7 CONCLUSION

Based on the information provided above, it can be reasonably concluded that within the context of impacts on Slavonian grebe, no SPA Conservation Objective would be compromised due to the Proposed Development, and no adverse effect on integrity of any SPA would result, either alone or in-combination with other projects.

ⁱⁱⁱ Summers, R.W., Mavor, R.A., Hogg, S. & Harriman, R. (2011) Lake characteristics and their selection by breeding Slavonian Grebes *Podiceps auritus* in Scotland, *Bird Study*, 58:3, 349-356, DOI: 10.1080/00063657.2011.585630

^{iv} Ruddock, M. & Whitfield, D. P. (2007). A Review of Disturbance Distances in Selected Bird Species, A report from Natural Research (Projects) Ltd to Scottish Natural Heritage.

⁴<https://www.nature.scot/professional-advice/planning-and-development/environmental-assessment/habitats-regulations-appraisal-hra/habitats-regulations-appraisal-hra-likely>

^v Wright, L.J., Ross-Smith, V.H., Massimino, D., Dadam, D., Cook, A.S.C.P., and Burton, N.J.K. (2012). Assessing the risk of offshore wind farm development to migratory birds designated as features of UK Special Protection Areas (and other Annex 1 species). The Crown Estate Strategic Ornithological Support Services (SOSS) report SOSS-05. BTO and the Crown Estate.

^{vi} Robinson, R.A., Leech, D.I. & Clark, J.A. (2020). The Online Demography Report: Bird ringing and nest recording in Britain & Ireland in 2019. BTO, Thetford (<http://www.bto.org/ringing-report>, created on 10-September-2020)

^{vii} Frost, T.M., Calbrade, N.A., Birtles, G.A., Mellan, H.J., Hall, C., Robinson, A.E., Wotton, S.R., Balmer, D.E. and Austin, G.E. 2020. Waterbirds in the UK 2018/19: The Wetland Bird Survey. BTO, RSPB and JNCC, in association with WWT. British Trust for Ornithology, Thetford.