EARTH ACTIVE
BESPOKE ESG ADVISORS

JSC WINDPOWER

Supplementary Avifauna Analysis and Action Plan

08 May 2024

Creating Sustainable Value

Certified B Corporation

Document control

Role	Name	Date	Signature

Disclaimer

This document entitled **Supplementary Avifauna Analysis and Action Plan** was prepared by Earth Active Ltd ("EA") for the account of **JSC Windpower** (the "Client") with all reasonable skill, care and diligence within the terms of the Appointment and with the resources and manpower agreed with the Client. Unless EA has expressly agreed otherwise, this document must not be used, or relied upon, by any third party and EA disclaims all liability for any such use or reliance. This document should be used only in its complete form, including any disclaimers, without modification. This document is based on current conditions (such as environmental, regulatory or policy conditions) at the time it was prepared, and EA is not responsible for updating it to reflect subsequent changes in those conditions or advising the Client on their impact. This report has been prepared based on the information reasonably available during the project programme. All information relevant to the scope may not have been received. EA has not undertaken a complete verification of any data and information provided to it by the Client or any third party, is entitled to rely on those inputs, and is not responsible for the accuracy, correctness, completeness or fitness for purpose of those inputs or any outputs based on them. Unless expressly identified otherwise, EA has not consulted with funders or other interested third parties. Even if such consultation has taken place, EA cannot guarantee that the contents of this document will be accepted by funders or other interested third parties. EA is an environmental consultant, and this document does not constitute legal, financial or investment advice. The Client is recommended to seek further specialist advice where applicable and is responsible for its own investment decisions.

Contents

Executive Summary

Earth Active (EA) have produced this report on behalf of JSC Wind Power (100% subsidiary of Peri LLC) with regard to the development of a 206 MW wind power plant near Ruisi, Georgia (hereafter, referred to as 'the Project').

This report reviews the pre-existing Project ornithological information, identifies information needs against good practice guidance, such as NatureScot (formerly Scottish Natural Heritage, (SNH)) and EBRD's Performance Requirement 6, and recommends key actions to address these information needs as required by the Project's Environmental and Social Action Plan (ESAP).

The pre-existing Project ornithological information (ESIA, available survey reports, and additional summaries from the lead surveyor) gives an overview of the 2021/22 fieldwork results. These state that the Site is outside key migratory corridors and the total numbers and flock size of migrating target species is significantly less than those observed at the main or secondary fly-ways within Georgia. Subsequently, within the ESIA, the importance of the study area from the ornithological point of view is concluded to be "low" (ESIA, p.356).

Following a review against good practice guidelines[4567], EA has identified a number of information needs in the data collection methods, collision-risk modelling, and impact assessment. As a result, whilst EA is of the opinion that the Site is unlikely to present high-risk to birds, and bird impacts could be managed through appropriate good practice mitigation (e.g. site-specific switch-off mechanism and post-collision monitoring), further information is required to confirm this.

To that end, Spring 2024 surveys are ongoing (initial findings are presented in Appendix A[1]) to provide further indication of the regular presence of sensitive bird species (e.g. Critical Habitat or Priority Biodiversity Feature-qualifying species). In addition, collision-risk modelling is proposed (June 2024) which will give a clearer picture of the potential impacts (and requisite mitigation measures) to any such bird species.

A full year of further surveys is recommended prior to windfarm operation to cover the full seasons of an annual bird life-cycle, and a number of additional actions are also proposed to supplement the pre-existing Project ornithological information. Depending on the results and availability of additional information (e.g. from Spring 2022), a second year may be required to account for natural variability across seasons and years.

Short-term actions include obtaining and reviewing additional information from the Spring 2022 report, as well as obtaining independent stakeholder opinions as part of the consultation

1 It is important to note that these do not yet comprise a full Spring survey. Survey works will need to be ongoing and further survey work is planned for May 2024. The results have therefore not yet been analysed and interpreted as part of this report. They are provided only to demonstrate progress and to give an initial indication of birds present on Site.

process (e.g. academic, local groups or NGOs). Longer-term actions include carrying out the aforementioned collision-risk model following the results of the Spring 2024 surveys.

As written, the draft ESAP will commit the Project to incorporate a site-specific switch-off mechanism into the final Project design, should this be identified as a requirement based on the findings of the Spring 2024 surveys and collision risk modelling. Globally, site-specific switch-off mechanisms have proven effective in mitigating bird impacts when designed by suitably qualified experts with careful consideration of the landscape and local bird populations. However, it is important to note that the effectiveness of such a mitigation strategy within the Project's context is not certain until the previously stated additional actions have been completed. At such time, should it be considered that a site-specific switch-off mechanism would not prove to be effective, the Project will be required to implement a follow up set of measures designed specifically to generate no net loss and/or net gain outcomes for birds (as required).

1 Introduction

1.1 Background

This Supplementary Avifauna Analysis and Action Plan has been prepared by Earth Active (EA) on behalf of JSC Wind Power (100% subsidiary of Peri LLC) and relates to the development of a 206 MW wind power plant near Ruisi, Georgia (hereafter, referred to as 'the Project'). The Site is shown on the Location Plan in Figure 1. At the time of issuing this report, JSC Wind Power is seeking international finance for the Project.

1.2 Site Context

The Project covers an area of approximately 13,000 ha within a perimeter of more than 45 km, with a total planned capacity of 206 MW. The Project is partly located at the ridge north of Ruisi at elevations of between 657 to 845 m above sea level. This area offers the best wind resources due to specific terrain hypsometry and elevation. Other clusters of the Project are located in agricultural fields around Dzevljari and Sakasheti villages. Based on publicly available aerial photography and topographic information, the Site is predominantly flat, with minor hills to the south-east, and dominated by agricultural land.

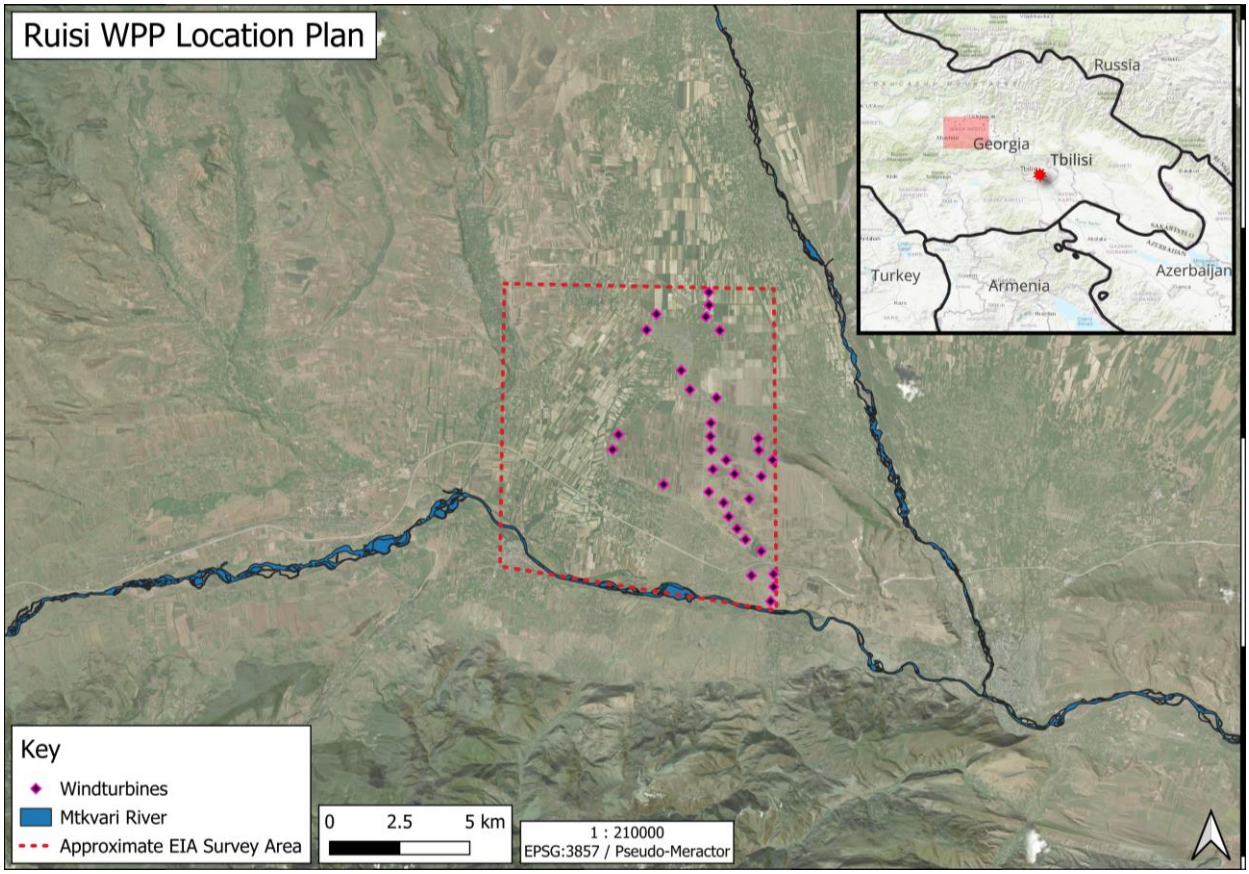

Figure 1: Location Plan of the Site which is predominantly flat, with minor hills to the south-east, and dominated by agricultural land.

1.3 Proposed Development

The Project will enhance Georgia's power reliability and provide a significant contribution to the country's energy independence. By bolstering domestic power production, it aims to diminish Georgia's reliance on imported energy.

As of 2024, the Project consists of 33 wind turbines (reduced from 46 wind turbines assumed as a benchmark for the 2023 Environmental Social Impact Assessment (ESIA)). Each wind turbine is expected to produce 6.25 MW, have a hub height 105 m and rotor diameter of 171m (compared to 4.5 MW and hub height of 150m assumed as a benchmark for the 2023 ESIA).

1.4 Scope of Report

During the lender Environmental and Social Due Diligence (ESDD) process, a number of potential information needs were identified in the pre-existing Project's ornithological information. EA have been contracted to confirm this against good practice guidance, such as NatureScot (formerly Natural Heritage, (SNH)[2]) and EBRD's Performance Requirement 6[3], and recommend key actions to address these information needs as required by the Project's Environmental and Social Action Plan (ESAP).

This Supplementary Avifauna Analysis and Action Plan is the result of the assessment, which followed three stages:

1. **Evidence gathering**: bird survey information, impact assessment and supplementary reporting was collated and summarised;
2. **Information needs**: the evidence was reviewed against good practice guidelines[4][5][6][7], including an assessment of data collection methods, collision risk modelling and subsequent impact assessment; and,
3. **Action plan**: recommended actions have been identified to address information needs and comply with good practice guidelines.

---

2 Scottish Natural Heritage (SNH) changed its name to NatureScot in 2020, and some of its guidance documents have not yet been re-branded to the new organisational name. For avoidance of doubt, guidance published under the name SNH and NatureScot originate from the same organisation.

3 Available at: https://www.ebrd.com/downloads/about/sustainability/ESP_PR06_Eng.pdf

4 NatureScot pre-application guidance for onshore wind farms

5 NatureScot Guidance - Assessing the significance of impacts on bird populations from onshore wind farms that do not affect protected areas.

6 Scottish Natural Heritage. Recommended bird survey methods to inform impact assessment of onshore wind farms.

7 Scottish Natural Heritage Guidance Windfarms And Birds: Calculating a theoretical collision risk assuming no avoidance action.

2 Pre-existing Project Ornithological Information

A series of five ornithological surveys were undertaken for the Project between October 6, 2021 and September 27, 2022. These are reported in a number of documents including:

- detailed survey reports for Autumn 2021, Winter 2022 and Summer 2022;
- the Project ESIA report (October 2023) which includes a summarised ornithological baseline;
- a summary report entitled the 'Main Results of the Study of Ornithological Situation and Ornithological Monitoring' issued by the lead surveyor in November 2022; and
- summary comments from the same author regarding collision-risk modelling (undated).

The lead surveyor, and author of relevant sections of the above reports, Dr. A. Abuladze, is an academic ornithologist based at the Institute of Zoology, Ilia State University. He has authored recent publications on the status of the birds of prey and owls in nearby areas (at the Kvernaki Ridge) and undertook ornithological surveys in 2016-2018 at a nearby wind farm. The November 2022 summary report includes a baseline description based on the author's own experience as well as results of the surveys.

Bird migration occurs year-round in Georgia with distinct spring and autumn passages. The migratory flyways are linked to natural features such as the Black Sea coastline (Batumi), river valleys (Enguri, Khobistskali, Rioni, Mtkvari and their tributaries), and mountain ranges as shown below in Figure 2. *The Site is not considered to be directly on any these major migratory routes*. Mtkvari river is found approximately 1km to the south, however, this is a secondary migratory flyway only (ESIA, p.357) (see Figure 1).

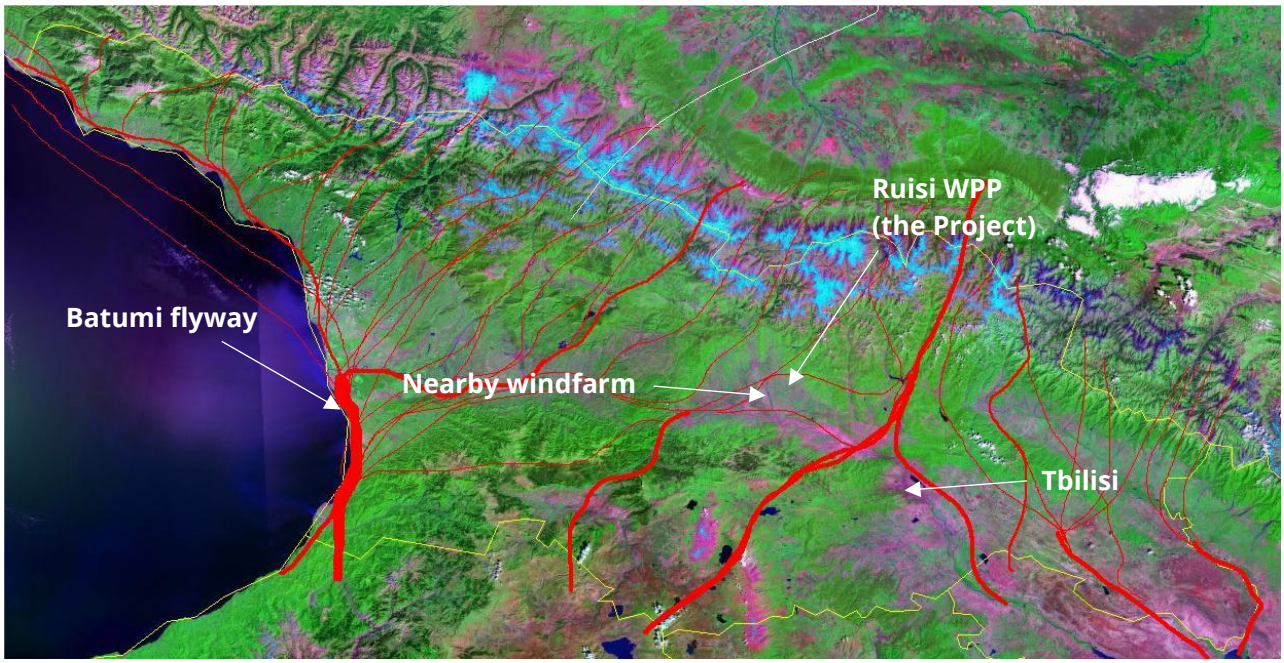

Figure 2: Migratory flyways across Georgia. Adapted from figure 6 39 in the ESIA. The Site is not on major migratory routes and is approximately 25km from a nearby wind farm .

The study area within the ornithological surveys is approximately 13,000ha. A combination of vantage point surveys (1-4 vantage points), transect surveys by foot and car, and use of playbacks for nocturnal surveys are reported in the ESIA.

Some 96 species of birds were recorded during the ornithological surveys (ESIA, p.257). Of these, 37 were target species which are described as 'all birds of prey, owls and quail' in the November 2022 summary report. The ESIA states that 16 target species, including Black kite *Milvus migrans*, Common buzzard *Buteo buteo*, and Sparrowhawk *Accipiter nisus*, were observed in numbers above ten individuals for the full season of observation, and all others were recorded as rare solitary visitors in the project area (ESIA, p.258).

The ESIA also reports that some significant seasonal variation was recorded during the ornithological surveys. For example, in autumn, activity pulses of migratory birds were observed, with '300 … 400' target species individuals per day, of which '50 - 150 individuals [were] flying directly into the risk zone' (ESIA, p.359). For comparison, at the world-renowned Batumi flyway on the coast, numbers can surpass 100,000 raptors on peak days, and on an average day in September at least 20,000 birds of prey may be recorded[8].

The ESIA therefore concludes that, based on the results of the ornithological surveys, the importance of the study area from the ornithological point of view should be classified as "low" (ESIA, p.356). It goes on to state that the Project was assessed to have no 'serious negative impact on the avifauna' during construction and operation.

[8] Batumi Raptor Count. Available at: https://www.batumiraptorcount.org/data

3 Information Needs and Recommended Actions

A review of the pre-existing Project ornithological information against good practice guidelines[4567] has identified a number of information needs in data collection methods, collision-risk modelling, and impact assessment. These information needs are described further below with recommended actions to address them. If achieved, the actions should allow the Project to provide confidence in the ESIA conclusion that the Site is unlikely to be high-risk to birds.

3.1 Data Collection Methods

3.1.1 Information Needs

Selection of Priority Species

The list of priority species is broadly what would be expected, with the majority of birds recorded designated as 'Least Concern' (LC) in the species list. It is however, unclear which classifications were used and it is recommended that the classification from the following sources be used to set the priority species for the Project: European red list of birds (Birdlife International 2021), IUCN Red List, and Georgian National Red List.

Duration of Survey Period

NatureScot '*recommends to survey for a minimum of two years to allow for variation in bird use between years*' and that "*when other adequate site-specific information on birds is available and not older than 5 years this may be used instead of specifically commissioned new bird surveys*"[6] [3.5 Duration of Survey Period, p.10]. In the absence of additional information and subsequent justification, the current (one year) data does not align with this guidance.

NatureScot state *"individual elements of the survey programme should not be split over different years"*[6] [3.5 Duration of Survey Period, page 11]. However, the Autumn 2021 and Autumn 2022 survey seasons were in differing periods (October in 2021 and September in 2022) and used different methodologies, including number and location(s) of vantage points employed.

Timing of Survey Visits

NatureScot states that fieldwork '*should be based around the times when birds are likely to be most active*'[6] [3.4 Timing of Survey Visits, p.10] to account for natural variability and pulses in activity. This can be high in Georgian migratory seasons. For example, at the world-renowned Batumi flyway on the West coast, numbers can surpass 100,000 raptors on peak days, and on an average day in September at least 20,000 birds of prey could be recorded[9].

In accordance with good practice guidelines, surveys were timed to coincide with each season from Autumn 2021 to Autumn 2022, however, they were carried out over short, intensive

9 Batumi Raptor Count. Available at: https://www.batumiraptorcount.org/data

periods. As a result, there are durations of over a month during which there were no observations four times a year. Since different species can migrate at different times, some, such as Black kite at the end of August, could be missed altogether if the timing of the fieldwork did not coincide with their migration.

Transect Surveys

Transect surveys were carried out consistent with NatureScot methodology. However, the data recorded has not been geographically referenced, meaning that the location of birds in relation to habitat types that would be lost or modified during the construction process cannot be assessed. This limits collision-risk modelling and detailed design of a site-specific switch-off mechanism. Data should be presented as overlays of species presence on a map of habitat type, and each transect should include its length, duration, starting and end times, as well as the position and duration of all stops to scan the surrounding areas for target species should be uniformized throughout the study design.

Vantage Point Surveys

While the ESIA report indicates that the vantage point survey methodology employed in the study follows NatureScot guidance, there are a number of deviations from the recommended methods.

During Autumn 2021, observations were made from a single vantage point at distances spanning 4-5km, with a field of view exceeding 180 degrees. NatureScot advises the survey area should be designed '*such that no point is greater than 2km from a vantage point*' and recommends an arc of '*up to 180 degrees*'[6] [3.8.4 Vantage Point Watch Location, p.16]. While additional vantage points were utilised during other survey periods, the specifics regarding observation range or arc of view resulting from these supplementary viewpoints remain unclear. Good practice advocates for the consistent use of the same viewpoints throughout a study, which was not adhered to in this case. Given the 2 km observation distance limit, EA considers the utilization of only 1-4 vantage points insufficient to adequately cover the study area and supplementary work should be undertaken. Furthermore, a viewshed plan would be expected for each vantage point, delineating the total observable area from the lowest point of the turbine blade swept area, however, this is not available in the reporting.

The prescribed vantage point survey methodology by NatureScot advocates a combination of focal individual sampling and activity summaries. Focal individual sampling entails selecting and tracking a bird within the observation area, recording its movements and altitude changes. This method enables the mapping of bird locations in relation to turbine positions. Additionally, good practice recommends conducting total activity estimates during vantage point surveys, involving a 5-minute scanning period across the viewshed to count all observed individuals. This data, combined with altitude proportions obtained from focal individual sampling, informs collision risk models, yet it was not collected in this instance, hindering a thorough collision risk assessment.

Good practice requires that survey staff must be suitably qualified and experienced, with subsequent checks to ensure data comparability among different observers. The lead surveyor is a leading academic ornithologist in Georgia, but the expertise of his survey team is unclear from the EIA. NatureScot stipulates '*not more than 3 hours continuous duration*'[6] [3.8.7 Vantage Point Watch Durations, p.18] to mitigate observer fatigue, but many vantage point surveys exceeding five hours. This is amplified in absence of documentation confirming surveyor qualifications and experience.

3.1.2 Actions to Address Information Needs

Additional Surveys in Accordance With Guidance

Further surveys have been commissioned to cover the latter half of the Spring 2024 season. This is being led by a suitably qualified ornithologist with extensive experience designing survey methodologies according to NatureScot guidance.

Some initial findings from the Spring 2024 survey are presented in Appendix A. It is important to note that these do not yet comprise a full Spring survey. Survey works will need to be ongoing and further survey work is planned for May 2024. The results in Appendix A have therefore not yet been analysed and interpreted as part of this report. They are provided only to demonstrate progress and to give an initial indication of birds present on Site.

Ultimately, a full year of further surveys is recommended before the windfarm starts operations which covers the relevant seasons of an annual bird life cycle: wintering, pre and post-breeding migrations, breeding and post-breeding dispersal. Depending on the results and availability of additional information (e.g. from Spring 2022), a second year may be required to account for natural variability across seasons and years.

Obtaining Supplementary Data

In addition to further surveys, additional data should be obtained and reviewed to supplement the pre-existing Project ornithological information. This includes:

- the Spring 2022 survey report produced by Dr. Abuladze; and,
- pre-existing data from independent suitably qualified experts and stakeholders, including [NGOs, academics, local groups]

Together, this additional data should be used to confirm the ESIA bird collision risk assessment that importance of the study area from the ornithological point of view should be classified as "low" (ESIA, p.356), and the Project is likely to have no 'serious negative impact on the avifauna' during construction and operation.

Furthermore, this other site-specific information may be adequate to support a potential justification in the future with regard to commissioning further surveys. However, this would need to confirmed with the results of further surveys.

Finally, NatureScot recommends that for proposals greater than 50MW '*a comparable control or reference site is selected and surveyed at the time of the initial surveys*"[6] [3.6 Control and Reference

Sites, page 11]. While the additional information is unlikely to provide this control in itself, it may nevertheless support the identification of a suitable reference site which can be used to inform the design of a site-specific switch-off mechanism and post-construction monitoring programme.

3.2 Collision Risk Modelling

3.2.1 Information Need

The ESIA includes minimal collision risk modelling, the rationale and justification for which are provided within the main text and separate summary comments from the same author regarding collision-risk modelling (undated). As provided in the ESIA, this lacks quantitative data from field observations (e.g. flight heights across seasons). Moreover, without detailed methodologies or data-driven evidence, it relies solely on professional judgement and does not align with NatureScot's guidelines[7]. This has been justified based on limited technical details available from the design of the wind turbines, yet, established industry standards would indicate that there may in fact have been sufficient preliminary information for an initial quantitative analysis using preliminary risk scenarios. For example, field data, albeit limited, indicate that birds operate within rotor range.

3.2.2 Action to Address Information Need

A collision risk assessment has been commissioned upon completion of Spring 2024 surveys. This will include quantitative data from field observations, notably flight heights, as well as precise location and specifications of wind turbines which have reduced from 46 to 33 and their locations and specifications have since been updated since the ESIA. Additional supplementary literature for collision risk, such as field-specific variables like local bird density and avoidance behaviour, will also be considered.

3.3 Impact Assessment

3.3.1 Information Needs

The ESIA includes a broad discussion of the ornithological baseline of the Site based on results from the seasonal surveys. However, there is minimal analysis of the three main areas where wind farm developments may impact on bird populations: collision mortality, displacement and habitat loss. As a result, potential impacts to birds due the Project, including associated infrastructure, are not considered in detail on specific bird populations.

Subsequently, the ESIA focuses on high-level and general mitigation measures, such as "bird diverters" (including spikes) and bird boxes for passerines, and only briefly considers a post-construction monitoring programme and systematic control of the Site. The ESIA does not recommend a site-specific switch-off mechanism as mitigation for impacts to birds.

3.3.2 Actions to Address Information Needs

Switch Off Mechanism

As per the Project ESAP, a switch-off mechanism must be defined for the Project if species of conservation of concern are present on Site. Once results of Spring 2024 surveys are available, including a collision-risk modelling, the design and specification of the switch-off mechanism will be incorporated, as required, into final Project designs following a precautionary principle. Any updates will require independent advice and verification from suitably qualified experts.

Post-Collision Monitoring

As per the Project ESAP, a comprehensive post-collision monitoring programme must be defined for the Project. NatureScot, alongside recent good practice guidance[10] published by IFC, EBRD and KfW, recommends that this is designed to estimate collision mortality by carcass collection, as well as assess how migration through the Site has been affected by repeating vantage point observations and comparing them to a control area outside the Project.

10 IFC (2023) Post-Construction Bird And Bat Fatality Monitoring For Onshore Wind Energy Facilities In Emerging Market Countries

4 Conclusion

The pre-existing Project ornithological information (ESIA, available survey reports, and additional summaries from the lead surveyor) gives an overview of the 2021/22 fieldwork results. These state that the Site is outside key migratory corridors and the total numbers and flock size of migrating target species is significantly less than those observed at the main or secondary fly-ways within Georgia. Broadly, this constitutes a baseline assessment of the bird populations present on Site.

A number of information needs have been identified in data collection methods, collision-risk modelling and impact assessment. Despite these, EA considers it unlikely that the Site is of high-risk to birds, although this should be confirmed further through implementing the recommended actions. The precautionary principle should also be applied and good practice mitigation (e.g. site-specific switch-off mechanism and post-collision monitoring) is proposed to mitigate bird impacts.

The results of the Spring 2024 surveys are likely to provide further indication of the regular presence of sensitive bird species (e.g. Critical Habitat or Priority Biodiversity Feature-qualifying species). In addition, subsequent collision-risk modelling in June 2024 will support a robust assessment of the potential impacts (and requisite mitigation measures) to such bird species as a result of the Project.

While, ultimately, a full year of further surveys is required prior to operations commencing to cover the relevant seasons of an annual life cycle, there are a number of additional actions (below) to supplement the pre-existing Project ornithological information. These actions would allow the Project to provide further confidence that the Site does not present a high-risk to priority bird populations.

Table 1: Schedule of actions to address information needs

Action	Status	Timeline to completion
1. **Obtain and review detailed Spring 2022 results**	Spring 2022 results have been obtained, including accompanying survey report. These are yet to be reviewed in detail, however, it is anticipated they will provide evidence of the Spring migration alongside Spring 2024 surveys.	5th July 2024
2. **Approach an independent expert or local community group for further evidence**	A second opinion has been obtained confirming the original ESIA assessment. The source of this opinion remains to be verified.	5th July 2024
3. **Conduct collision-risk modelling with detailed**	Collision-risk modelling will commence upon the completion of Spring 2024 surveys on	5th July 2024

	Spring 2024 survey results	June 3rd. Two weeks are anticipated for this to be completed and results interpreted.	
4.	**Define a site-specific switch-off mechanism**	Upon completion of the Spring 2024 surveys and collision-risk modelling, a site-specific switch off mechanism will be defined following a precautionary principle, and incorporated into final Project designs.	To be delivered in line with ESAP deadlines and requirements
5.	**Define post-collision monitoring measures**	Upon completion of the Spring 2024 surveys and collision-risk modelling, post-collision monitoring measures will be defined as required.	To be delivered in line with ESAP deadlines and requirements

New information as a result of the first three actions will be reviewed and appended to this Supplementary Avifauna Analysis and Action Plan accordingly.

As written, the draft ESAP will commit the Project to incorporate a site-specific switch-off mechanism into final Project design, should this be identified as a requirement based on the findings of the Spring 2024 surveys and collision risk modelling. Globally, site-specific switch-off mechanisms have proven effective in mitigating bird impacts when designed by suitably qualified experts with careful consideration of the landscape and local bird populations. However, it's important to note that the effectiveness of such a mitigation strategy within the Project's context is not certain until previously stated additional actions have been completed. At such time, should it be considered that a site-specific switch-off mechanism would not prove to be effective, the Project will be required to implement a follow up set of measures designed specifically to generate no net loss and/or net gain outcomes for birds (as required).

Appendix A – WSP April Bird Survey 2024

Ruisi WPP Ornithology Surveys and Reporting: Spring 2024.

TO	Zaza Bakuradze and Maia Gikoshvili	**FROM**	Dr. Rhys Bullman (WSP)
DATE	**22 April 2024**	**CONFIDENTIALITY**	**Confidential**
SUBJECT	**Ruisi WPP Ornithology Survey and Reporting: Spring 2024**		

EXISTING BIRD SURVEY AND ANALYSIS WORK

It is understood from the documents provided to WSP by JSC Windpower that a range of ornithology surveys have been undertaken. These documents are as follows and have been reviewed by WSP:

- Bird monitoring report for Autumn 2021
- Bird monitoring report for Summer 2022
- Bird monitoring report for Winter 2022
- Ruisi WPP ESIA Volume 1

These survey reports have been subject to a full gap analysis by Earth Active and it has been broadly concluded that there are a number of deviations from the recommended approach to undertaking bird surveys at a windfarm in accordance with SNH (2017)[1]. It is also noted that there is no available reporting for Spring 2022 or any subsequent Spring seasons. A summary of the key issues is as follows:

- The target species list is not clearly defined, and a large amount of data has been collected on species that are common and not perceived to be at risk from wind turbines.
- The visible coverage of the wind farm project area by vantage points for flight activity surveys is varied insufficient in all seasons.
- Data was apparently not collected in a way that could effectively inform a collision risk model and no collision risk modelling has been undertaken.
- The qualification and expertise of the surveyors has not been provided.

[1] SNH (2017) Recommended bird survey methods to inform impact assessment of onshore wind farms. Version 2.

SCOPE OF WORKS

The core scope of works, as requested by JSC Windpower, are summarised here and details of WSPs approach to fulfilling this scope are then provided.

Task 1: Strengthening the avifauna baseline (Spring 2024)

JSC Wind power has asked WSP Consulting UK Ltd to collect an ornithology survey dataset for the Spring season 2024 (April and May) that is compliant with the recommended survey methods guidance i.e. SNH (2017). WSP had determined that these surveys will comprise of flight activity surveys and breeding bird surveys specifically targeted at the revised 33 turbine layout. As these groups of turbines are arranged in a group of cluster, the survey will focus on the areas covered by the turbines only.

An experienced Georgian bird surveyor, Mr Nika Melikishvili who has previous experience of conducting bird surveys for renewable energy projects in Georgia and has been directly trained in the field by Dr Rhys Bullman of WSP will be used on the project. Rhys will manage the survey programme, will ensure that the works are carried out in accordance with SNH (2017) and will conduct a site survey mission to visit each VP and to assess the habitats within the site for breeding birds. To expediate surveys rapidly with a commencement in April 2024, WSP will provide all the relevant field recording forms for the survey team and WSP will also provide a suitable excel database for data storage and ensure that both scanned paper and excel spreadsheets are uploaded to a WSP storage area on a daily basis.

The main purpose of the bird surveys will be to characterise the magnitude of flight activity in the key survey areas with the WPP and to identify the range of species that may be potentially at risk from collision. They will do so by monitoring flight heights and time spent in the proximity of the wind turbine locations at risk height. All the flight activity data will be suitable to inform any requirement for mitigation. Once the survey plan is in place, the proposed vantage point locations will be ground-truthed by WSP staff as soon as possible during the survey period to ensure that they are fit for purpose.

It is assumed for the purpose of these surveys that there are no further surveys required for any transmission line infrastructure associated with the WPP.

Proposed Survey Approach

FLIGHT ACTIVITY SURVEYS

To ensure that fully robust data is collected during the Spring Migration period, the full details of the flight activity survey methods are provided here. To fully cover the turbines, it is suggested that **seven vantage points** are used. Vantage point locations have already been checked and ground truthed for suitability in the field and the viewshed is set at no more than 2000m:

- Vantage Point 1 covering Turbines: 03, 09, 45, 08 and 33. VP facing west.
- Vantage Point 2 covering Turbines: 31, 02, 04, 30, 17, 01, 10, 05, 13, 07, 25. VP to be set up on the rural track opposite T02 facing west.
- Vantage Point 3 covering Turbines: 44, 37 and 38. VP to be set up near T30 facing north east.
- Vantage Point 4 covering Turbines: 11, 19 and 28. VP to be set up between T11 and T19 facing north west.
- Vantage Point 5 covering Turbines: 34 and 35
- Vantage Point 6 covering Turbines 20, 32 40 and 18

- Vantage Point 7 covering Turbines 16, 06, 42 and 46.

The purpose of VP or Flight Activity surveys, is given in section 3.8 of SNH (2017) *'A VP survey is designed to quantify the level of flight activity and its distribution over the survey area. Its primary purpose is to provide input data for the Collision Risk Model which predicts mortalities from collision with turbines.'*

The time the bird, or flock, is first detected and the duration of the flight whilst in view will also be recorded and a mean height will be estimated for flocks of birds. The bird's flight height will be estimated from the time it enters the viewshed and then at 15 second intervals until it leaves the viewshed or becomes lost from view. The recorded flight heights will be chosen to reflect the dimensions of the proposed turbines which have been provided by JSC Windpower i.e.:

- Turbine hub height 105 m
- Rotor diameter 171 m
- Rotation period rated rotational speed 10.3 rpm
- Pitch (degrees) 5-90
- Max Chord Length (root/Maxim/Tip) 3.3 m/4.0808/0.15m

Consequently, the height bands that will be used in the flight activity surveys are:

- 0-20 m (not at risk of collision)
- 20-200 m (potentially at risk of collision)
- >200m (no collision risk potential)

Bespoke recording forms will be provided so that all of the above information can be recorded along with weather records for each survey hour.

Survey Effort

To ensure that a full data set is collected for Spring 2024, six hours of survey per VP per month is required. Normally, the Spring period covers the months of March to May. However, as surveys can only commence in April, it is suggested that double the survey effort is undertaken in May to account for the missing hours. Given that the 2022 data is currently missing, this level of survey effort should provide a contemporary data robust enough for a Spring season collision risk model with the caveat that March data is not available.

Survey days are detailed in Table 1.

Breeding Bird Surveys

Breeding bird survey results are detailed for Summer 2022 (June 3 to July 15) where it is stated in the monitoring report that 83 hours of walked transect surveys and 24 hours of driven transects were conducted. This is an extremely high level of survey effort, but although a list of species recorded is given there are no maps indicating where these birds are in relation to the proposed turbine locations and associated infrastructure such as access tracks or transmission lines.

It is proposed that breeding bird surveys focussing on IUCN and Georgian red listed species are carried out in April and May to supplement the 2022 data and to provide some spatial context to the breeding bird community with the project area to inform any potential mitigation.

Survey days are detailed in Table 1, albeit they are limited in April due to surveyor availability.

Table 1: Survey effort required for Spring 2024

	April	May
Vantage Point Surveys (Days)	7	14
Breeding Bird Surveys (Days)	1 (limited)	4

It is proposed that Dr Rhys Bullman visits the site in May and undertakes a survey at each of the VPs to ensure that they are fully suitable and to prepare a site survey report for Earth Active to assist them with their assessment.

REPORTING

Reporting deliverables are as follows:

- A baseline report producing the results of the flight activity surveys and the breeding birds surveys. This report will not include any interpretation of the results regarding to the conclusion of the ESIA, as that task will be undertaken by Earth Active. However a collision risk model will be produced using the April and May data.
- All the raw data will also be provided both JSC WindPower and Earth Active for review.

Appendix B - References

Bellebaum J, Korner-Nievergelt F, Dürr T, Mammen U (2013) *Wind turbine fatalities approach a level of concern in a raptor population*. J Nat. Conserv. 21: 394–400. doi:10.1016/j.jnc.2013.06.001

BirdLife International (2021) *European Red List of Birds*. Luxembourg: Publications Office of the European Union.

Dahl EL, Bevanger K, Nygård T, Røskaft E, BG Stokke (2012) *Reduced breeding success in white tailed eagles at Smøla wind farm, western Norway, is caused by mortality and displacement*. Biological Conservation 145:79–85. doi:10.1016/j.biocon.2011.10.012

De Lucas M, Ferrer M, Bechard MJ & Muñoz AR (2012) *Griffon vulture mortality at wind farms in southern Spain: Distribution of fatalities and active mitigation measures*. Biological Conservation 147: 184-189.

Ferrer, M., de Lucas, M., Janss, F.E., Casado, E., Muñoz, A.R., Bechard, M.J. & Calabuig, C.P. (2011) *Weak relationship between risk assessment studies and recorded mortality in wind farms*. Journal of Applied Ecology 49: 38-46.

Hull CL, Stark EM, Peruzzo S, Sims CC (2013) *Avian collisions at two wind farms in Tasmania, Australia: taxonomic and ecological characteristics of colliders versus non-colliders*. New Zeal. J. Zool. 40: 47–62.

Lekuona, J.M. & Ursúa, C. (2007) *Avian mortality in wind power plants of Navarra (Northern Spain).* In: de Lucas, M., Janss, G.F.E., Ferrer, M. (Eds.), Birds and Wind Farms: risk assessment and mitigation. Quercus, Madrid, Spain, pp. 177-192.

Marques AT, Batalha H, Rodrigues S, Costa H, Pereira MJR, Fonseca C, Mascarenhas M, Bernardino J (2014) *Understanding bird collisions at wind farms: An updated review on the causes and possible mitigation strategies*. Biological Conservation 179: 40–52.

Martin GR, Portugal SJ, Campbell PM (2012) *Visual fields, foraging and collision vulnerability in Gyps vultures*. Ibis 154 (3): 626-631.

May R, Bevanger K, van Dijk J, Petrin Z, Brende H (2012). *Renewable Energy Respecting Nature. A Synthesis of Knowledge on Environmental Impacts of Renewable Energy financed by the Research Council of Norway*, NINA Report. Trondheim.

STRIX (2017). *Wind turbine shutdown on demand operations and bird migration monitoring in the Gabal el Zayt Wind Farm (200 MW)*, Egypt. Unpublished report. Portugal.

Thaxter CB, Buchanan GM, Carr J, Butchart SHM, Newbold T, Green RE, Tobias JE, Foden WB, O'Brien S, Pearce-Higgins JW (2017) *Bird and bat species' global vulnerability to collision*

mortality at wind farms revealed through a trait-based assessment. Proc. R Soc B 284: 20170829. http://dx.doi.org/10.1098/rspb.2017.0829.

Tomé R, Canário F, Leitão AH, Pires N & Repas M (2017) *Radar assisted shutdown on demand ensures zero soaring bird mortality at a wind farm located in a migratory flyway*. In: J Köppel (ed.) Wind energy and wildlife interactions. Springer.

Appendix C – Addendum

[Placeholder]

EARTH ACTIVE
BESPOKE ESG ADVISORS

07876 687 288
enquiries@earth-active.com

24-28 Bloomsbury Way
London
WC1A 2SN

Registered Company No: 11468960
Registered Office: 2a High Street,
Thames Ditton, England, KT7 0RY