

SC ECO GREEN CONSULTING SRL

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To

THE ROMANIAN ORNITHOLOGY SOCIETY

ECO - PONTICA FOUNDATION

Further to the conclusions of the discussion that we had on 25 January 2012 on the premises of EDP Renewables Romania SRL (that was also attended by representatives of the Romanian Ornithology Society, Eco-Pontica Foundation, EDP Renewables Romania and Eco Green Consulting SRL) and based on the conditions imposed in the Environment Permit No. 8372/23.01.2012, please find attached the proposal regarding the Monitoring Plan that will be implemented during the operational lifespan of Sarichioi wind farm (including the 110kV cabling area to Zebil North).

**MONITORING PLAN
PROPOSED FOR THE OPERATIONAL LIFESPAN
OF "SARICHIOI WIND FARM,, - main client: EDP RENEWABLES ROMANIA SRL**

According to Environment Permit No. 8372/23.01.2012, the biodiversity in the operational area of the wind farm (including the cabling area up to the 110 kV Zebil North plan) has to be monitored, and especially the local habitats, the flora and fauna species for which the Natura 2000 ROSCI0060 Agighiol Highlands, ROSCI0067 Deniz-Tepe and Deniz-Tepe Nature Reserve and ROSPA0032 Deniz-Tepe areas were officially declared to be "protected areas".

The period under scrutiny - study methods: The species and habitats within the perimeters that are part of this investment will be monitored from March through October every year. The onsite visit periods will be so selected so as to facilitate the descriptions, more specifically to facilitate the study of all flora seasons and all development phases of the fauna species. In the case of habitats, the periods favourable to descriptions are those in which the type of vegetation under scrutiny has the largest number of species, fully developed, more specifically in this case we are taking about grasslands turned to steppe in highland areas; all observations will mostly be made from March through July..

Regarding the climat, the area under scrutiny is a low hill area, with an Eastern continental influence, with annual average temperatures of about 10,6°C and annual average precipitations of 480 mm.

Given the fact that the perimeter where the investment is located has an irregular shape and the area under scrutiny covers approximately 500 ha, which is the double of the perimeter of the wind farm that covers approximately 254 ha. This 500 ha sizing of the area enables an objective evaluation of the impact that wind farming operations will have upon the local biodiversity. On the other hand, also under scrutiny will be the electric cabling area (from DN22A Tulcea- Constanta road) to the 110 kV Zebil North plant.

Classic methods will be used in order to study the flora and the vegetation in the area, more specific a phytocenotic scale mapping will be outlined to cover fixed test areas of 1600 sq.m. each. This is where flora species will be studied and for every species the abundance and prevalence rates will be determined based on the *Braun - Balanquet* scaling method. The 11 test areas will be established in the areas that are affected by construction works. Apart from the scale mapping, the transects' method will also be used, especially to identify species that are important for conservation purposes or that are protected under the enforceable legislation.

The area under scrutiny was so established as to cover the full perimeter of the wind farm, the electric cable area, as well as the adjoining area, depending on the types of birds under scrutiny.

Bird populations in the area will be monitored over one calendar year and the monitoring will cover all of the 6 phenological characteristics of the annual cycle of bird species: *Hibernal, Prevernal, Vernal, Aestival, Serotinal, and Autumnal*. Following this succession, the following periods will be covered:

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- the autumn migrations (serotinal and autumnal),
- winter period (hibernal),
- spring migrations (prevernal and a part of the vernal period) and
- and the nesting time (vernal and aestival).

Working methods were customised to each separate category of birds so that the quality of the data can reflect the real onsite *status quo*, more specifically: nesting species, birds of passage, wintering birds. For that matter, since the cabling area covers 870 m of the Natura 2000 ROSPA 0032 Deniz-Tepe site, we shall have to monitor the presence/absence of the key bird species that this Natura 2000 site was supposed to host.

In order to identify the nesting birds species, the area will be divided into survey perimeters and fixed points will be selected wherefrom to study the local area. The monitoring perimeters were established on a random basis, so that the collected data can be as accurate as possible. In order to fill in the data collected from the fixed points, transects will be established in these observation points too in order to confirm and substantiate the first data category, thereby insuring the consistency of the data. In this way, the distribution of the species throughout the area under scrutiny will be better observed too.

Fixed point method - this method will be used to monitor the birds during their migration period (autumn and spring). The fixed point method is a quantitative method that will enable us to estimate the relative abundance of birds. Fixed points will be so selected so as the collected data should be relevant to the study. During the observation period, the following details will be noted down:

- the species under scrutiny
- the number of individuals of a certain species
- the flight direction of the species
- estimated flight height
- type of habitat where the species was found

By applying the fixed point method, data will be found with regard to:

(1) the diversity of bird species over the migration time (specific composition/qualitative evaluation) and the

(2) estimate of average flight height for the key species and

(3) the flight direction.

The Vantage Point Method - this method will be applied in order to evaluate the collision risk in the case of birds that have to be preserved. The Vantage point survey involves observations from a fixed point which is located in a favourable position that should enable watchers to observe flight activities without disturbing the birds' life and behaviour. The longer the fixed point observation period, the better outlined the behavioural flight pattern will be and the impact will also be assessed more accurately. The purposes of the Vantage Point Observation are to:

1. collect data for the *key bird species* regarding the following:

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- ✓ fly-over time above the study area
- ✓ relative usage rate (feeding, mating, rest, passage) of the various perimeters inside the study area
- ✓ flight time above or under the rotor (the diameter of the rotor) of the turbine (this will be noted after the wind farm has become operational.)

2. to calculate the index of the flight activity for species other than the key bird species - secondary species

The transect method combined with the fixed point method - this combined method will help monitor birds nesting and wintering in the study area. The number of transects will be established based on the overall surface of the overhead power line, the peculiarities of the area (topography, vegetation, etc.), so that the transects of the study area can cover the habitats that are specified to this area in order to be able to analyse the relationship between the habitat and the species. Fixed points will be established along the overhead power line ever 3 km.

While scrutinising a transect, the following details will be noted:

- number of species seen
- number of individuals of a certain species
- the activity of birds
- estimated flight height
- type of habitat where the species was seen

Operators will spend about 5 minutes at every fixed point and will note the following:

- the fixed point wherefrom the observation was made
- number of species seen
- number of individuals of every species
- type of activity of the bird
- estimated flight height
- type of habitat where the species was seen

By applying the fixed point method, data will be found with regard to:

- the diversity of the bird species over the nesting and wintering period (specific composition/qualitative evaluation)
- the analysis of the species - habitat relationship,
- the flight height of the species.

Nesting birds will be observed on the site whenever they are more active, for instance when young chicks have already left the nest and are ready to fly, since this is when it is easier to establish where

a bird species is present or missing in the area under scrutiny.

For the migrating bird species, different monitoring methods will be implemented and used so that these methods can properly reflect all of the passage peculiarities (moving directions, migration corridors, behaviour, etc.). The main working method use was the fixed points methods because the data collected based on this method helps to establish the migration dynamics (patterns).

Referring to the species of amphibians, reptiles and mammals, they will be monitored during the onsite assignments that will be performed to monitor the birds because the onsite assignments scheduled on the optimum timing will coincide with the bird watching assignments, therefore the data will be collected together.

Monitoring the bird populations

The monitoring programme has to be so designed as to enable the collection of data that should refer to all of the animal categories that can be found on the location of the wind farm, more specifically: reptiles, nesting birds or summer birds, sedentary birds, wintering birds and migratory birds, that can migrate by flying over this location, and also mammals. Taking these considerations into account, two distinct methods will be used to collect data and to assess the bird populations, more specifically: the point transects method for the nesting species, sedentary birds and wintering birds and the fixed points method for the migrating birds. The periods when the bird populations will be monitored will be established depending on the periods that are favourable to collecting every data set, as it is illustrated in table below (Table No. 1):

	January	February	March	April	May	June	July	August	September	October	November	December
Nesting birds												
Sedentary birds												
Birds of passage												
Wintering birds												
Amphibians												
Reptiles												
Mammals												

Table No. 1: Favorable/optimum monitoring periods

Favourable period
 Optimum period

Although the periods favourable to every bird category are known (nesting birds, birds of passage, sedentary, etc.), it is advisable to refrain from establishing strict *onsite* data collection dates, because the climate or other external factors may influence the birds' dynamics and these strict data may negatively influence the quality of the obtained data. Along this sense, it is recommendable that every monitoring phase should cover a sufficient amount of data collection days in order to be able to cover all phases of a stage, according to the frequencies itemised in Table No. 3.

All observations shall focus on the following:

A. A detailed analysis of the flight activity of the key species detected

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1. The area will be scanned until an individual of a certain species will be noticed.
2. From that moment on, the individual will be monitored up to the time when they stop flying or has not been seen for at least 10 minutes. This period will be registered and noted down in the standard reports.
3. The distance to the observed individual and their flight direction will be estimated. The distance will be estimated by selecting a milestone that indicates the location of the respective individual and that will be measured subsequently.
4. The flight height will be estimated on the point where the individual was detected and the status will be re-estimated at an interval of 30 seconds of the flight height fluctuation. This period of 30 seconds is recommended in order to minimise the dependence among the data. The flight height estimate will be classified in <20, 20 - 100m and >100 m. The height will be estimated as against certain vertical structures, so that the data can be as accurate as possible.

B. Summary of the activity that is applied to secondary species

Every observation period of the secondary species will be divided into periods of 10 minutes along which the numbers and activities of all secondary bird species will be registered. If, along these 10 minutes, a key bird species has been identified, then the activity summary for that specific period will be abandoned and the observations will be resumed once the monitoring of the flight activity of the key species is over.

The observations focusing on the key species will take precedence over the secondary species. On the other hand, the still birds will be recorded separately from the flying birds

The data collected by all methods shall be recorded on observation reports and on maps, if necessary. The following will be used too:

-observation reports for the transects

-observation reports for the fixed points

- 2 types of observation reports for the vantage point observations: PF 1 - the observation report for the detailed analysis of the flight activity; PF 2 – the observation report for the summary of the activity.

The fauna monitoring plan will contain several peculiarities depending on the taxonomy group, as they are described in the table below (No. 2), each established object is measurable through the specific indicators:

FAUNA MONITORING PLAN - TABLE NO. 2		
TAXONOMY CLASSIFICATION	OBJECTIVES	INDICATORS
Reptiles and amphibians	1. Monitoring the populations of reptiles that are present inside the location;	1. Identification of all reptile species; 2. Performing works only during the recommended durations
Nesting birds	1. Continuing the monitoring of the locations of the nesting species inside the wind farm; 2. Monitoring the ethology of nesting bird species during the functioning time;	1. Complement current data with the data collected during the monitoring programme. 2. Describe the behaviour of birds comparing it with the initial behaviour 3. Comply with the

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FAUNA MONITORING PLAN - TABLE NO. 2		
TAXONOMY CLASSIFICATION	OBJECTIVES	INDICATORS
Birds of passage	1. Monitoring the dynamics of migration within the perimeter of the wind farm and the adjoining areas; 2. Monitoring the behaviour of birds of passage while the wind farm is operational in order to insure optimum passage conditions.	recommended periods 1. Complement current data with the data collected during the monitoring programme. 2. Describe the behaviour of birds comparing it with the initial behaviour
Wintering birds	1. Monitoring the seasonal travels of geese populations within their wintering area;	1. Complement current data with the data collected during the monitoring programme.
Mammals	1. Monitoring the resident species of mammals and those that can transit the wind farm while looking for food;	1. Complement current data with the data collected during the monitoring programme.

The surface under the monitoring plan is represented by the surface area of the wind farm and that of the overhead power line, plus the adjoining area that contain the same kind of habitats like the site under scrutiny. These adjoining areas are actually witness areas that are a reference point between the current status found on the site and the final status, which is represented by the operation of the wind farm. Depending on the data collected on the site location and in the witness areas, the potential differences found between the analysed data will mark the way in which the biodiversity developed in the wind farm location starting from the time when the farm was commissioned.

Monitoring the flora and the vegetation

Target species/habitats	Measured attribute	Limitations	Monitoring method	Period
The relationship between the habitats	Changes the appearance of habitats	Increased and maintained at the levels reported in 2011	Phytocenotic scale mapping in the test areas	Biannual in May and July.
Vegetation - indicator species	Species % coverage Relative abundance	Increased and maintained at the levels reported in 2011	Monitoring the selected test areas.	Biannual in May and July.

The vegetation in the monitored area will be studied according to European phytocenology methods, along several phases:

- preliminary phase - the purpose and phases proposed for the study will be analysed during this phase, the scientific specialty literature covering research methods and the studies previously conducted in this area, as well as the physical and geographical conditions in this area will also be studied (relief, soil types, geomorphologic structure, hydrographic network, climate) and the optimum periods will be established for the performance of the on-site identification work.
- on-site research - this phase will cover works consisting of geo-botanical descriptions, photo shooting, mapping the studied points on the site in order to be able to subsequently establish the species and habitats of community interest, if needed (species will be established based on the determination keys taken from specialty publications [Ciocarlan, 2000]). The vegetation of phytocenoses will be studied starting from the outside of the area under scrutiny inwards, according to the itinerary-based research method. The surface area to be scanned has been established so as to cover all of the existing phytocenotic types.
- the closing phase involves the processing of the data in order to establish certainly the vegetal species and associations, the presence/absence of the plant species and the habitats that are interesting for conservation purposes.

Annex 1

Plan monitoring

Bird species monitoring methodology in Sarichioi wind farm and the related overhead power line area

Purpose Monitor the bird spe

cies and evaluate the potential impact upon the local bird populations that implementation of Sarichioi wind farm and the related overhead power lines could have upon the ROSPA0032 Deniz Tepe area.

Objectives

1. Evaluate the bird populations (including the key species as per the standard Natura 2000 form) as against the seasonal agglomerations/fluctuations and the way in which aerial space and the habitats are used.
2. Evaluate the disturbance (the fact that the habitat can no longer be used properly, if at all, the fact that the feeding areas are lost, the rest areas are lost too) that this project will cause to the local birds.
3. Evaluate the risk of electrocution of birds (when touching the power cables).
4. The evaluation of the barrier effect created by the obstacles that birds can encounter across their normal migration and transit corridors.
5. The evaluation of the potential impact that habitat changes may have upon the birds.

The information collected by monitoring will provide quantitative and qualitative data about the bird fauna located within the overhead power line area and the adjoining areas. The data will be analysed and interpreted according to the objectives that we have in mind.

The report so prepared will present in detail the selected methods, the periods when the methods will be applied in the on-site research activities and the reasons why it is considered that the impact has been evaluated satisfactorily. Apart from all that, a special attention will be attached to the following issues:

- The estimates and details about the evaluation of the impact upon bird species will be presented for every key species separately that will have been identified as vulnerable to the overhead power lines.
- The collision risk will be estimated and presented for each season separately (migration, reproduction, wintering, resident species) and whenever the characteristics of the species permit it, the electrocution risk will be presented separately for each age category (nesting adults, juvenile birds/immature birds). This approach will enable us to establish (and subsequently compare based on the monitoring that will be performed after the project is implemented and commissioned) the causes that lead to the electrocution of birds against the overhead power lines;
- The report will be accompanied by standard observation reports that are commonly used to monitor species.
- The estimates covering flight activities will be made insofar as possible in correlation against the behaviour of the species (flight to the feeding territory, mating flight, etc.), depending on

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age/gender and depending on the date/season and hour.

- A detailed map with points and observation itineraries will be presented; the location of the wind towers must also be indicated on the map.
- Maps and tables describing the distribution of the species/nests;

On the other hand, the report will propose the measures that will be necessary to diminish the negative effects determined by the project, if applicable, as well alternative measures or compensation measures, if needed. The data will be collected:

- with adequate methods and materials.
- as frequently as necessary in order to capture the essentials of the biology of the species under scrutiny.
- over the periods when the largest amount of information that is relevant for this study can be collected,

The bird fauna survey will primarily focus on the species of birds that were invoked when the site under scrutiny was declared a Natura 2000 site, according to the standard "Natura 2000" Form in Government Decision No. 1284/2007, as amended.

The list of bird species itemised in Annex I to the Council Directive 79/409/EEC and their inventory in the RPSPA0032 Deniz-Tepe area (Natura 2000 standard form)

3.2.a Species of birds specified in Annex I of Council Directive

Species code	Resident population	Wintering	Passage	Site	Preservation	Isolation	Global
A402 Accipiter brevipes	2-4 p		90-100 i	B	A	C	B
A255 Anthus campestris	1200 p			C	A	C	B
A090 Aquila clanga			2-5 i	A	A	C	A
A089 Aquila pomarina	1p		300 i	C	B	C	B
A215 Bubo bubo	1-2 p			C	A	C	B
A133 Burhinus oedicnemus	20-24 p			C	B	C	B
A403 Buteo rufinus	4-5 p			B	A	B	C
A243 Calandrella brachydactyla	100-150 p			C	A	C	B
A224 Caprimulgus europaeus	20-30 i			C	C	C	C
A080 Circaetus gallicus	3-4 p			B	A	B	A
A082 Circus cyaneus			200 i	D	B	C	B
A084 Circus pygargus			300 i	B	A	B	B
A231 Coracias garrulus	20-30 p			C	A	C	B
A429 Dendrocopos syriacus	10p			C	A	B	C
A511 Falco cherrug	2p			A	A	B	A
A097 Falco vespertinus	200-300 p			C	A	C	B
A092 Hieraaetus pennatus	1 p			C	B	C	B
A246 Lullula arborea	300-350 p			D	A	C	B
A242 Melanocorypha calandra	200-300 p			C	A	C	B
A533 Oenanthe pleschanka	16-20 p			C	A	C	B

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Actions	Study methods:			Planning		the activities along the year							
		J	F	M.	A	M.	J	J	A	S	O	N	D
1. Analysis of bird species populations along an annual cycle, key bird species included.						(Natura 2000)							
> Evaluate the inventory of hatching birds	The itineraries method The "Vantage Point" Method - Sound level evaluation				X	X	X	X	X				
> Evaluate the inventories of birds that transit the area during their migration and that stop to rest or feed.	The itineraries method The fixed point method / The "Vantage Point" methodology		X	X	X				X	X	X	X	
> Evaluate the inventories of birds that transit the area during their migration without stopping to rest or feed.	The itineraries method The fixed point method / The "Vantage Point" methodology		X	X	X				X	X	X	X	
> Evaluate the inventory of hatching birds of prey	The itineraries method Methods specific to birds of prey (e.g. Hardey et al. 2005, Gilbert et al 1998) Identification of nests by means of the "Vantage Point" methodology					X	X	X					
> Evaluate the inventory of non-hatching birds of prey	The itineraries method/ Methods specific to birds of prey (e.g. Hardey et al. 2005) The fixed point method / The "Vantage Point" methodology	X	X	X	X				X	X	X	X	X
> Evaluate the inventory of wintering birds	The itineraries method / The "Vantage Point" methodology	X	X								X	X	X
2. Identification of seasonal agglomerations:													
> Identification of overnight stay areas that birds use during their migration within the farm area and its vicinity.	Itineraries method		X	X	X				X	X	X	X	
> Identification of the wintering headquarters of aquatic birds (Order <i>Anseriformes</i>) within the farm area and in the neighbouring area.	Itineraries method	X	X								X	X	X
3. Follow the way in which priority birds use the air space													
> Identify the migration itineraries	The fixed point method		X	X	X				X	X	X	X	
> flight height in relationship to overhead power line poles	The "Vantage Point" methodology	X	X	X	X	X	X	X	X	X	X	X	X

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Actions	Study methods:	Planning the activities along the year											
		J	F	M.	A	M.	J	J	A	S	O	N	D
> The intensity of the day use of the air space by the species of birds under scrutiny	The "Vantage Point" methodology	X	X	X	X	X	X	X	X	X	X	X	X
> The estimated "stay period" and the abundance of the birds that use the area for feeding, rest or overnight stay (habitats have to be considered too)	The "Vantage Point" methodology	X	X	X	X	X	X	X	X	X	X	X	X
> Analysis of how key birds use the habitats in the project area	The "Vantage Point" methodology	X	X	X	X	X	X	X	X	X	X	X	X
4. Behavioural aspects													
> Follow the behavioural patterns of birds (while weather conditions are both favourable and unfavourable)	The "Vantage Point" methodology	X	X	X	X	X	X	X	X	X	X	X	X

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Table 3. Details about the birds' movements, which are necessary in order to monitor the respective bird species

Month	January	February	March	April	May	June	July	August	September	October	November	December	Total
No. of expeditions	2	2	3	2	3	2	2	2	3	2	2	2	27
No. of days/expeditions	1	1	2	3	2	3	1	1	2	2	1	1	
Total days	2	2	6	6	6	6	2	2	6	4	2	2	46

Monitoring report frequency - once/year, according to the provisions of Environment Permit No. 8372/23.012012.

We are awaiting your opinion.

Sincerely yours,

SC ECO GREEN CONSULTING SRL

Administrator,

BADEA GABRIELA

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