TECHNICAL RULES AND PROCEDURES CONCERNING THE OPERATION OF INTEGRATED SYSTEM FOR PROTECTION OF BIRDS ON THE TERRITORY OF KALIAKRA PROTECTED AREA WITH CODE BG0002051

I. GENERAL TERMS

1. Purpose

The purpose of the current technical rules and procedures is to achieve effective management and to minimize the risk of bird mortality from the rotors of the wind generators by integrating the applied in the operating Wind Farms, Early Warning System, suspending single turbines, groups of generators or whole Wind Farms, as well as monitoring during risk periods for species of conservation significance.

2. Scope

2.1. The Integrated System is implemented by the Wind Farms located in the protected area "Kaliakra" with code BG0002051 and signed or joined to the Agreement on Construction and Operation of Integrated System for Protection of Birds.

2.2. Target bird species:

	Species
1	**Egyptian Vulture (*Neophron percnopterus)***
2	**Griffon Vulture (*Gyps fulvus)***
3	**Black Vulture (*Aegypius monachus)***
4	**Pallid Harrier (*Circus macrourus)***
5	**Greater Spotted Eagle (*Aquila clanga)***
6	**Eastern Imperial Eagle (*Aquila heliaca)***
7	**Lesser Kestrel (*Falco naumanni)***
8	**Saker Falcon (*Falco cherrug)***
9	**White-tailed *Eagle (Haliaeetus albicilla)***
10	**Dalmatian Pelican *(Pelecanus crispus)***
11	**Great White Pelican (*Pelecanus onocrotalus)***
12	**Mute Swan (*Cygnus olor)***
13	**Tundra Swan (*Cygnus columbianus)***
14	**Whooper swan (*Cygnus cygnus)***
15	**Red-breasted Goose (*Branta ruficollis)***
16	**Graylag Goose (*Anser anser*)**
17	**White-headed Duck (*Oxyura leucocephala)***
18	**Short-toed snake Eagle (*Circaetus gallicus)***
19	**Montagu's harrier (Circus pygargus)**
20	**Long-legged Buzzard (*Buteo rufinus)***
21	**Lesser Spotted Eagle (*Aquila pomarina)***
22	**Golden eagle (*Aquila chrysaetos)***
23	**Booted Eagle (*Aquila pennata)***
24	**River Hawk (*Pandion haliaetus)***
25	**Red-footed Falcon *(Falco vespertinus)***
26	**Eurasian eagle-owl (*Bubo bubo)***
27	**Red-throated diver *(Gavia stellata)***
28	**Black- throated diver (*Gavia arctica)***
29	**White Stork (Ciconia ciconia)**
30	**Black Stork (Ciconia nigra)**

*** Note:** the target species are defined on the basis of Report "Map of areas with risk for the birds from construction of wind turbine generators", Sofia, 2013 ECONECT (http://natura2000.moew.government.bg/PublicDownloads/Auto/OtherDoc/276299 /276299_Birds_120.pdf. The list may be supplemented or reduced in the course of the implementation of the ISPB.

2.3. Period of application: All year round, including during spring and autumn migration and wintering.

3. Compliance with the regulatory framework

All actions under these technical rules and procedures should only be undertaken insofar as they are in compliance with the legislative acts in force in the Republic of Bulgaria as well as with the administrative acts related to the Wind Farms located in SPA "KAliakra".

II. ELEMENTS OF THE INTEGRATED SYSTEM

A combination of existing high-tech radar observations, meteorological data integrated with field visual observations shall be implemented to meet the objectives.

The use of both tools is essential for the accurate risk assessment and ensures that appropriate action is taken immediately.

The system includes:

1. A system of high-tech radars and meteorological stations:

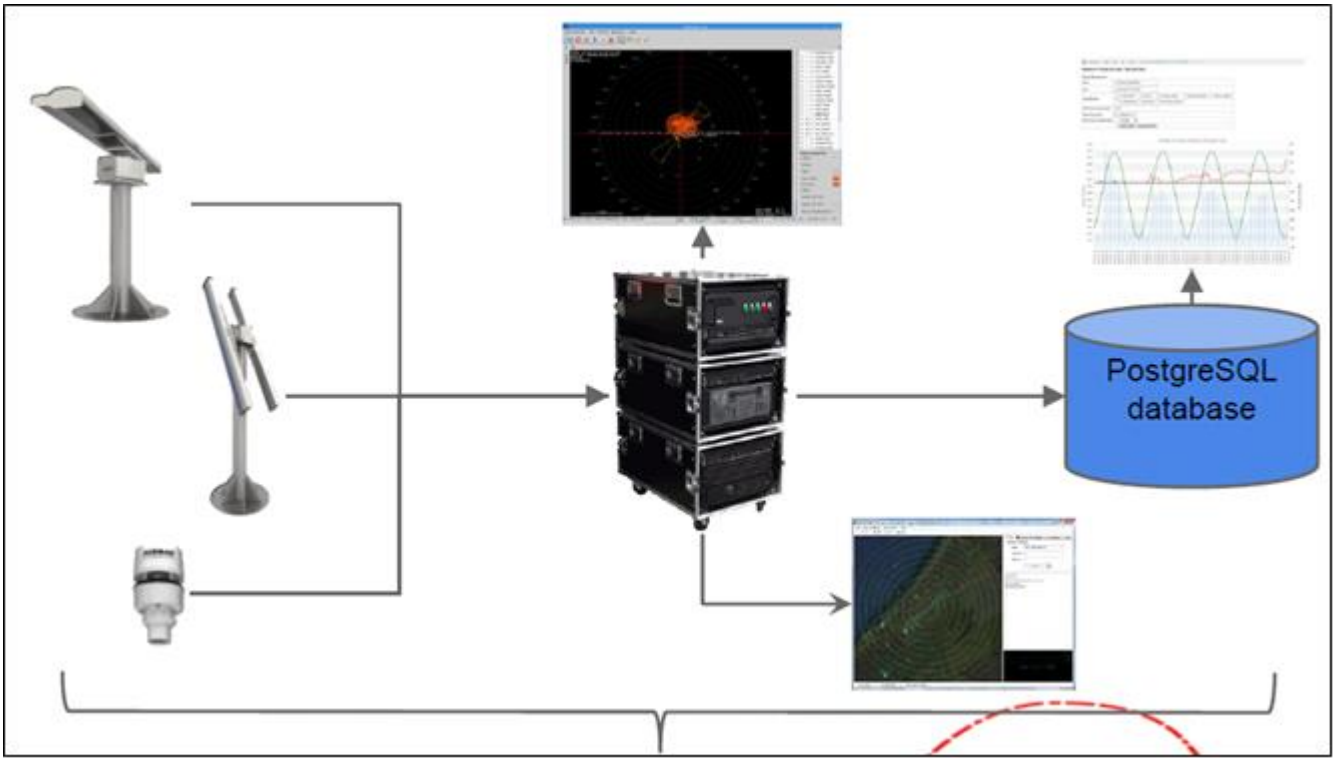
1.1. Radar System Robin

The radar system has a coverage of more than 20 km in diameter (http://www.robinradar.com). Purchased and installed in connection with the construction of EVN Kavarna's WF. The radar is calibrated to automatically stop wind turbines at EVN WF in the event of a risk of collision with birds. The precise radar adjustment was carried out after a detailed preliminary ornithological on-site survey conducted by Bulgarian and foreign experts, as well as a result of ornithological monitoring after the construction of wind turbines, in the period from July 2012 to July 2013.

The elements of the radar system are as follows:

- Radar (pulse) with horizontal range;
- Vertical-range radar (FMCW);
- Weather station (determines wind speed and direction);
- Data converter connected to PLC;
- Data Control and Processing System (SCADA – Supervisory Control and Data Acquisition);

Scheme of radar system "Robin"



The parameters of the radar system are as follows:

Horizontal radar range – 10 km (radius);

Range of vertical radar – 3.5 km (radius);

Range of detection of standalone objects (in meters from radar):

Objects	Horizontal radar (м)	Vertical radar (м)
Small-sized birds (sparrow)	1000	500
Medium-sized birds (pigeon)	3500	1500
Large-sized birds (goose)	7000	2500

1.2. Specialized Radar BIRD SCAN MS1

BirdScan MS1 Radar system https://swiss-birdradar.com/home.html was designed by the Swiss Ornithological Institute. It is mounted on a platform that facilitates maintenance activities and allows relocation when necessary to work in different positions during the season.

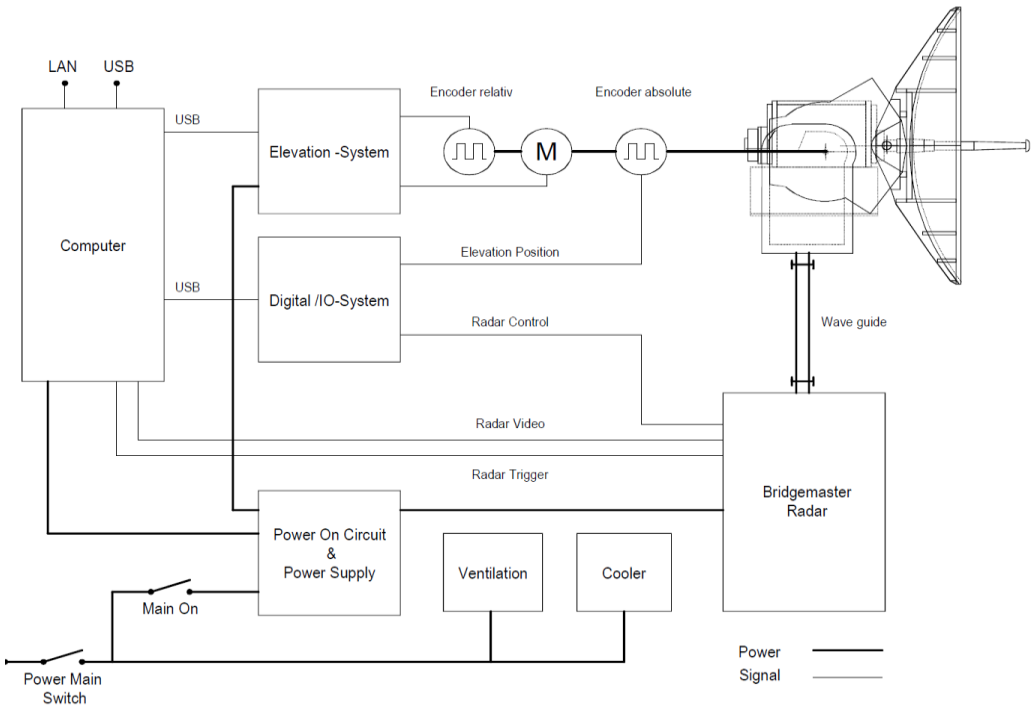
The antenna allows movement along horizontal and vertical axes with directing to the sector that requires monitoring. The angle can be changed in a certain range (0 to 90 degrees). It is positioned across the main migration stream in St. Nikola Wind Farm and covers a maximum area along the power plant.

The system operates in automatic mode. It is equipped with a Bridgemaster 65825H impulse horizontal radar.

Minimum resolution for small sparrow-like birds with a size of 10 cm - 2.5 km.

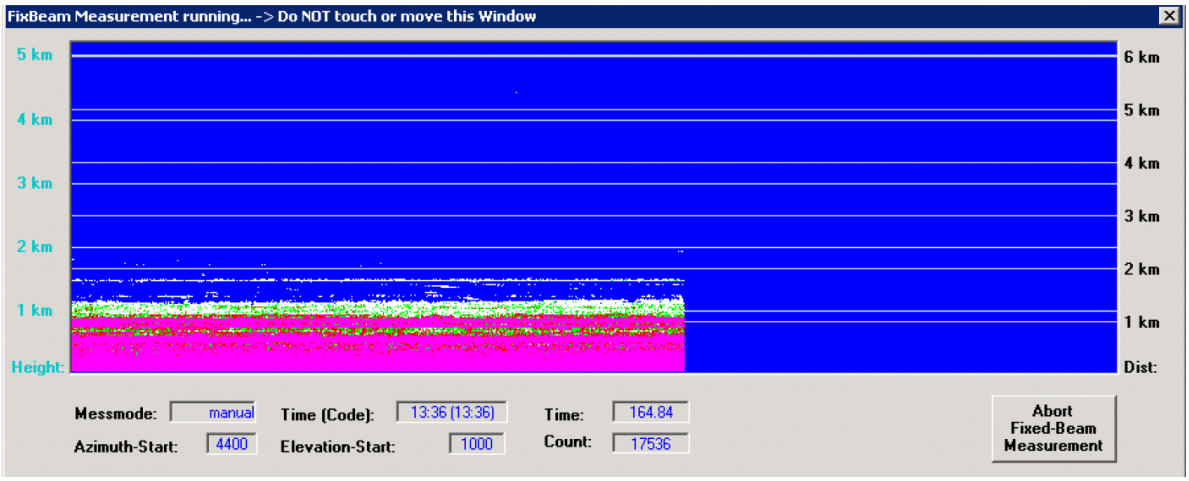
Minimum resolution for large birds - up to 15 km.

BIRD SCAN MS1 Radar System Scheme



The computer for control of the system is BookSize PC of DSM Computer. The video signal of the radar is digitized at 12 MHz frequency and is processed by specially developed BirdScanMS1 software.

The data is displayed on the screen in the form of a y-t (quantitative-time) diagram in colours with different intensity.



1.3. Specialized Radar of Kaliakra Wind Power AD

The Deltatrack Bird Detection System is a precise radar system, including two raster-scan type radars with high-resolution. It is designed for timely finding of flocks of birds fleeing within the range of the wind farm, which reduces the risks of death of flying birds.

The system consists of:

Output radar system including horizontal and vertical radar MK 6217 type, processor for data processing, type - horizontal, processor for data processing, type - vertical, power supply 220V, antenna 1 with modem, located on a mound, 6m height and 500 m distance from Balgarevo substation and

Control room, which includes: antenna 2 with modem, information processing system (IPS), standard monitor and keyboard.

The transmitted information signal is transmitted by Antenna 1 and received by Antenna 2, it is processed by the IPS and displayed on the monitor screen.

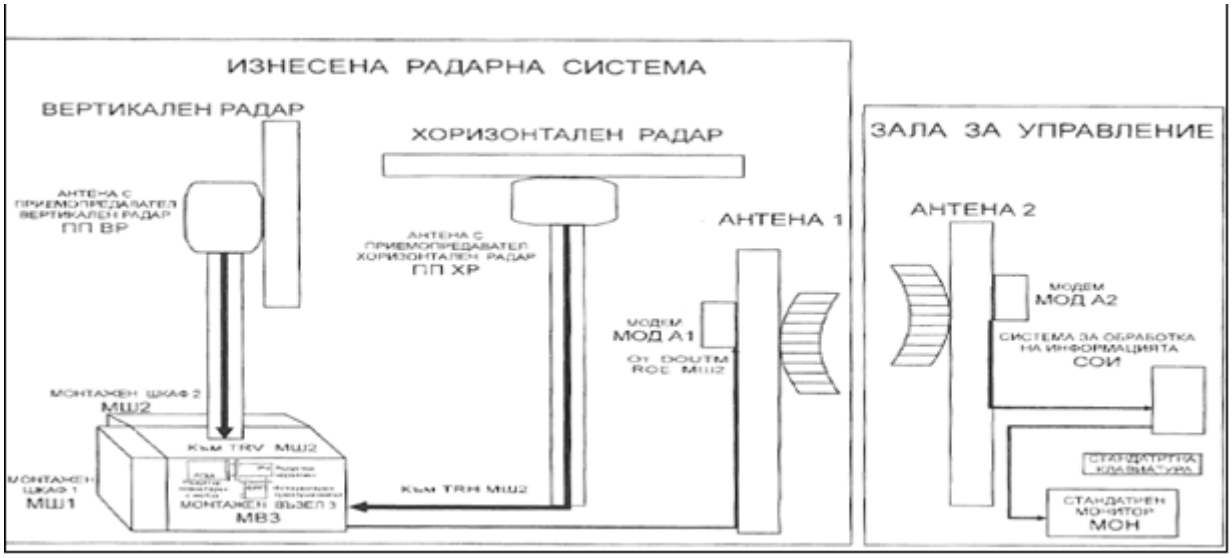
The alert system is set to when detecting a "**risk object**", it is visualized on the monitor screen while at the same time the operator receives a sound alarm for the presence of a flying target. These warning signals allow timely appropriate countermeasures to be taken in order to avoid a possible collision of an approaching flock with the wind turbine generators of the power plant.

For all purposes, a velocity vector line is displayed, indicating the direction of movement and the supposed position of the target in 5 minutes.

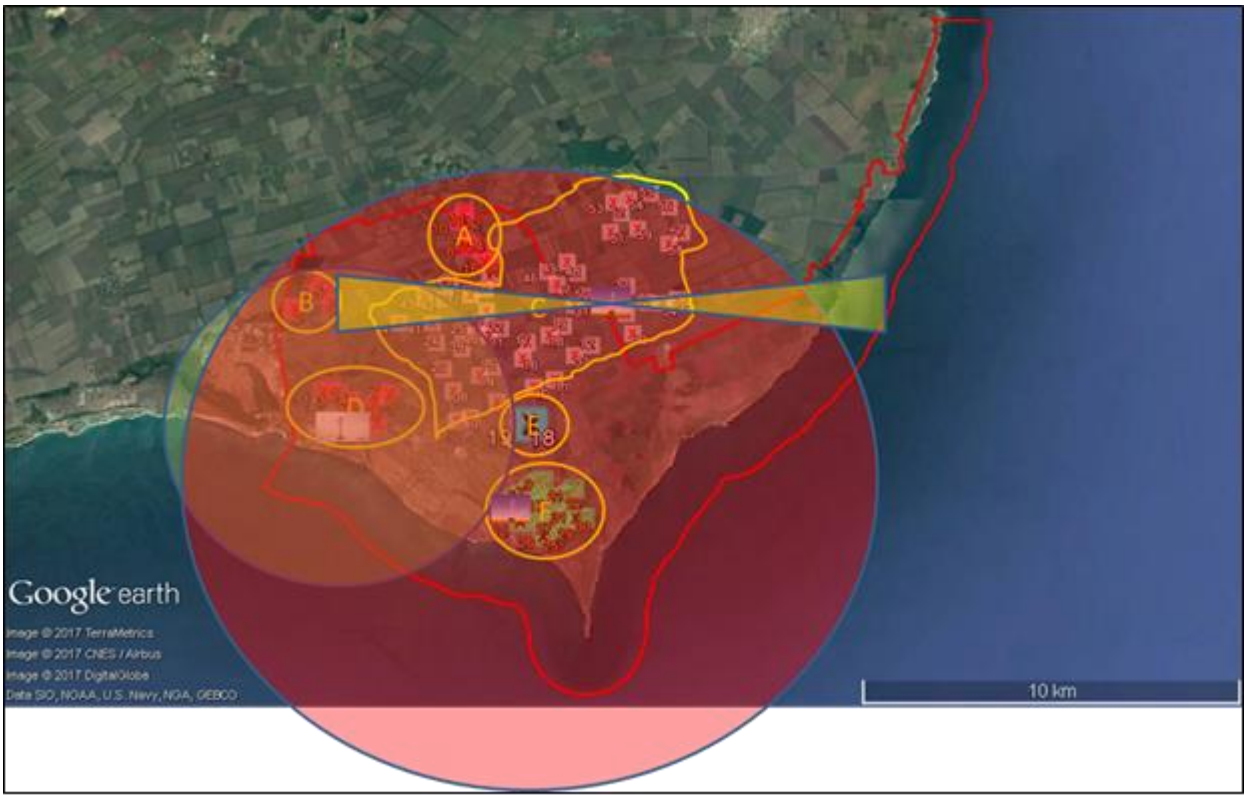
A **risk object** is any object that has the following parameters:

- Distance from the radar (Kaliakra Wind Farm region) from 1 to 20 km.
- Movement speed from 5 to 60 km/h.
- Direction of movement relative to the position of the radar +30/-30 degrees.

Deltatrack Radar System Scheme



The following scheme presents the range/coverage of the radar systems and the location of individual turbines.



Key:

A – Wind turbines of different operators
B – Wind Turbines of Long Man Invest OOD
C – Wind Turbines of AES Geo Energy Ltd.
D – Wind Turbines of EVN Kavarna
E – Wind Turbines of Vertikal-Petkov & Sie SD
F – Wind Turbines of Kaliakra Wind Power

Deltatrack Radar; **Robin Radar** **BIRD SCAN MS1 Radar**

2. Ornithologists and support staff

1.1. Senior Field Ornithologist (SFO) - coordinates the activities of the team of ornithologists and assistant ornithologists, tracks the registered birds and determines the direction of their flight, decides to suspend individual wind turbine generators or groups of wind turbine generators, communicates the decision with the operational staff of the Wind Farms, in coordination with the Wind Farms, participating in the ISPB, prepares periodic reports for the observations and the suspensions of the wind turbine generators;

1.2. Field ornithologists - carry out on-site bird flight observation in the periods of migration and communicate their observations with the SFO;

1.3. Assistant ornithologists - assist field ornithologists in monitoring activities of bird death from collision with the wind turbine generators' propellers;

3. Control room

The control room is located in the territory of Kaliakra Protected Area. Technical means for visualization of the data from the radars, means of communication between the Senior Field Ornithologists (SFO), the field ornithologists and the wind farm operational staff are located in it. The location of the control room will be determined according to the technical possibilities for visualization of the operating power plant turbines and the radar data.

4. Other technical means

For visualization of the radar data, communication links will be established between the radars and the control room, where monitors will be provided for visualization.

A Scheme/Card with a unified codification of the generators included in the ISPB will be prepared for identification of the wind turbine generators, which will be provided to the field ornithologists and the SFO.

For the functioning of the Integrated System will also be provided:

- Laptop for documenting the monitoring and reporting;
- Radio stations and/or mobile phones for connection between SFO and field ornithologists
- GPSs;
- Vehicles for transportation of the ornithologists;
- Binoculars;
- Stationery for taking notes from the monitoring;

III. FUNCTIONING OF THE SYSTEM

1. Visual monitoring

Expert ornithologists, coordinated by the SFO, will be located in places where they can monitor bird approaches to the wind turbine generators. The visual observations will allow the bird species to be determined and, therefore, to distinguish the highly sensitive species, the species of conservation significance from the other bird species. In this way are recorded birds and flocks in the lowest range of radar work, where there are many reflected side echo signals, called noise.

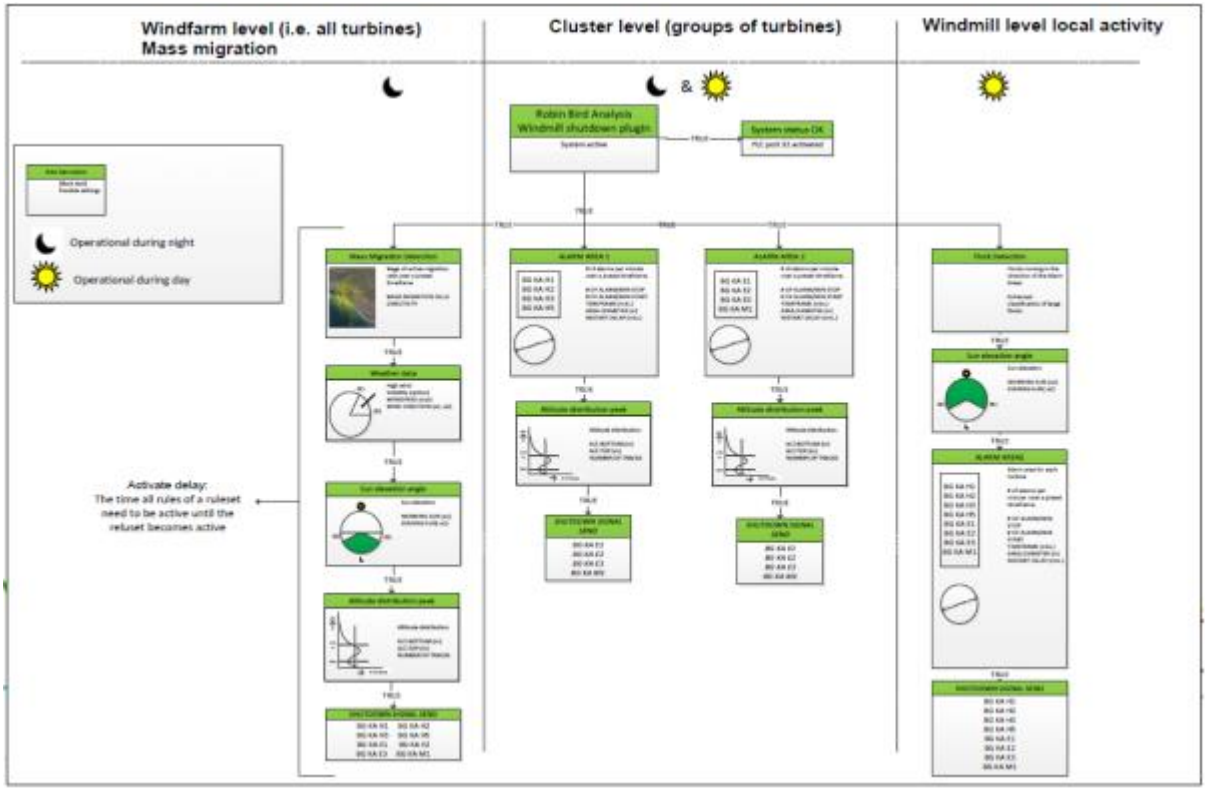
In the case of "risky" bird movements being observed (within the range of the turbine propellers), a suspension protocol for the affected turbines is triggered. Single turbines, groups of turbines or whole Wind Farms are then suspended to reduce the risk of collision. The volume of the suspension depends on the size of the "risk" flocks, the direction of their flight and the specific climatic conditions.

2. Wind turbine suspension protocols

2.1. Protocol for turbines shut down in EVN Kavarna

The ROBIN 3D Flex system for detecting and preventing the risk of collisions with birds is autonomous, fully automated and operates in continuous mode. If necessary, it can stop the operation of the facilities on three functional levels, depending on the case – the entire plant, two groups of 4 wind turbines and on each individual turbine.

On the scheme below is presented the technology of shut down the different functional levels:



2.2. Protocol for the suspension of turbines of other wind farms participating in or joining the system

The SFO has full authority to order the suspension of the turbines of the Wind Farms. The decision to suspend a turbine or a group of turbines is based on the professional judgment of the SFO and is based on the radar data, the field ornithologists' observations and the meteorological data.

The bird tracking activities and the activities on deciding to suspend the wind turbine generators shall be carried out in accordance with the following principles:

- As soon as a significant number of birds are found to fly in an area of 5 km. around a Wind Farm whether through radars or by the ornithologists, the SFO notifies the operational staff of the power plants;
- The SFO orders the registered birds to be tracked and the direction of their flight to be determined;
- The determination of flock's significance varies depending on the bird species in the flock and their number. For example, a small number of rare bird species may be considered important. Determining the importance of the flock is responsibility of the SFO;
- When the direction of the flight passes in proximity but does not cross the territory of the power plant/s, the tracking of the flock continues until the birds completely go away from the territory;

- The weather and wind direction in the area is used to predict risk situations when the bird concentration in the area can increase. On such days, the attention and readiness to make an operational decision is increased;
- When the direction of the flight indicates a tendency to cross Wind Farms or parts of them, the tracking through the observations and the radar continues under constant coordination with the SFO;
- SFO decides to suspend all Wind Farms or part of them according to the field observations and the radar information. The decision is based on a combination of the following factors:

– the bird species (defines their behaviour with regard to the generators, such as circumvention). Circumvention of the turbines is found in over 90% of the birds of all bird species, i.e. the risk varies from 0 to 10 percent of all bird species. For the species established so far in Kaliakra Protected Area the rate of successful circumvention is over 99.9% of the birds;

– the speed of flight;

– the height of flight;

– the conservation status of the species;

– the height at which the flock approaches the power plant - under 20% of the birds fly at the level of the turbines;

– the speed at which the flock approaches the turbine (this is a function of the bird species and the wind conditions);

– the direction of the flight (to determine the exact number of turbines to be suspended);

– known typical behaviour of the species in regard to avoiding the turbine;

– specific climatic conditions, mainly in terms of wind direction and wind speed, predictable several days ahead. With excellent visibility (in the autumn almost 100%, in the winter almost 70%), the risk of collision is categorized as low;

– the time required to transmit the order for suspension and the technological implementation;

- The time required to execute the order for suspension from the moment of transmission to the stopping of the propellers is a few minutes. The decision on when to transmit the order will consider this delay;
- If the bird species defined in the flock is of high conservation importance, even in the case of single such birds, a decision for suspension is taken;
- Immediately after deciding to suspend turbines, the SFO informs the Wind Farm's operational staff by identifying himself/herself and specifying for which turbines, groups of turbine the decision concerns;
- The operational staff executes the order and informs the TDM and/or the dispatchers of the electricity distribution company about the suspension;
- The decision to start the suspended turbines is taken by the SFO after the risks that led to their suspension have been eliminated, by permitting the Wind Farm's operational staff to re-start the turbines. Without such permission, the operational staff is not entitled to start the suspended turbines.
- The SFO and the field ornithologists document the observations and stop of the wind turbine generators;
- When the flock circumvents or rises and gets out of the dangerous proximity to the turbines, suspension of the turbines shall not be undertaken;
- For flocks spending the night and feeding on the territory of the Wind Farms, the SFO informs the operational staff of the Wind Farms to suspend the nearby turbines that would potentially endanger these birds when landing

and flying away based on the following:

– Flock proximity to the Wind Farm;

– The species of the birds in the flock (this determines details of the behaviour, speed, height of flight and the importance of the species);

– The meteorological situation, mainly in terms of speed and direction of wind;

– If possible, the direction where the birds would fly (for example, the geese fly to Lake Shabla);

– A period of several minutes between ordering and suspending the propeller blades;

– After the birds take off and the risks of collision drop, the turbines shall be switched on.

- In order to coordinate the activities of the different working groups on the territory of the wind power plants, the ornithological monitoring group shall inform the operational staff of the power plants on his/her arrival and the commencement of the operations for the day, as well as when leaving the power plants and terminating the operations for the day.

2.3. Procedure for the application of ISPB

The procedures described follow the recommendations given in the report: Early Warning Systems Regulating the Operation of Wind Farms and Applicability in Bulgaria.

(http://natura2000.moew.government.bg/PublicDownloads/Auto/OtherDoc/276294/276294_Birds_120.pdf)

IV. MONITORING, CONTROL AND PUBLICITY

1. Monitoring

To assess the effectiveness of the Integrated System for Protection of Birds in Kaliakra Protected area, monitoring will be carried out to detect collisions of birds with the turbines of the operating wind power plants. The assessment

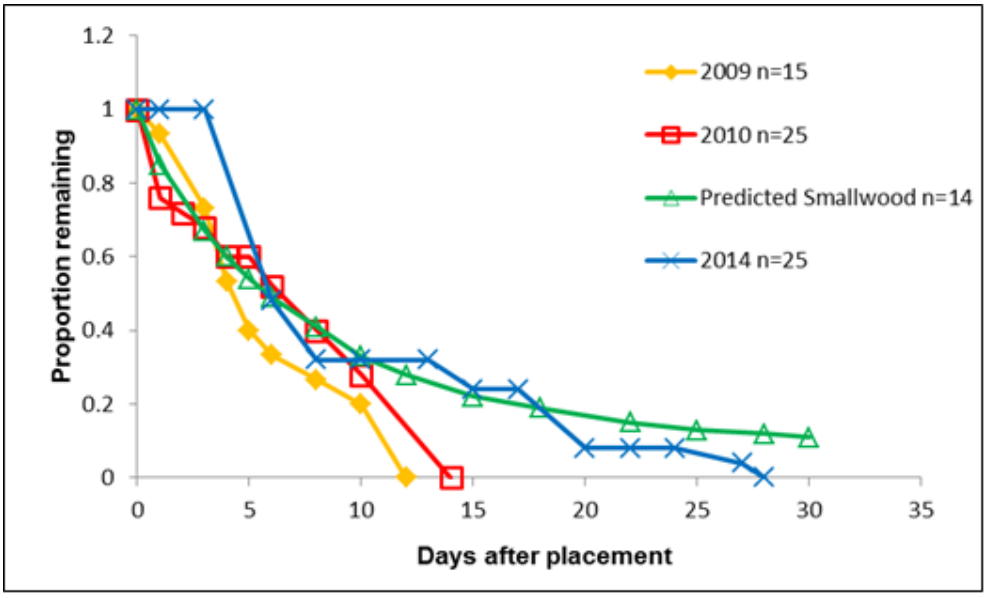
will follow the methodology developed in the United States (Morrison 1998) for monitoring bird collision with the turbines and will apply to all Wind Farms included or joined to ISPB. An area of 200/200 m. around each turbine will be carefully explored on foot or by using unmanned aerial vehicles (drones). For each recorded case of collision will be recorded the species, sex and age of the injured/dead bird (if known), location and time of detection, location (by GPS), distance and direction to the nearest turbine, state of carcass remains, specific climatic conditions and other comments. Each turbine will be subject of examination and monitoring of the carcass remains once a week throughout the peak migration season. Checks will be made once a month outside the season.

All the remains found are photographed to determine the species. All remins of feathers, skin or other parts of birds shall be collected and determined. The following information shall be reported at the end of each migration period:

- Species
- Gender and age
- Date and time of collection
- Position
- Distance and direction from the nearest turbine
- Condition
- Further information on the possible cause of death, etc.

Further studies on the effectiveness of this monitoring have been carried out and will be carried out in the course of the EWS in the Kaliakra SPA. These experiments aim to verify the role of the subject and predators living in the area in assessing mortality caused by turbines. These results allow an objective assessment of mortality due to turbines, taking into account the time during which carcasses could be found and the limitations of the results of the vegetation. These experiments shall be carried out controlled with poultry carcasses of origin guaranteed by the veterinary services.

Such checks, including a protocol on the effectiveness of the searchers and the percentage of missing carcasses, were carried out in autumn 2009, with the carcasses of 15 domestic hens and 10 pigeons scattered on five places under the turbines of the SNWF. The experiment aims to prepare a preliminary assessment of the most effective way of searches and its frequency in terms of monitoring the mortality from collision in SNWF. The effectiveness of the searcher as well as the percentage of missing carcasses varies over time, so such attempts were carried out in the autumn of 2009, 2010 and 2014, as well as in the winter of 2010/2011. The main objective of these experiments is to establish the appropriate frequency of checks in order to detect collision victims and to calibrate the methodology with regard to the percentage of carcasses disappearing, taking the check under each turbine appropriately every 7 days.



The extinction rate of bird remains in experiments conducted in the Kaliakra SPA in 2009, 2010 and 2014 and

theoretically expected according to Smallwood (2007), derived from researches in US.

Table of the effectiveness of searches on different bird sizes and the corresponding death recalculation factors, taking into account the extinction rate of the carcasses in the territory of the Kaliakra SPA

Species and Year	M_u	M_a
Hen 2009	10	22.9
Pigeon 2009	10	19.8
Hen + Pigeon 2009	10	21.5
Hen 2010	10	18.3
Hen 2014	10	16.0
Average of all years	10	19.2

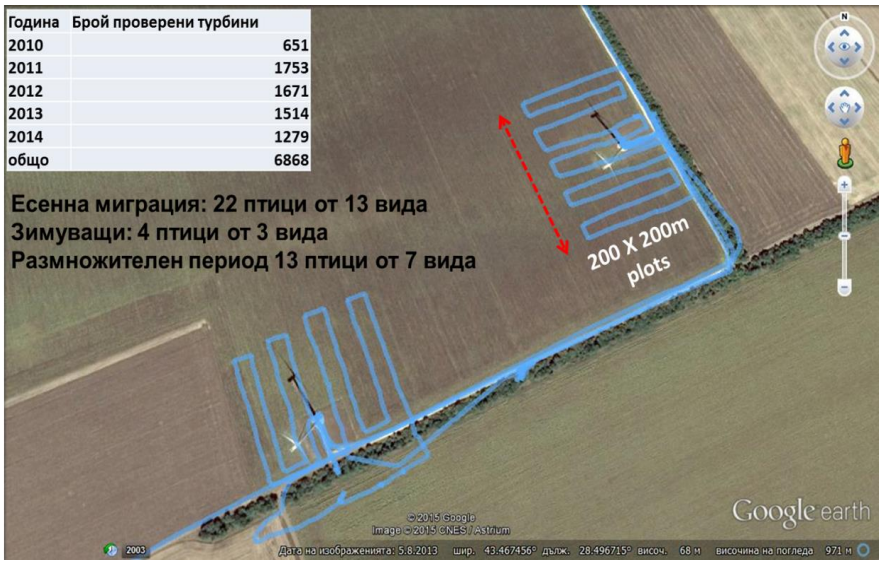
The condition of all carcass remains will be recorded as follows:

Whole - fully preserved carcass remains, not highly decomposed and no signs of being used for food by animals eating carrion or predators; With damaged integrity - fully preserved carcass remains that show traces of feeding of animals eating carrion or predators or part(s) of carcass remains in one place (e.g. wings, skeletal remains, legs, pieces of skin, etc.); Feathers - 10 or more feathers found in one place, showing feeding of predators or carrion-feeding animals;

To assess the results, an assessment of the effectiveness of the search for victims of collision will be periodically performed to determine the actual mortality caused by collision with the propellers. The results of these experiments will depend on the frequency of the checks during different seasons.

A key role in monitoring has the assistant ornithologists who will walk around the areas near each turbine and the drones. In case a bird carcass is found, identification will be performed by the SFO and the field ornithologists. If necessary, assistance may also be sought from outside experts.

The monitoring of the collisions of birds will be carried out throughout the year in order to effectively explore bird collisions and update of the ISPB.



Plan of Collision Mortality Checks carried out in Sveti Nikola Wind Farm

2. Efficiency assessment of ISPB

The efficiency of the ISPB as a risk management tool for the birds by the operating in Kaliakra Protected Area

Wind Farms is defined at three levels.

Individual level - single bird deaths in sporadic incidents have a negative effect on the local bird community and a short-term effect on the ecological links in the ecosystems. The effect of applying the ISPB at this level is determined by the number of birds of each species that have escaped collision with the turbines after the application of the ISPB. This effect is assessed by comparing the theoretical expectations derived from mathematical collision risk models (see, for example, Band Collision Rate Model http://snh.org.uk/pdfs/strategy/renewables/B362718.pdf) and the established real cases of collision.

Population level - additional mortality from collision with turbines that would not have had a place in the bird populations without the occurrence of the wind turbines at the site. This mortality can lead to negative trends in the numbers of individual populations of species, especially in case of mortality of a large number of birds of species with high conservation status. The efficiency of the ISPB at a population level is determined by the proportion of the birds of the species concerned that died from collision and the numbers of that species per given migratory season passing through the territory of ISPB. This efficiency of the ISPB can be determined by analysing the changes in the number of the birds flying through the territory of the ISPB during a statistically representative period of time (several migration seasons).

Species level - additional mortality from collisions with turbines on the territory of the whole area of a particular species is assumed mortality causing decrease in the number of the species concerned of 30% for 10 years or for 3 generations, respectively Version 3.1: IUCN (2001) (http://www.iucnredlist.org/static/categories_criteria_3_1):

The effectiveness of the ISPB at the species level is relevant to cumulative negative processes on a large geographical scale. The assessment of the effectiveness of the ISPB at the level of the species needs to be evaluated in the global number of the species after taking into account a complex of factors influencing its numbers within its entire global range. This assessment is possible after a prolonged monitoring period of tens of years.

3. Documentation, reporting and control

The messages for suspending and for restoration of the operation of the wind turbine generators will be prepared by the SFO. The SFO and the operational staff will document suspension events with the suspension time and the suspension duration as well as identification of the suspended turbines.

The field observations will be documented through environmental event forms with data on the birds' behaviour on the terrain before and during suspension.

The bird mortality monitoring data will be completed in a register.

After the end of each migration period, the SFO together with representative/s of the Wind Farms will prepare a summary report with information from the field monitoring, the suspensions of the wind turbine generators and the results from the monitoring. The reports will be submitted to the Wind Farms participating in the Integrated System for Protection of Birds, Regional Inspectorate for Environment and Water - Varna and the Ministry of Environment and Water. The scope of the information provided will be coordinated with the Ministry of Environment and Water

An annual review of the efficiency of the Integrated System will be carried out on the basis of the data from the reports of the SFO, information received from stakeholders or instructions from competent authorities.

4. Transparency and publicity

The Integrated System for Protection of Birds in Kaliakra Protected Area will maintain transparent communication with the interested third parties.

A dedicated ISPB website will be created to keep up-to-date information on flock passes, wind turbine generators suspension or whole Wind Farms suspension, the SFO reports, photo material, etc. will be publicly announced.

5. Terms and abbreviations used

ISPB	Integrated System for Protection of Birds
Wind Farm	Wind Farm
TDM	Territorial dispatch management
CDM	Central dispatch management
SFO	Senior Field Ornithologist
MoEW	Ministry of Environment and Water
RIEW	Regional Inspectorate for Environment and Water

V. Defining the terms "specific climatic conditions" and "intensive migratory flow of birds" used in the principles and protocol of ISPB in Kaliakra Protected Area.

1. Defining the term "specific climatic conditions"

An exact definition of the climatic conditions under which migratory birds form concentrations on the territory on Kaliakra Protected Area are specified in Kaliakra Protected Area Standard Form available at: http://natura2000.moew.government.bg/PublicDownloads/Auto/PS_SPA/BG0002051/BG0002051_PS_16.pdf.

According to this information, due to the geographical features of the shoreline (East-West direction) and **in northwest wind**, the migratory birds remain in the area longer than usual, trying to avoid the sea and to return to land, rising higher. **In a particularly strong wind** the storks and rapacious birds (mainly the harriers) land in the field between Kavarna and Cape Kaliakra.

According to the data available in the SF of Kaliakra Protected Area on the abundance of birds during the seasonal migrations and the description of the peculiarities of the relief and the dynamics of the migrating birds "**specific climatic conditions**" regarding the migratory birds **is wind direction west-northwest at a speed between 10,8 and 13.8 m/s (40-50 km/h) (https://www.stringmeteo.com/contribute/beaufort.php) in the period of migration of certain species through the territory of Kaliakra region.**

2. Defining the term "intensive migratory flow of birds"

In "Character of the migration of 42 bird species from the Bulgarian ornithofauna according to the level of the modern knowledge" report, prepared by: Irina Mateeva and Petar Yankov (Bulgarian Society for the Protection of Birds - BirdLife Bulgaria) within Lot 7 "Determination and minimization of the risks for wild birds" on Directive 79/409/EEC defines the **term "intensive migration flow of birds"** and the relevant periods when it is observed. **(http://natura2000.moew.government.bg/PublicDownloads/Auto/OtherDoc/276296/276296_Birds_120.pdf)**

In BirdLife Bulgaria's report, defining the terms, adopted and published by the Ministry of Environment and Water on the information page of NATURA 2000 for "intensive flight" within the seasonal dynamics is indicated the period when birds start to fly massively through a given area. This period is related to the number of birds that flew over a given territory in one day. It is determined by the total number of birds fleeing through the area but, in principle, with species with clearly defined periods with intense flight, it excludes the flight of single or small groups of birds. With regard to white stork in areas where hundreds of thousands of birds concentrate during migration, even daily numbers of 100 birds remain outside the intensive migration period (page 35 of that report).

Spring migration

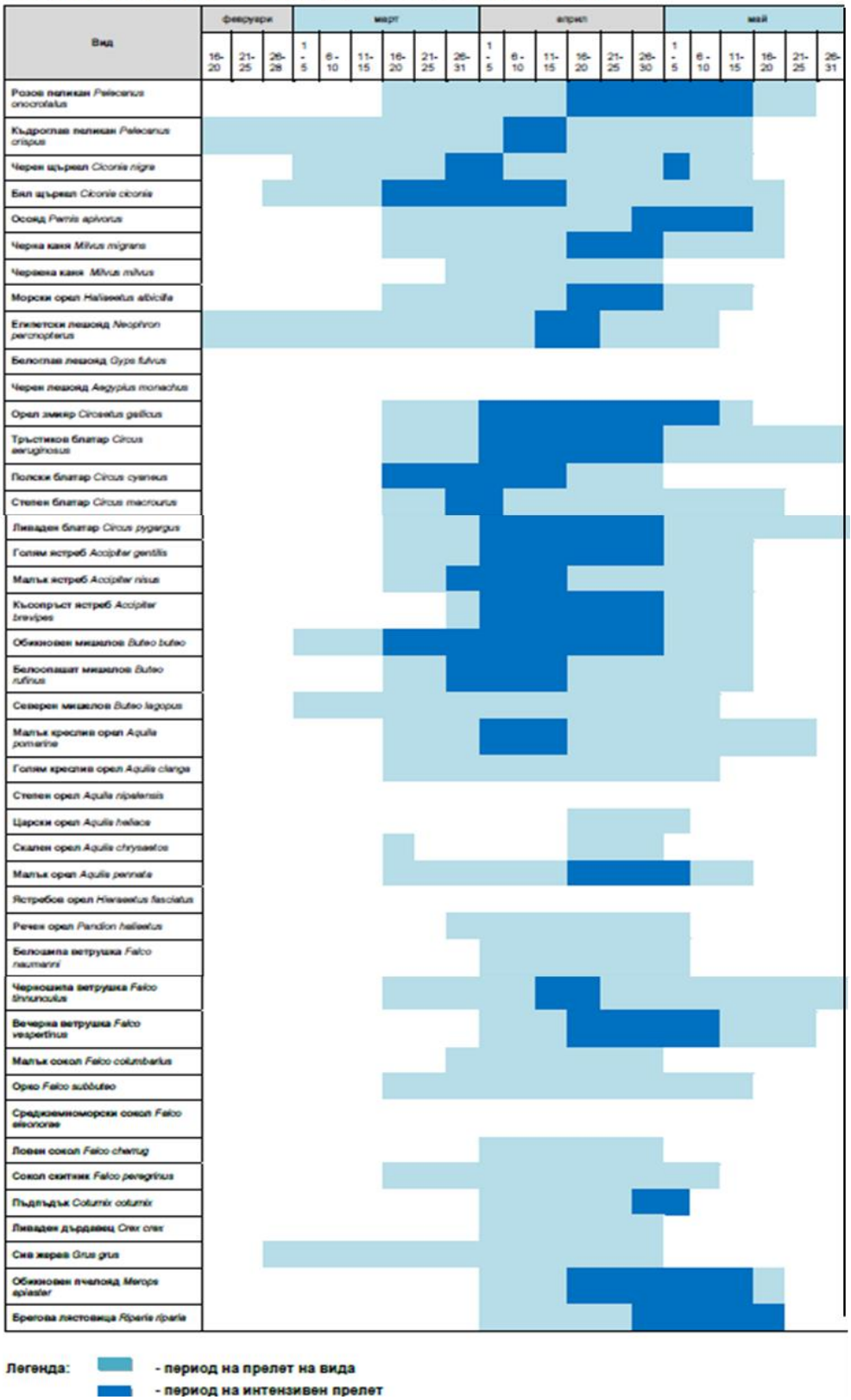
Spring migration through the territory of the country occurs with the beginning of the flight of the birds hibernating in the country. Some species such as the Dalmatian pelican, the Egyptian vulture and in warm winters - the white stork, start flying over in February. However, the majority of the species would start in March and continue until mid-May. The sexually mature birds that reproduce migrate earlier and the sexually immature ones migrate later. Late migrants are observed even until the end of May.

With some species, migration occurs evenly throughout the season (greater spotted eagle). With most rapacious

birds and the storks the intensive flight, after most of the birds have passed through, is in the second half of March and the first half of April. The European honey buzzard, the Eurasian eagle-owl, as well as the non-flying birds - the quail, the European bee-eater, the sand martin have a fairly late passage. Spring migration for most species is shorter than the autumn migration, lasting between 2 and 2.5 months. Between mid-March and the last ten days of May.

Table 3 of the report of the Bulgarian Society for the Protection of Birds BirdLife Bulgaria shows the ИСЗП expected periods for each bird species passing through the country during spring migration.

Таблица 3. Сезонна динамика на прелета на целевите видове птици по време на пролетна миграция



Autumn migration

Autumn migration with some species begins in the second half of July - mainly with non-reproducing birds, and continues in November (for example, with the common buzzard and the hen harrier). In the second half of October can be observed birds (buzzards, harriers) that stay to hibernate in the country. However, almost all species are

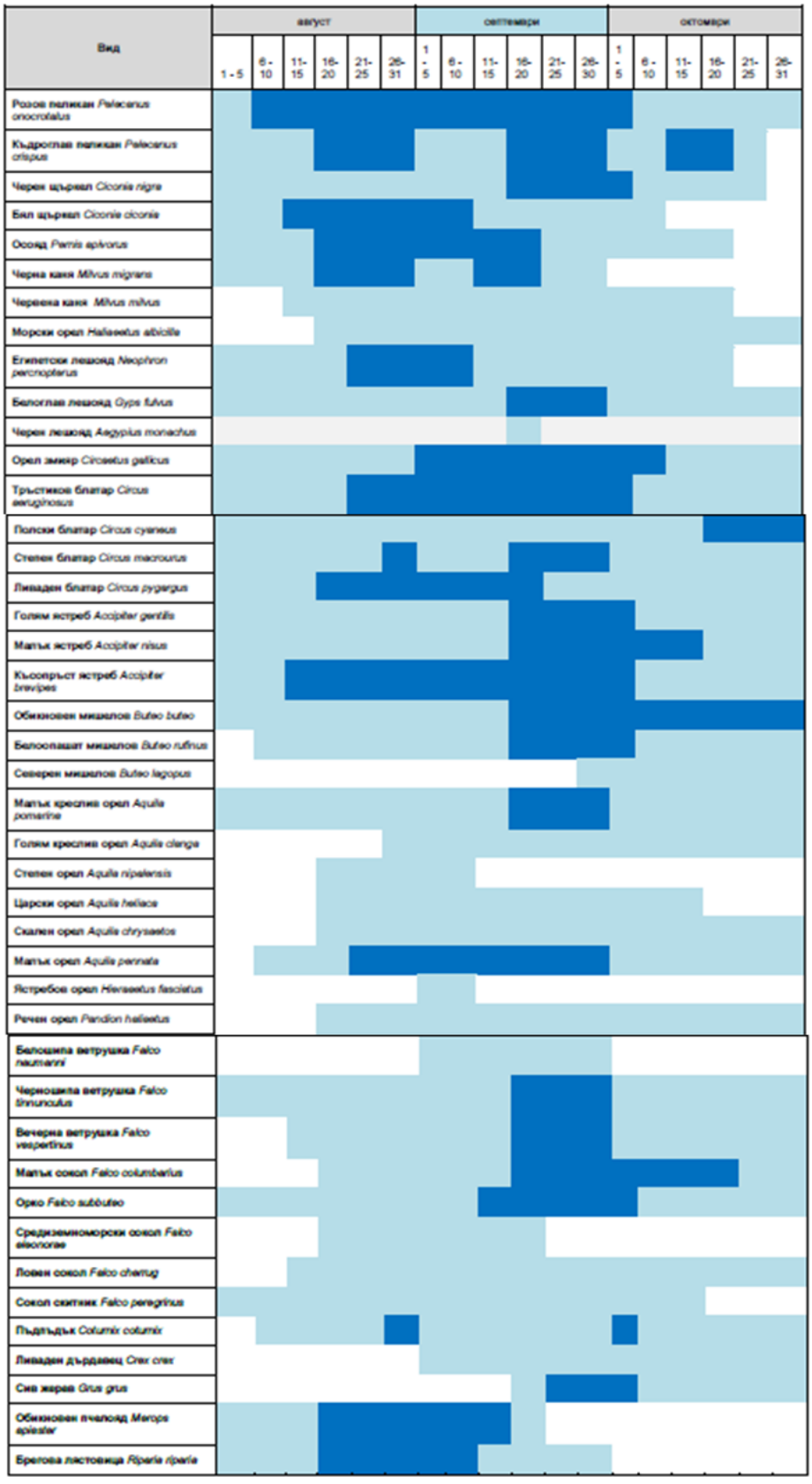
found to migrate between the beginning of August and the end of October. Most rapacious birds, like the black stork, have the most intense flight during the second half of September, and for the golden eagle and the Eurasian eagle-owl, this is the only period of intense flight in autumn (Table 4). Active flight in August is found with the white stork, the European honey buzzard, the Levant sparrowhawk, the great white pelican, the pallid harrier and the long-legged buzzard. In October the flight of the common buzzard, the hen harrier, the merlin, the rough-legged buzzard and the northern goshawk is intense. The Dalmatian pelican has a period of intensive flight over the three months.

The sand martin and the European bee-eater fly intensively from the middle of August until the middle of September.

In the period from the beginning of August to the end of October no intensive flight of any species was recorded only during the period from 1 to 5 August.

Table 4 of the report of the Bulgarian Society for the Protection of Birds BirdLife Bulgaria shows the expected periods for each bird species passing through the country during autumn migration.

Таблица 4. Сезонна динамика на прелета на целевите видове птици по време на есенна миграция



Легенда:

- период на прелет на вида

- период на интензивен прелет

3. Criteria for taking decisions for wind turbine generators' suspension

For the development of specific criteria in the conditions of Kaliakra Protected Area and in accordance with the objectives of declaring this protected area, are used the recommendations of BirdLife International for assessing the sensitivity of the birds to wind turbines and assessment of the risk of collision http://migratorysoaringbirds.undp.birdlife.org/

- **Principles for selecting target species for ISPB and their prioritization:**

By taxonomic groups - only a small number of species are at risk of collision.

The flying birds, especially predatory birds, are particularly vulnerable. They are large, difficult to manoeuvre, and their flight behaviour implies a high risk of collision.

The species with long life expectancy (the long-living birds) with high survival rate at the adult birds are more vulnerable to risk of collision due to their comparatively low reproductive potential.

The risk of collision increases according to the shown range of bird sizes ranging from small and highly mobile flyers to larger and slightly maneuverable species of eagles and vultures.

For these reasons, the vulnerability of the birds is very relative and depends on the SPECIES of birds and the size of their natural populations.

The sensitivity of the species included in the objectives of ISPB for Kaliakra Protected Area is given for species indicated by BirdLife International for the territory of Kaliakra Protected Area as vulnerable to varying degrees (https://maps.birdlife.org/MSBtool/) and other large species of the groups of vulnerable species according to the criteria already described (Table 1) that are not mentioned in the recommendations of BirdLife but are observed in the territory.

For each bird species, the following qualitative criteria have been taken into account:

Which species migrate through the territory of Kaliakra Protected Area;

Conservation status of the species at national, regional and world level;

Number of birds of each established species flying over the territory of Kaliakra Protected Area;

- Proportion of the birds flying through Kaliakra Protected Area of the total number of birds of this species using Via Pontica migratory route;
- Proportion of the world population of the species flying over Kaliakra Protected Area.

Table 1. Assessment of the Sensitivity Index to Wind Farms (SVI Species Vulnerability Index*) target species for ISPB of Kaliakra Protected Area according to literary data (the index increases from 1 to 10).

	Species	IUCN Conservation Status	Total population of the species worldwide	Sensitivity index
1	Egyptian Vulture (Neophron percnopterus)	EN	37500	10
2	Griffon Vulture (Gyps fulvus)	LC	900000	10
3	Black Vulture (Aegypius monachus)	NT	21000	10
4	Dalmatian Pelican (Pelecanus crispus)	NT	13400	10
5	Great White Pelican (Pelecanus onocrotalus)	LC	300000	10
6	White Stork (Ciconia ciconia)	LC	702000	10
7	Black Stork (Ciconia nigra)	LC	34000	10
8	Greater Spotted Eagle (Aquila clanga)	VU	5100	9

9	Eastern Imperial Eagle (Aquila heliaca)	VU	9250	9
10	White-tailed Eagle (Haliaeetus albicilla)	LC	50000	9
11	Booted Eagle (Aquila pennata)	LC	168500	9
12	Pallid Harrier (Circus macrourus)	NT	27000	8
13	Montagu's harrier (Circus pygargus)	LC	150000	8
14	Short-toed snake Eagle (Circaetus gallicus)	LC	150000	7
15	Long-legged Buzzard (Buteo rufinus)	LC	499999	7
16	Lesser Spotted Eagle (Aquila pomarina)	LC	5340000	7
17	Golden eagle (Aquila chrysaetos)	LC	200000	7
18	Red-throated diver (Gavia stellata)	LC	600000	7
19	Black- throated diver (Gavia arctica)	LC	176000	7
20	Lesser Kestrel (Falco naumanni)	LC	76000	6
21	Saker Falcon (Falco cherrug)	EN	21800	6
22	River Hawk (Pandion haliaetus)	LC	500000	6
23	Red-footed Falcon (Falco vespertinus)	NT	550000	6
24	Eurasian eagle-owl (Bubo bubo)	LC	500000	6
25	Mute Swan (Cygnus olor)*	LC	231000	3
26	Tundra Swan (Cygnus columbianus)*	LC	12000	3
27	Whooper swan (Cygnus cygnus)*	LC	65500	3
28	Red-breasted Goose (Branta ruficollis)*	VU	150000	1
29	Graylag Goose (Anser anser)*	LC	853000	1
30	White-headed Duck (Oxyura leucocephala)*	EN	14100000	1

- *** SVI Species Vulnerability Index according to BirdLife (https://maps.birdlife.org/MSBtool/ and literary data for established collisions with turbines**
- **Conditions for taking decision for suspension**

The decision for suspension is taken by the SFO after assessing the direction and height of the flight of the birds in each individual situation under the following conditions:

Condition 1: Monitoring of ENDANGERED SPECIES of birds

When observing a bird of such species, suspension of the turbines in the bird's flight way is obligatory if this bird is at the height of the rotors and therefore there is a risk of collision.

Condition 2: Flock of 10 or more flying birds

When a flock of 10 or more flying birds is observed to approach wind turbine generators in Kaliakra Protected Area at the height of the rotors and therefore there is a risk of collision, the turbines shall be suspended. The risk will be assessed according to the type of birds, the height of their flight and the time required for executing the suspension of the turbines.

Condition 3: In an apparent upcoming collision of birds

When observing an upcoming collision after assessing the distance, the height of the flight and all other factors and assessment for unavoidable collision with the turbines the precautionary principle will apply even in the case of unclear species and conservation status of the birds. Any risk of collision with the wind turbine generators will be avoided in this way. These suspensions are intended for short periods in the absence of information about the species of the birds and their exact location and refer to individual turbines and short periods.

Condition 4: Bad visibility (fog, snowfall and strong wind)

Under these bad meteorological or specific climatic conditions during seasonal migrations with established presence of groups of birds or single birds of high conservation significance or sensitivity (Table 1), the turbines near the established birds will be suspended until the safe flying away of the birds from the region of the suspended turbines.

The senior field ornithologist prepares daily risk models for the upcoming 5 business days in a 5-stage scale:

0 - bird migration is not expected

1 - flight of species with low conservation significance and low risk of collision is expected

2 - a gathering of migrating birds of mass species with low sensitivity to Wind Farms is expected

3 – flight of flocks of flying bird species is expected with probability of passing at heights significantly above the risk area of 200 meters over the field

4 - flight of flocks of flying birds is expected with probability of passing at low height with a high risk of collision

5 - facts and information are known ensuring the occurrence of high risk of collision of individual birds or flocks of species of conservation significance

The assessment is sent daily to the contact persons from all Wind Farms in ISPB.

For the purpose of this weekly assessment, the senior field ornithologist uses all available sources of information, including co-ordination with non-governmental conservation organizations.