Saint Nikola Wind Farm: 2010 Breeding Bird Survey

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Summary

The need for a Breeding Bird Survey was identified in the Saint Nikola Wind Farm Environmental Management and Monitoring Plan (EMMP) and is being undertaken to characterize the breeding bird assemblage within the Saint Nikola Wind Farm (SNWF) and to assess any future changes which may be attributable to the operation of the wind turbines. This report synthesizes the results of 3 months study performed in 2010 within the scope of the comparative analysis of the results from 2009. The same transects running roughly north to south through the wind farm territory have been chosen and surveyed. Two control transects as in 2009 have been chosen outside of the wind farm territory to account for 'natural changes' in breeding bird populations within the project area, which would not be attributable to an effect of the operational turbines. Details of the vegetation along each transect were recorded to account for any habitat-related effects on changes in the breeding bird assemblage in present analyses. The results of the 2009 and 2010 surveys are assessed against the European Ornithological Atlas Committee's (EOAC) criteria for breeding bird status. A total of 94 species was recorded, including many with national or international classifications of vulnerable or threatened status. The number of species and their numbers in the wind farm territory fluctuate in relation to the natural patterns in their dynamics in highly anthropogenised agricultural habitats depending on the crops planted in the field. Findings do not suggest that the SNWF is of particular conservation importance for its breeding birds. Based on the results of Breeding Bird Surveys in 2009 and 2010 there is no adverse effect of the wind park operation on the bird assemblage in the wind park territory and surroundings including investigated steppe habitats.

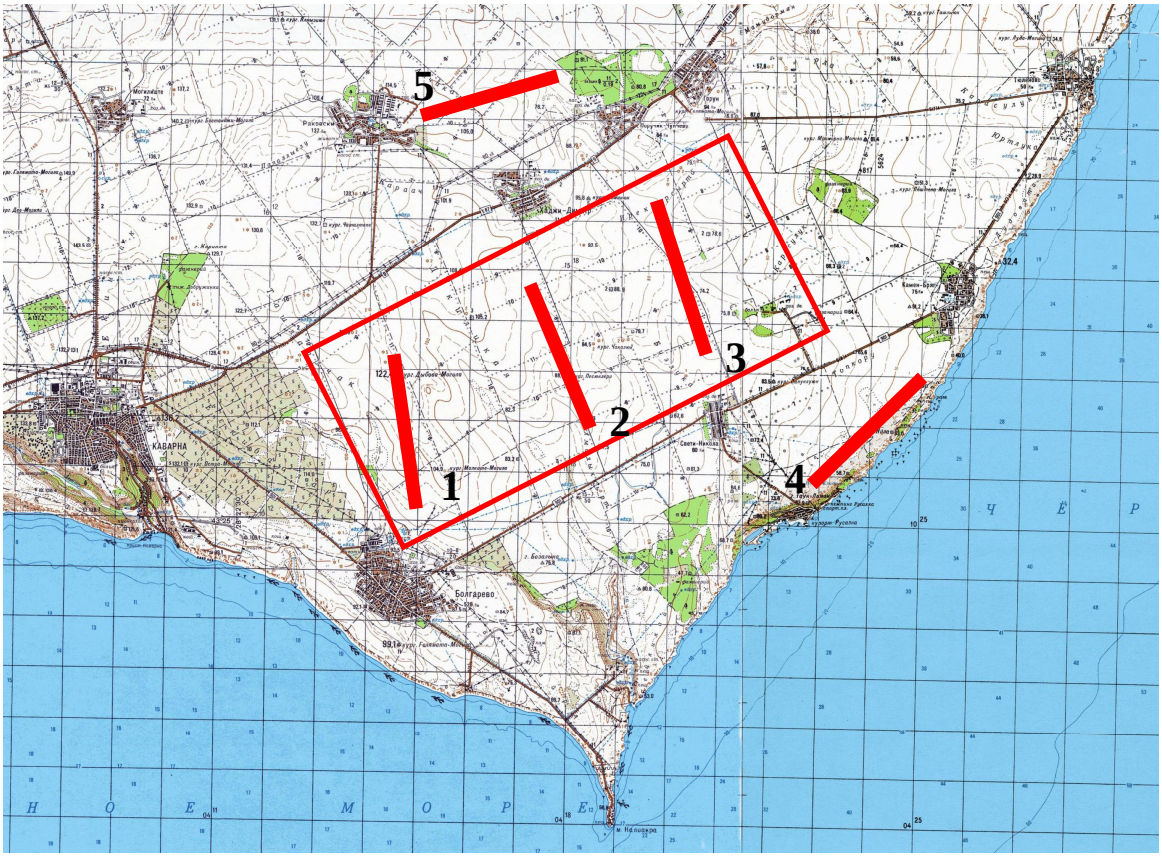
Introduction

In this study we aimed to identify the bird species breeding in the wind park territory (Saint Nikola Wind Farm: SNWF) and quantify their densities in order to compare the same characteristics of the breeding bird communities found in 2009. SNWF is located in NE Bulgaria, close to the Black Sea coast near the cape of Kaliakra and lies between the road from the village of Bulgarevo to St. Nikola (municipality of Kavarna), and the 1st class road E 87 Kavarna to Shabla (Map 1). SNWF consists mainly of arable land with different crops (wheat, sunflower, flax), intersected with roads and shelter belts. SNWF includes areas outside the original Natura 2000 proposed development site of Kaliakra.

Purpose of the Survey

The need for a Breeding Bird Survey was identified in the EMMP and is being undertaken to categorise the breeding bird assemblage within SNWF and to assess any impact of the operational wind farm on this assemblage. The comparison of the results of the surveys in Year 1 (2009) and Year 2 (2010) enable an assessment of the impact on the breeding bird assemblage prior to operation of the wind farm and during its operational period.

In order for this assessment to be made the surveys need to be reproducible and therefore they followed fixed transects in 2009. The same transects running roughly north to south through the wind farm territory were chosen in 2010 (Map 1). Since the breeding bird assemblage in SNWF may change for reasons independent of the construction and operation of the wind turbines, the same additional two control transects have been chosen outside of the wind farm territory to account for natural changes in breeding bird populations (Map 1). Knowledge of these trends outside of the influence of the programmed development is important to attribute the level of impact upon breeding birds of the wind turbines post-construction and during operation.



Map 1. Schematic representation of SNWF and the five breeding bird survey transects.

Methods

In order to obtain comparable quantitative results concerning breeding birds the same methods as in 2009 were applied. The methods were based on those used for breeding bird atlas surveys. They are designed to comprehensively categorise the breeding bird assemblage in the survey area. The results of the survey area were assessed against the European Ornithological Atlas Committee's (EOAC) criteria for breeding bird status. Five transects were selected; three in the wind park territory (WPT), one control transect in similar habitat and one within the natural steppe habitat adjacent to the project area. The three transects within the WPT, in the most part, followed shelter belts that run north to south. The control transect is located to the north of the WPT and comprises of habitats that are representative of those within the WPT. Survey results from a fifth transect, within the natural steppe habitat adjacent to the WPT, should better reflect the natural trends in breeding bird assemblage composition and bird density. These results will compliment the results from the WPT and control transects.

Details of the vegetation along each transect were recorded as in 2009 in order to allow analysis of changes in the breeding bird assemblage which may result from change in habitat (e.g. crop type).

Each transect was walked once every fortnight during the bird breeding season (April to June). Two observers simultaneously walked the route. Each observer recorded all birds within 500 metres of the centre of the transect with one observer recording all birds exclusively to the left of the route, and the other recording exclusively to the right. The position, species, number and activity of all birds seen were annotated on each map. Where the transect route ran along a shelter belt, observers walked either side of this habitat feature. All birds within the shelter belt were recorded on maps and results discussed between observers at the end of each survey to ensure no double counting of bird records.

The surveys started no earlier than one hour after sunrise and no later than 09:00. Each transect was walked five times over the survey period and the start point was alternated for each survey; survey 1 was run north to south, survey 2 south to north, etc (Table 1). Every species observed was recorded on the maps using two-letter species codes with

corresponding activity codes (see Breeding Bird Report 2009). The activity codes are vital to allow assessment of the results against the EOAC criteria for breeding activity. The data was also computerised in EXCEL. The numbers of observed breeding birds in range of 25, 100 and 200 metres from the observer were recorded. This approach allowed precise evaluation of the spatial distribution of the breeding birds and the composition of species in the applied analysis.

Table 1. Breeding Bird Survey 2010 Timetable

	Transect 1	Transect 2	Transect 3	Control 1	Steppe Control
Survey 1	4th April	5th April	7th April	8th April	9th April
Survey 2	21th April	22th April	23th April	24th April	25st April
Survey 3	4th May	6th May	9th May	7th May	10th May
Survey 4	22th May	23th May	24th May	26th May	25th May
Survey 5	5th June	7th June	6th June	8th June	9th June

Breeding Bird Species Codes

All birds were recorded on the field maps using two letter codes as presented in Breeding Bird Report 2009. These codes are based on those used in the UK for all bird surveys; however due to the presence of a very different breeding bird assemblage in Bulgaria some have been made up for the purpose of this survey using unassigned British codes. The codes are made up of two letters and are specific to each species registered; the codes were annotated on the field map with additional detail to indicate species behaviour and number (for detailed description see Breeding Bird Report 2009 and Own Monitoring Plan).

Breeding Bird Activity

All birds exhibit certain behaviour characteristics that allow conclusions to be made as to their breeding status, and these have been incorporated within the EOAC criteria for determining breeding bird status as: confirmed, probable, possible or non-breeding. The same symbols were used as in 2009 when marking each registration on the field map (for detailed descriptions see Breeding Bird Report 2009 and Own Monitoring Plan)

Results

Total number of birds registered during the survey in 2010 is given in Table 2. There was no significant difference in the total number of birds observed by transect in 2009 and 2010. Variations within the year were greater then the differences between the surveys 2009 and 2010. 94 bird species were recorded in SNWF during the breeding season of 2010 (Table 3). 17 additional species were registered in the survey 2010. The new registered species are mainly migrating birds and their breeding status is not confirmed. A late spring in 2010 is the most likely explanation of the increase of registered species in the wind farm territory No globally threatened species were confirmed as breeding under the EOAC criteria for determining breeding bird status.

Table 2. Total number of birds registered per transect during the surveys. 2009/2010

date	Tr.1	Tr.2	Tr.3	Tr.4	Tr.5	Total
07-11 April 2009	399	135	260	88	98	980
04-09 April 2010	594	349	283	254	196	1676
18-22 April 2009	403	155	313	103	147	1121
21-25 April 2010	279	176	291	313	126	1185
01-05 May 2009	418	178	439	175	98	1308
04-10 May 2010	316	242	298	285	185	1326
17-21 May 2009	446	218	340	131	136	1271
22-26 May 2010	398	253	347	269	314	1581
08-12 June 2009	570	376	301	233	424	1904
05-09 June 2010	265	200	317	317	183	1282
Grand Total 2009	2236	1062	1653	730	903	6584
Grand Total 2010	1852	1220	1536	1438	1004	7050

Recorded densities of birds in the 2009 and 2010 surveys are comparable with those given in the recently published Atlas of Breeding Birds in Bulgaria, however, and do not indicate any special conservation importance of the wind park territory.

Variations in bird numbers according to different transects and to different species likely reflect spatial differences in the distribution of crops and habitats. Densities of every registered species per transect are given in Tables 4 – 8.

The changes in the crop between 2009 and 2010 were recorded. There is a little proportion of the studied territory with slight change of crops and only about 10% of the field around the transects were changed.

Table 3. Trends in the number of all bird species registered by transects (1 to 5). Codes for comparison between 2009 and 2010: 0 = no difference, - = lower in 2010, + = higher in 2010, D = not recorded in 2010, N = "new" species in 2010.

N	Species name/transect	1	2	3	4	5
1	Accipiter nisus	-				
2	Acrocephalus arundinaceus		N			N
3	Acrocephalus scirpaceus			D		
4	Alauda arvensis	+	-	+	N	+
5	Anthus campestris	+	D	N	+	+
6	Anthus trivialis	+	+	0		+
7	Apus apus	-	+	+	N	
8	Burhinus oedicnemus				N	
9	Buteo buteo	-	+	D		
10	Buteo rufinus			+		D
11	Calandrella brachydactyla				N	
12	Carduelis cannabina		D	+		+
13	Carduelis carduelis	+	-	D	N	+
14	Carduelis chloris					-
15	Carduelis spinus	N				
16	Circus aeruginosus		+	+	N	N
17	Circus pygargus			N		
18	Coccothraustes coccothraustes	+	+	N	N	D
19	Columba livia				N	N
20	Coracias garrulus			D	N	N
21	Corvus cornix	N	N	N	N	N
22	Corvus corone cornix	D	D			D
23	Corvus frugilegus				N	
24	Corvus monedula		N		N	
25	Coturnix coturnix	0	+	+	N	0
26	Cuculus canorus	-	+	+	N	+
27	Delichon urbica	D		D	N	
28	Dendrocopos major	N	+			
29	Dendrocopos syriacus			D		D
30	Emberiza cirlus	D				
31	Emberiza citrinella		D			
32	Emberiza hortulana	+	+	+	N	+
33	Emberiza melanocephala	+	+	+	N	+
34	Erithacus rubecula	+		+		N
35	Falco peregrinus			D		
36	Falco subbuteo		D	+	N	
37	Falco tinnunculus	-	+	N	N	N
38	Falco vespertinus		-	D	N	N
39	Ficedula albicollis	+	+			

40	**Ficedula hypoleuca**	**-**	**+**	**-**	**N**	**D**
41	**Ficedula semitorquata**	**+**		**D**		
42	**Fringilla coelebs**	**+**	**D**			**N**
43	**Galerida crisata**		**+**			
44	**Gallinago gallinago**			**D**		
45	**Garrulus glandarius**	**-**	**-**	**+**	**N**	**+**
46	**Hirundo daurica**				**N**	
47	**Hirundo rustica**	**+**	**+**	**-**	**N**	**-**
48	**Jynx torquilla**					**N**
49	**Lanius collurio**	**+**	**-**	**+**	**+**	**+**
50	**Lanius minor**	**+**	**+**	**+**	**+**	**+**
51	**Lanius senator**	**+**			**0**	**D**
52	**Luscinia luscinia**	**-**		**D**	**N**	
53	**Luscinia megarhynchos**	**+**	**+**	**+**		**+**
54	**Melanocorypha calandra**	**+**	**+**	**+**	**+**	**+**
55	**Merops apiaster**	**-**	**-**	**D**	**N**	**0**
56	**Miliaria calandra**	**+**	**+**	**+**	**N**	**+**
57	**Motacilla alba**	**+**	**+**	**+**		**-**
58	**Motacilla flava**	**+**	**0**	**-**	**N**	**+**
59	**Muscicapa striata**	**D**	**-**	**+**	**N**	**N**
60	**Oenanthe isabelina**				**N**	**N**
61	**Oenanthe oenanthe**	**+**	**-**	**D**	**N**	**N**
62	**Oenanthe pleschanka**				**N**	
63	**Oriolus oriolus**	**-**	**+**	**+**	**N**	**+**
64	**Parus major**		**+**	**D**		**0**
65	**Passer domesticus**		**+**			**+**
66	**Passer hispaniolensis**	**+**	**+**	**-**	**N**	**+**
67	**Passer montanus**	**N**				
68	**Perdix perdix**	**N**		**N**		
69	**Phasianus colchicus**					**N**
70	**Phoenicurus ochruros**	**D**	**N**	**D**		
71	**Phylloscopus collybita**	**+**	**+**	**-**		**N**
72	**Phylloscopus sibilatrix**	**D**	**D**	**D**		**D**
73	**Phylloscopus trochilus**	**+**	**+**	**-**		**+**
74	**Pica pica**	**+**	**+**	**+**	**N**	**+**
75	**Picus canus**					**D**
76	**Picus viridis**	**D**				
77	**Riparia riparia**		**D**		**N**	
78	**Saxicola rubetra**	**+**	**D**	**-**	**N**	**-**
79	**Saxicola torquata**			**D**		
80	**Sitta europaea**			**D**		
81	**Streptopelia decaocto**		**+**			**-**
82	**Streptopelia turtur**	**+**	**+**	**+**	**N**	**-**
83	**Sturnus vulgaris**	**+**	**+**	**+**	**N**	**-**
84	**Sylvia atricapilla**	**0**	**N**	**0**		**D**
85	**Sylvia communis**	**-**	**+**	**+**	**+**	**+**
86	**Sylvia curruca**	**N**	**D**	**+**	**N**	**0**
87	**Sylvia nisoria**	**+**		**D**		**D**

88	**Troglodytes troglodytes**			**D**		
89	**Turdus merula**	**+**	**-**	**0**	**N**	**0**
90	**Turdus philomelos**	**+**		**+**		
91	**Turdus pilaris**	**D**	**D**	**N**		
92	**Tyto alba**			**D**		
93	**Upupa epops**	**D**	**+**	**+**	**-**	**D**
94	**Vanellus vanellus**			**N**		

Table 4. Changes in the breeding bird densities in Transect 1 (see Table 3 for key to codes on Trends).

N	Species name	2009	2010	Trend
1	**Accipiter nisus**	**0,2**		**-**
2	**Alauda arvensis**	**95,6**	**115,6**	**+**
3	**Anthus campestris**	**1,4**	**1,5**	**+**
4	**Anthus trivialis**	**1,2**	**2,5**	**+**
5	**Apus apus**	**0,8**		**-**
6	**Buteo buteo**	**1,5**		**-**
7	**Carduelis carduelis**	**0,6**	**4,25**	**+**
8	**Carduelis spinus**		**31**	**N**
9	**Coccothraustes coccothraustes**	**1,8**	**3**	**+**
10	**Corvus cornix**		**2**	**N**
11	**Corvus corone cornix**	**0,2**		**D**
12	**Coturnix coturnix**	**1,8**	**1,8**	**0**
13	**Cuculus canorus**	**1,3**	**1**	**-**
14	**Delichon urbica**	**2,8**		**D**
15	**Dendrocopos major**		**1**	**N**
16	**Emberiza cirlus**	**0,3**		**D**
17	**Emberiza hortulala**	**4,1**	**13,7**	**+**
18	**Emberiza melanocephala**	**1,8**	**12,3**	**+**
19	**Erithacus rubecula**	**0,8**	**19**	**+**
20	**Falco tinnunculus**	**2**	**1**	**-**
21	**Ficedula albicollis**	**0,6**	**2**	**+**
22	**Ficedula hypoleuca**	**5,2**	**3,6**	**-**
23	**Ficedula semitorquata**	**0,2**	**1**	**+**
24	**Fringilla coelebs**	**1,8**	**10**	**+**
25	**Garrulus glandarius**	**5,7**	**1,5**	**-**
26	**Hirundo rustica**	**3,4**	**16**	**+**
27	**Lanius collurio**	**6,2**	**10**	**+**
28	**Lanius minor**	**6,6**	**12,7**	**+**
29	**Lanius senator**	**1,7**	**2**	**+**
30	**Luscinia luscinia**	**0,4**		**-**
31	**Luscinia megarhynchos**	**2,3**	**5**	**+**
32	**Melanocorypha calandra**	**6,8**	**13**	**+**
33	**Merops apiaster**	**3,2**		**-**
34	**Miliaria calandra**	**4,8**	**11,4**	**+**
35	**Motacilla alba**	**0,4**	**11**	**+**
36	**Motacilla flava**	**5,8**	**7**	**+**

37	**Muscicapa striata**	**2,2**		**D**
38	**Oenanthe oenanthe**	**0,6**	**1,7**	**+**
39	**Oriolus oriolus**	**33,2**	**16,3**	**-**
40	**Passer hispaniolensis**	**2,3**	**38,5**	**+**
41	**Passer montanus**		**2**	**N**
42	**Perdix perdix**		**2**	**N**
43	**Phoenicurus ochruros**	**0,4**		**0,4**
44	**Phylloscopus collybita**	**0,7**	**8**	**+**
45	**Phylloscopus sibilatrix**	**1,5**		**D**
46	**Phylloscopus trochilus**	**0,8**	**3**	**+**
47	**Pica pica**	**0,3**	**2**	**+**
48	**Picus viridis**	**2,8**		**D**
49	**Saxicola rubetra**	**1**	**2**	**+**
50	**Streptopelia turtur**	**3,2**	**6**	**+**
51	**Sturnus vulgaris**	**8**	**71,6**	**+**
52	**Sylvia atricapilla**	**1**	**1**	**0**
53	**Sylvia communis**	**2**	**1,5**	**-**
54	**Sylvia curruca**		**1**	**N**
55	**Sylvia nisoria**	**1,2**	**3**	**+**
56	**Turdus merula**	**18**	**20,6**	**+**
57	**Turdus philomelos**	**1,7**	**2**	**+**
58	**Turdus pilaris**	**0,6**		**D**
59	**Upupa epops**	**0,7**		**D**

Table 5. Changes in the breeding bird densities in Transect 2 (see Table 3 for key to codes on Trends).

N	Species name	2009	2010	Trend
1	**Acrocephalus arundinaceus**		**1**	**N**
2	**Alauda arvensis**	**75**	**70,6**	**-**
3	**Anthus campestris**	**0,2**		**D**
4	**Anthus trivialis**	**0,8**	**3,5**	**+**
5	**Apus apus**	**0,8**	**1**	**+**
6	**Buteo buteo**	**0,2**	**1**	**+**
7	**Carduelis cannabina**	**0,2**		**D**
8	**Carduelis carduelis**	**1,6**	**1**	**-**
9	**Carduelis carduelis**	**1,6**	**1**	**-**
10	**Circus aeruginosus**		**1**	**+**
11	**Coccothraustes coccothraustes**	**0,6**	**3**	**+**
12	**Corvus cornix**		**2,8**	**N**
13	**Corvus corone cornix**	**1**		**D**
14	**Corvus monedula**		**1**	**N**
15	**Coturnix coturnix**	**0,6**	**1**	**+**
16	**Cuculus canorus**		**2**	**+**

17	**Dendrocopos major**	**0,4**	**1,67**	**+**
18	**Emberiza citrinella**	**0,2**		**D**
19	**Emberiza hortulana**	**2**	**7,5**	**+**
20	**Emberiza melanocephala**	**2**	**7,3**	**+**
21	**Falco subbuteo**	**0,2**		**D**
22	**Falco tinnunculus**	**0,2**	**1**	**+**
23	**Falco vespertinus**	**0,2**		**-**
24	**Ficedula albicollis**	**0,4**	**1,5**	**+**
25	**Ficedula hypoleuca**	**2,8**	**4**	**+**
26	**Fringilla coelebs**	**0,2**		**D**
27	**Galerida crisata**	**1,6**	**2**	**+**
28	**Garrulus glandarius**	**6**	**3,8**	**-**
29	**Hirundo rustica**	**5,7**	**9**	**+**
30	**Lanius collurio**	**4**	**2,5**	**-**
31	**Lanius minor**	**2**	**10,6**	**+**
32	**Luscinia megarhynchos**	**2,4**	**4**	**+**
33	**Melanocorypha calandra**	**2,8**	**4,4**	**+**
34	**Merops apiaster**	**0,4**		**-**
35	**Miliaria calandra**	**1,6**	**2,8**	**+**
36	**Motacilla alba**	**0,8**	**1,5**	**+**
37	**Motcailla flava**	**8,6**	**8,6**	**0**
38	**Muscicapa striata**	**1,6**	**1**	**-**
39	**Oenanthe oenanthe**	**1,6**	**1,6**	**-**
40	**Oriolus oriolus**	**6,4**	**13,3**	**+**
41	**Parus major**	**0,6**	**1**	**+**
42	**Passer domesticus**	**6,6**	**11,75**	**+**
43	**Passer hispaniolensis**	**4**	**12**	**+**
44	**Phoenicurus ochruros**		**1**	**N**
45	**Phylloscopus collybita**	**0,2**	**1,5**	**+**
46	**Phylloscopus sibilatrix**	**1,2**		**D**
47	**Phylloscopus trochilus**	**0,4**	**10**	**+**
48	**Pica pica**	**3,4**	**7,6**	**+**
49	**Riparia riparia**	**0,4**		**D**
50	**Saxicola rubetra**	**4,8**		**D**
51	**Streptopelia decaocto**	**2,2**	**3,2**	**+**
52	**Streptopelia turtur**	**1,2**	**1,3**	**+**
53	**Sturnus vulgaris**	**32**	**71,4**	**+**
54	**Sylvia atricapilla**		**4**	**N**
55	**Sylvia communis**	**0,7**	**2,5**	**+**
56	**Sylvia curruca**	**1**		**D**
57	**Turdus merula**	**5,6**	**2,6**	**4,1**

58	**Turdus pilaris**	**1,2**		**D**
59	**Upupa epops**	**0,3**	**1**	**+**

Table 6. Changes in the breeding bird densities in Transect 3 (see Table 3 for key to codes on Trends). Conservation status of species is given as follows: A – globally threatened species; B- species of European conservation concern; C- nationally threatened species.

N	Species name	C. Status	2009	2010	Trend
1	**Acrocephalus scirpaceus**		**0,4**		**D**
2	**Alauda arvensis**	**B**	**128**	**148**	**+**
3	**Anthus campestris**	**BC**	**0**	**1**	**N**
5	**Anthus trivialis**		**1,4**	**1,5**	**0**
6	**Apus apus**		**2,8**	**5**	**+**
7	**Buteo buteo**	**C**	**0,8**		**D**
8	**Buteo rufinus**	**BC**	**1,2**	**1**	**+**
10	**Carduelis cannabina**		**0,6**	**1**	**+**
11	**Carduelis carduelis**	**B**	**1**		**D**
13	**Circus aeruginosus**	**C**	**0,4**	**1**	**+**
14	**Circus pygargus**			**1**	**N**
15	**Coccothraustes coccothraustes**			**4,5**	**N**
17	**Coracias garrulus**	**ABC**	**0,2**		**D**
19	**Corvus cornix**			**2**	**N**
21	**Coturnix coturnix**	**B**	**1,2**	**3,5**	**+**
25	**Cuculus canorus**		**1**	**1,5**	**+**
27	**Delichon urbica**	**B**	**2,2**		**D**
29	**Dendrocopos syriacus**	**C**	**0,6**		**D**
31	**Emberiza hortulala**	**BC**	**4,6**	**5**	**+**
35	**Emberiza melanocephala**	**B**	**7**	**14,67**	**+**
36	**Erithacus rubecula**		**1,8**	**7**	**+**
37	**Falco peregrinus**	**C**	**0,4**		**D**
38	**Falco subbuteo**	**C**	**0,2**	**1**	**+**
39	**Falco tinnunculus**			**1**	**N**
40	**Falco vespertinus**	**ABC**	**3,8**		**D**
41	**Ficedula hypoleuca**	**C**	**9,8**	**1**	**-**
42	**Ficedula semitorquata**	**ABC**	**0,2**		**D**
43	**Gallinago gallinago**	**BC**	**0,2**		**D**
44	**Garrulus glandarius**		**4,4**	**4,67**	**+**
45	**Hirundo rustica**	**B**	**10**	**3**	**-**
46	**Lanius collurio**	**B**	**3,6**	**5**	**+**
47	**Lanius minor**	**BC**	**5,6**	**12**	**+**
48	**Luscinia luscinia**		**0,4**		**D**

49	**Luscinia megarhynchos**		**2,2**	**2,5**	**+**
50	**Melanocorypha calandra**	**BC**	**26,8**	**41**	**+**
51	**Merops apiaster**	**BC**	**0,6**		**D**
52	**Miliaria calandra**	**B**	**7,4**	**10**	**+**
53	**Motacilla alba**		**1**	**4**	**+**
54	**Motacilla flava**		**16,2**	**9,4**	**-**
55	**Muscicapa striata**	**B**	**1,8**	**5**	**+**
56	**Oenanthe oenanthe**	**B**	**1**		**1**
57	**Oriolus oriolus**		**8**	**14**	**+**
58	**Parus major**		**0,4**		**D**
59	**Passer hispaniolensis**		**28,8**	**5,67**	**-**
60	**Perdix perdix**			**2,8**	**N**
61	**Phoenicurus ochruros**		**1,4**		**D**
62	**Phylloscopus collybita**		**3,6**	**2**	**-**
63	**Phylloscopus sibilatrix**	**B**	**0,4**		**D**
64	**Phylloscopus trochilus**		**4,4**	**2**	**-**
65	**Pica pica**		**1,8**	**5**	**+**
66	**Saxicola rubetra**		**6,4**	**2**	**-**
67	**Saxicola torquata**		**0,2**		**D**
68	**Sitta europaea**		**0,2**		**D**
69	**Streptopelia turtur**	**B**	**5**	**5,5**	**+**
70	**Sturnus vulgaris**	**B**	**0,6**	**13,2**	**+**
71	**Sylvia atricapilla**		**1**	**1**	**0**
72	**Sylvia communis**		**4**	**6**	**+**
73	**Sylvia curruca**		**0,4**	**1**	**+**
74	**Sylvia nisoria**	**C**	**0,2**		**D**
75	**Troglodytes troglodytes**		**0,2**		**D**
76	**Turdus merula**		**4,8**	**4,4**	**0**
77	**Turdus philomelos**		**0,8**	**22**	**+**
78	**Turdus pilaris**			**2**	**2**
79	**Tyto alba**	**BC**	**1**		**1**
80	**Upupa epops**	**B**	**0,8**	**1**	**+**
81	**Vanellus vanellus**			**1**	**1**

Table 7. Changes in the breeding bird densities in Transect 4 (see Table 3 for key to codes on Trends). Conservation status of species is given as follows: A – globally threatened species; B- species of European conservation concern; C- nationally threatened species.

N	Species name	Cons.	2009	2010	Trend
1	**Alauda arvensis**			**26,2**	**N**

2	**Anthus campestris**	**BC**	**3,2**	**3,5**	**+**
3	**Apus apus**			**20,0**	**N**
4	**Burhinus oedicnemus**			**1,5**	**N**
5	**Calandrella brachydactyla**			**6,8**	**N**
6	**Carduelis carduelis**			**2,0**	**N**
7	**Circus aeruginosus**			**1,0**	**N**
8	**Coccothraustes coccothraustes**			**1,0**	**N**
9	**Columba livia**			**3,5**	**N**
10	**Coracias garrulus**			**1,0**	**N**
11	**Corvus cornix**			**3,3**	**N**
12	**Corvus frugilegus**			**1,0**	**N**
13	**Corvus monedula**			**3,0**	**N**
14	**Coturnix coturnix**			**1,7**	**N**
15	**Cuculus canorus**			**1,0**	**N**
16	**Delichon urbica**			**2,0**	**N**
17	**Emberiza hortulana**			**1,0**	**N**
18	**Emberiza melanocephala**			**6,7**	**N**
19	**Falco subbuteo**			**2,0**	**N**
20	**Falco tinnunculus**			**1,0**	**N**
21	**Falco vespertinus**			**2,5**	**N**
22	**Ficedula hypoleuca**			**2,0**	**N**
23	**Garrulus glandarius**			**1,0**	**N**
24	**Hirundo daurica**			**2,0**	**N**
25	**Hirundo rustica**			**9,4**	**N**
26	**Lanius collurio**	**B**	**1,4**	**8,0**	**+**
27	**Lanius minor**	**BC**	**0,8**	**3,3**	**+**
28	**Lanius senator**	**B**	**1,0**	**1,0**	**0**
29	**Luscinia luscinia**			**1,0**	**N**
30	**Melanocorypha calandra**	**BC**	**135,8**	**141,8**	**+**
31	**Merops apiaster**			**5,0**	**N**
32	**Miliaria calandra**			**37,4**	**N**
33	**Motacilla flava**			**2,0**	**N**
34	**Muscicapa striata**			**1,0**	**N**
35	**Oenanthe isabellina**			**1,0**	**N**
36	**Oenanthe oenanthe**			**1,0**	**N**
37	**Oenanthe pleschanka**			**1,0**	**N**
38	**Oriolus oriolus**		**0,4**	**1,0**	**N**
39	**Passer hispaniolensis**			**6,0**	**N**
40	**Pica pica**			**1,0**	**N**
41	**Riparia riparia**			**8,0**	**N**
42	**Saxicola rubetra**			**2,7**	**N**

43	**Streptopelia turtur**			**3,7**	**N**
44	**Sturnus vulgaris**			**14,8**	**N**
45	**Sylvia communis**		**1,8**	**2,3**	**+**
46	**Sylvia curruca**			**1,0**	**N**
47	**Turdus merula**			**1,0**	**N**
48	**Upupa epops**	**B**	**2,4**	**1,8**	**-**

Table 8. Changes in the breeding bird densities in Transect 5 (see Table 3 for key to codes on Trends). Conservation status of species is given as follows: A – globally threatened species; B- species of European conservation concern; C- nationally threatened species.

N	Species name	Cons.	2009	2010	Trend
1	**Acrocephalus arundinaceus**			**1,0**	**N**
2	**Alauda arvensis**	**B**	**32,2**	**38,0**	**+**
3	**Anthus campestris**	**BC**	**0,6**	**1,0**	**+**
4	**Anthus trivialis**		**1,2**	**5,0**	**+**
5	**Buteo rufinus**	**BC**	**0,2**		**D**
6	**Carduelis cannabina**		**0,2**	**1,3**	**+**
7	**Carduelis carduelis**	**B**	**0,7**	**1,5**	**+**
8	**Carduelis chloris**		**3,0**	**2,0**	**-**
9	**Circus aeruginosus**			**1,0**	**N**
10	**Coccothraustes coccothraustes**		**1,8**	**3,7**	**+**
11	**Columba livia(domestica)**			**1,0**	**N**
12	**Coracias garrulus**			**2,0**	**N**
13	**Corvus cornix**			**2,5**	**N**
14	**Corvus corone cornix**		**0,6**		**D**
15	**Coturnix coturnix**	**B**	**1,0**	**1,0**	**0**
16	**Cuculus canorus**		**0,6**	**1,0**	**+**
17	**Dendrocopos syriacus**	**C**	**1,0**		**D**
18	**Emberiza hortulana**	**BC**	**6,4**	**6,5**	**6,5**
19	**Emberiza melanocephala**	**B**	**1,7**	**6,0**	**+**
20	**Erithacus rubeculla**			**1,0**	**N**
21	**Falco tinnunculus**			**1,0**	**N**
22	**Falco vespertinus**			**1,0**	**N**
23	**Ficedula hypoleuca**	**C**	**2,0**		**D**
24	**Fringilla coelebs**			**2,5**	**N**
25	**Garrulus glandarius**		**3,6**	**4,5**	**+**
26	**Hirundo rustica**	**B**	**9,4**	**5,3**	**-**
27	**Jynx torquilla**			**1,0**	**N**

28	**Lanius collurio**	**B**	**2,2**	**6,0**	**+**
29	**Lanius minor**	**BC**	**2,4**	**9,3**	**+**
30	**Lanius senator**	**B**	**0,6**		**D**
31	**Luscinia megarhynchos**		**1,4**	**4,0**	**+**
32	**Melanocorypha calandra**	**BC**	**1,4**	**7,4**	**+**
33	**Merops apiaster**		**0,4**	**4,0**	**0**
34	**Miliaria calandra**	**B**	**12,0**	**18,0**	**+**
35	**Motacilla alba alba**		**0,2**	**1,0**	**-**
36	**Motcailla flava feldegg**		**3,0**	**3,8**	**+**
37	**Muscicapa striata**			**1,0**	**N**
38	**Oenanthe isabelina**			**1,0**	**N**
39	**Oenanthe oenanthe**			**3,0**	**N**
40	**Oriolus oriolus**		**7,2**	**13,7**	**+**
41	**Parus major**		**1,0**	**1,0**	**0**
42	**Passer domesticus**	**B**	**1,0**	**2,0**	**+**
43	**Passer hispaniolensis**		**0,6**	**23,7**	**+**
44	**Phasianus colchicus**			**1,0**	**N**
45	**Phylloscopus collybita**			**1,0**	**N**
46	**Phylloscopus sibilatrix**	**B**	**1,0**		**D**
47	**Phylloscopus trochilus**		**2,0**	**2,0**	**+**
48	**Pica pica**		**1,2**	**5,3**	**+**
49	**Picus canus**	**BC**	**0,2**		**D**
50	**Saxicola rubetra**		**2,0**	**1,0**	**-**
51	**Streptopelia decaocto**		**1,4**	**1,0**	**-**
52	**Streptopelia turtur**	**B**	**5,0**	**2,0**	**-**
53	**Sturnus vulgaris**	**B**	**73,4**	**46,6**	**-**
54	**Sylvia atricapilla**		**1,0**		**D**
55	**Sylvia communis**		**1,0**	**2,0**	**+**
56	**Sylvia curruca**		**1,0**	**1,0**	**0**
57	**Sylvia nisoria**	**C**	**0,4**	**3,3**	**+**
58	**Turdus merula**		**5,4**	**5,4**	**0**
59	**Upupa epops**	**B**	**0,4**		**D**

Comparative analysis of the changes in breeding bird community by transects revealed general increase in the number of species as well as in the numbers of individuals. These changes between the years 1 and 2 are presented in Table 9. The increase in the number of species was observed at the same rate in all 3 transects in the wind park territory (Table 9).The same increase in the number of species was observed in the control transect outside the wind park territory where no construction of wind turbines had taken place. A slight increase was observed even in the transect through the steppe habitat where no changes in the habitat were registered. Proportion of the trends of breeding birds by transects are presented in Table 10. The higher variations in the bird species as well as in

their numbers in the agricultural habitats compared to the steppe territory can be expected concerning yearly changes in the crops planted.

Table 9. Number of species with different trends by transects

	Transect				
Trend	**1**	**2**	**3**	**4**	**5**
Increase	**31**	**32**	**27**	**5**	**22**
Decrease	**11**	**10**	**7**	**1**	**7**
New species	**6**	**5**	**8**	**42**	**15**
Disappeared	**9**	**11**	**21**	**0**	**11**
No change	**2**	**1**	**3**	**1**	**5**
Grand Total	**59**	**59**	**66**	**49**	**60**

Table 10. Proportion of the bird species with different trends in numbers by transect.

	Transect					
Trend	**1**	**2**	**3**	**4**	**5**	**Total**
Increase	**53%**	**54%**	**41%**	**10%**	**37%**	**40%**
Decrease	**19%**	**17%**	**11%**	**2%**	**12%**	**12%**
New species	**10%**	**8%**	**12%**	**86%**	**25%**	**26%**
Disappeared	**15%**	**19%**	**32%**	**0%**	**18%**	**18%**
No change	**3%**	**2%**	**5%**	**2%**	**8%**	**4%**

Conclusions

1. The Breeding Bird Survey in 2010 registered an increase in the recorded bird species with varying degrees of breeding evidence at the wind park territory. There were 17 more bird species than registered in 2009 before the operation of the wind park started

2. The overall number of the individuals of many bird species increased in 2010.

3. The number of common species as well as their abundance remained similar after operation as it was before the construction (operation) of the wind park.

4. There are no breeding species of high conservation value registered in significant numbers, or zones with high conservation values, in the wind park territory

5. There are fluctuations of the numbers of different breeding bird species through the wind farm, but they do not differ from the control territory outside the park.

6. There is no evidence of any adverse effect of the wind park on the bird community breeding in SNWF

APPENDIX I

Digital distributions of every established species per transect are available in PDF files and will be delivered on request from AES Geo Power.