

ANTHROPOGENIC ACTIVITIES AND THEIR EFFECTS ON THE BIRDFAUNA WITHIN NATURE 2000 CALAFAT-CIUPERCENI-DANUBE SITE (DOLJ COUNTY, ROMANIA)

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Abstract. The paper presents an eco-biological characterization of the “Nature 2000 Calafat–Ciuperceni–Danube” site (RO SPA 0013), highlighting the anthropogenic activities affecting the birdfauna in the ecosystems of the floodable area that the sit is located in; moreover, there are rendered certain solutions able to improve the negative effects and to rehabilitate the bird population and species, as well as their habitats. It is absolutely necessary to include the measures enumerated in this paper in the management plan of the site, allowing a long-term exploitation of the natural resources and also a sustainable development of the floodable zone.

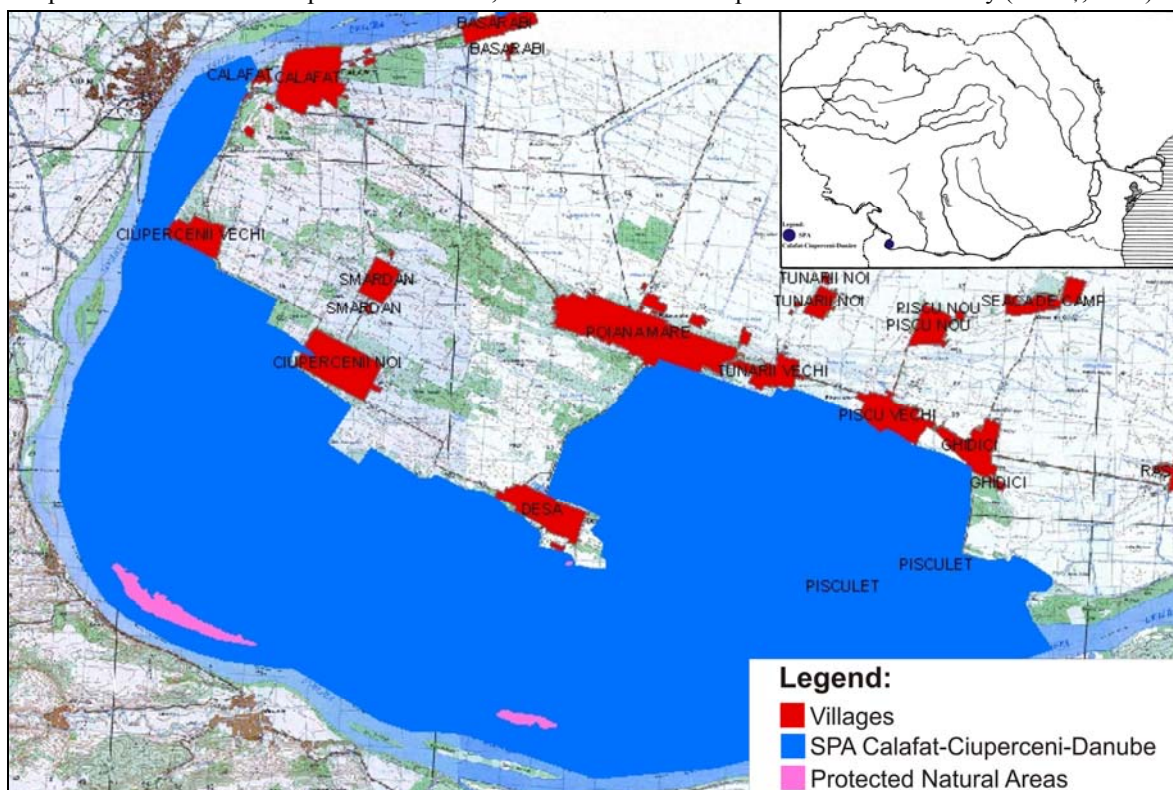
Keywords: anthropogenic activities, birdfauna, Nature 2000 site.

Rezumat. Activități antropice și efectele lor asupra avifaunei din situl Natura 2000 Calafat-Ciuperceni-Dunăre (județul Dolj). În studiul de față, după o caracterizare ecobiologică a sitului Natura 2000 Calafat–Ciuperceni–Dunăre (ROSPA 0013), sunt evidențiate activitățile antropice care au avut și au impact asupra spectrului avifaunei din ecosistemele zonei inundabile în care este localizat situl; totodată sunt precizate soluțiile de ameliorare a efectelor negative și de reabilitare a speciilor și populațiilor de păsări și habitatelor lor. Aceste măsuri sunt obligatorii în planul de management al sitului și permit o exploatare pe termen lung a resurselor naturale și o dezvoltare durabilă a zonei inundabile.

Cuvinte cheie: activități antropice, avifauna, sit Natura 2000.

INTRODUCTION

The Nature 2000 Calafat–Ciuperceni–Danube site contains a complex of aquatic and semi-aquatic biotopes (pools, streams, reed beds, swamp or salty lands, meadow-forest) as well as the terrestrial biotopes complex (xerophilous and xeromesophilous meadows, dunes—either free or fixed with acacia and poplar plantations, cultivated or abandoned arable lands) placed in the undammed section of the Danube Floodplain, located south of Calafat–Ciuperceni–Desa–Poiana Mare–Piscu Vechi–Ghidici to the Danube, respectively the area located between 760 and 714 kilometers of the river (Map 1). The relief conditions and the lithological substrate allow the rain water to infiltrate, therefore reducing the surface runoff comparatively to the internal drainage and the groundwater drainage. The soils in this area are alluvial, being constituted by fluvial deposits. The climate is temperate-continental, with hot summers and periods of extreme aridity (COTET, 1957).



Map 1. Special Protected Avifaunistic Area (SPA) Calafat-Ciuperceni-Danube (adaptation: APM Dolj & Oltenia Museum).
Harta 1. Aria de protecție specială avifaunistică (SPA) Calafat-Ciuperceni-Dunăre (adaptat: APM Dolj și Muzeul Olteniei).

In 2007, this area was designated as a Special Protection Area (SPA) for the birdfauna (RO SPA 0013: Calafat–Ciuperceni–Danube) and thus integrated in the ecological network Nature 2000, according to the Government Decision HG No. 1284/October 24, 2007.

The total surface of APS is 28,981 hectares, including several protected natural areas (declared by the Law no. 5/2000) to be treated as areas of national interest.

- Ciuperceni-Desa Pool, known by the locals as Arcerului Pool, covers an area of 200 hectares, being limited by Oveasele Forest in the North, by Zăvoi-Arcerul Forest in the South, by Grânicerilor Hill in the East, and by Arcer Road in the West. Even during the very dry periods, this pool does not fully get dry.

- Lata Pool covers an area of 28 hectares, being located on the administrative territory of Desa village. It is limited by the exploitation road DE 1340 in the North, by the exploitation road DE 1339 and a pasture in the East, by the exploitation road DE 1315 and a Canadian poplar forest in the South, and by the exploitation road DE 1335 and some unproductive sandy lands in the West. It is a permanent pool, which does not totally get dry even during the very dry summer times.

- Neagra Pool covers an area of 1.20 hectares; it is located on the administrative territory of Desa village. The neighbours are an acacia forest (private property) in the North, a vineyard in the East, another pool (namely Balta Bulboaca) in the South, and a private range in the West.

This pool is accessible by driving on the county road DJ Poiana Mare – Desa and then on the exploitation roads DE 1110 – 1112 and DE 1105. It is a temporary pool, which dries up during dry summers.

There are several wetlands (permanent or temporary pools, streams, swamps, islets) inside this site, the hydrological level of which depends mostly on the Danube floods and less on the rainfalls.

The most important of these wetlands are presented in Table 1.

Table 1. Wetlands in Ciuperceni-Calafat-Danube SPA.
Tabel 1. Zone umede din SPA Calafat-Ciuperceni-Dunăre.

No.	Name	Location	Surface (hectares)	Type
1.	Ciupercenilor Pool	Calafat Ciupercenii Vechi	167.1	permanent
2.	Jdegla Pool	Calafat Ciupercenii Vechi	83.1	temporary
3.	Ostrovul Mare and Ostovul Chichinete	Calafat Ciupercenii Vechi	153.58	permanent
4.	Marginița	Ciupercenii Noi	234.29	temporary
5.	Oveasele Pool	Ciupercenii Noi	88.37	permanent
6.	Murta Pool	Ciupercenii Noi	24.40	temporary
7.	Lungulița Pool	Ciupercenii Noi	34	temporary
8.	Strâmba Pool	Ciupercenii Noi	171.50	permanent
9.	Ciuperceni-Desa Pool (Arcerului Pool)	Ciupercenii Noi	200	permanent
10.	Lata Pool	Desa	28	permanent
11.	Țarova Pool	Piscu Vechi	19.63	permanent
12.	Brașiței Pool	Piscu Vechi	30.85	permanent
13.	Țarovița Pool	Ghidici	11.5	temporary
14.	Satului Pool	Ghidici	12.8	temporary
15.	Brăniștioru Pool	Poiana Mare	25	permanent
16.	Râiosu Pool	Poiana Mare	20	permanent
17.	Bagioaica	Poiana Mare	40	permanent
18.	Lunga Pool	Poiana Mare	45	permanent

Although less frequent, river islets represent an important component of the site, providing favorable conditions for feeding, resting and reproduction of many species of birds, especially as the anthropogenic pressure is less present on these islands with a rich spontaneous vegetation.

Because of the reduced water supply induced by the river, temporary pools are often used as pasture or as arable land during the dry season.

The old permanent pools have generally maintained their primary aspect. An exception is Arcerului Pool, which has been submitted, during the last decades of the previous century, to several changes, in order to provide hydraulic facilities (dams, drainage) or for economic purposes (fish stock); these modifications presently proved to be unnecessary and unfavorable for the development of stable biocoenoses (especially bird biocoenoses).

The non-irrigated arable land represent 11.2% of the terrestrial biotopes of the site; the grassy natural vegetation areas represent about 9.2% of the total surface of SPA (PAPP & FĂNTÂNĂ, 2008). Woodlands occupy the largest area, i.e. 44.5% of the total surface (a percent of 10.9% is represented by forest-scrub transition zones). Many of the fundamental natural forests, consisting of wild species (*Salix* sp., *Populus* sp., *Quercus* sp., *Fraxinus* sp., *Morus* sp. and so on) were replaced by monospecific plantations, consisting of *Populus canadensis*.

A presentation of the forests, based on the data provided by The Central Forestry Department from the Dolj County, is rendered in Table 2.

Table 2. Forest types from Calafat-Ciuperceni-Danube SPA.
Tabel 2. Tipuri de pădure din SPA Calafat-Ciuperceni-Dunăre.

Forest type	Area (ha)
Forest steppe brown oak	18.9
Plantations of acacia on the sand dunes	8024.7
Glades within acacia forests	4134.4
Coppice of white poplar and Euro-American poplar	166.6
Coppice of white poplar, black poplar, Euro-American poplar	1452.2
Willows, low places in the Danube floodplain	370
Acacia and poplar plantations (Euro-American poplar)	503.9
Poplar zones: white poplar, black poplar, and Euro-American poplar	619.8
Poplar zones: white poplar, black poplar, Euro-American poplar with willow zones on the inter-dune	33.5
Total	15,324

The importance of the birdfauna from the floodable zone between Ciuperceni Noi and Ghidici was highlighted by TĂLPEANU (1965, 1968, 1971), MUNTEANU et al. (2002) and MUNTEANU (2004), their studies providing the basis for the protection status of this area.

Recent references on the birdfauna of this territory were made by RIDICHE (2004, 2005, 2007-2009).

The preliminary list of birds recorded in the Calafat-Ciuperceni-Danube SPA comprises 127 species; 36 of them are listed in Annex 1 of Birds Directive 2009/147/EC, making the object to special conservation measures concerning the birdfauna; most of these are breeding species (quoted operas, PAPP & FĂNTĂNĂ, 2008) – Table 3.

Table 3. Species of birds identified in Calafat-Ciuperceni-Danube SPA, listed in Annex I of Birds Directive.
Tabel 3. Specii de păsări identificate în SPA Calafat-Ciuperceni-Dunăre, înscrise în Anexa I a Directivei Păsări.

Nr. crt.	Specia	Breeding
1	<i>Phalacrocorax pygmeus</i> (PALLAS 1773)	+
2	<i>Botaurus stellaris</i> (LINNAEUS 1758)	?
3	<i>Ixobrychus minutus</i> (LINNAEUS 1766)	+
4	<i>Nycticorax nycticorax</i> (LINNAEUS 1758)	+
5	<i>Ardeola ralloides</i> (SCOPOLI 1769)	+
6	<i>Egretta garzetta</i> (LINNAEUS 1766)	+
7	<i>Egretta alba</i> (LINNAEUS 1758)	+
8	<i>Ardea purpurea</i> LINNAEUS 1766	+
9	<i>Ciconia nigra</i> (LINNAEUS 1758)	+
10	<i>Ciconia ciconia</i> (LINNAEUS 1758)	+
11	<i>Plegadis falcinellus</i> (LINNAEUS 1766)	+
12	<i>Platalea leucorodia</i> LINNAEUS 1758	+
13	<i>Aythya nyroca</i> (GÜLDENSTÄDT 1770)	+
14	<i>Haliaeetus albicilla</i> (LINNAEUS 1758)	+
15	<i>Circus aeruginosus</i> (LINNAEUS 1758)	+
16	<i>Buteo rufinus</i> (CRETZSCHEMAR 1827)	-
17	<i>Porzana porzana</i> (LINNAEUS 1766)	+
18	<i>Porzana parva</i> (SCOPOLI 1769)	+
19	<i>Crex crex</i> (LINNAEUS 1758)	+
20	<i>Himantopus himantopus</i> (LINNAEUS 1758)	?
21	<i>Recurvirostra avosetta</i> LINNAEUS 1758	?
22	<i>Burhinus oediconemus</i> (LINNAEUS 1758)	+
23	<i>Sterna hirundo</i> LINNAEUS 1758	+
24	<i>Sterna albifrons</i> PALLAS 1764	+
25	<i>Chlidonias hybrida</i> (PALLAS 1811)	+
26	<i>Chlidonias niger</i> (LINNAEUS 1758)	+
27	<i>Bubo bubo</i> (LINNAEUS 1758)	+
28	<i>Alcedo atthis</i> (LINNAEUS 1758)	+
29	<i>Coracias garrulus</i> (LINNAEUS 1758)	+
30	<i>Picus canus</i> GMELIN 1788	+
31	<i>Dendrocopos syriacus</i> (HEMPRICH&EHRENBERG 1833)	+
32	<i>Dendrocopos medius</i> (LINNAEUS 1758)	+
33	<i>Anthus campestris</i> (LINNAEUS 1758)	+
34	<i>Lanius collurio</i> (LINNAEUS 1758)	+
35	<i>Lanius minor</i> GMELIN 1788	+
36	<i>Emberiza hortulana</i> LINNAEUS 1758	+

Legend: ? – uncertain.

MATERIAL AND METHODS

The study was based on the observations made by the authors in this area, starting with 2000; for the ecobiological characterization of the site, there have been used the data provided by authorities (data given by Dolj Forestry Directorate, the forest wards and the local councils of the municipalities of the site); specialized literature has been taken into account; to develop measures for the amelioration of the human impact we used as support some recommendations from the specialized literature (HEATH & EVANS, 2000; MUNTEANU, 2000).

RESULTS AND DISCUSSIONS

The ecosystems from Calafat-Ciuperceni-Danube SPA are important for the economy (production of fish, agricultural land, pasture, forest areas) and fauna - mainly for birdfauna, but also in terms of conserving biodiversity, this area also appertaining to the site of community interests RO SCI 0039 Ciuperceni-Desa designated for the habitat values, species of plants and animals (fish, amphibians, reptiles, mammals).

In the mosaic of ecosystems of the site (SPA), the birdfauna has an important role in the interspecific relationships and in limiting some animal species (e.g. insects, micromammals), which can become harmful after certain thresholds. The presence all types of birds, respectively the species with vegetarian, zoophagous or mixed trophic regime, is therefore important.

There are still certain anthropogenic factors contributing to the change of the spectrum of the ecosystems in the floodable zone and thus to the destabilization of their trophic networks.

Human activities with negative effects on the birds from the studied sector are both economic (forestry work, farming operations, grazing, mowing, waste disposal, intensive fishing) and recreational (hunting, fishing alone, unorganized tourism) - Table 4.

To exploit the long-term resources on this site and also to preserve the bird communities and therefore other faunistic elements, which ensure stability and proper functioning of the ecosystems in the perimeter of the site, it is necessary to adopt measures that are mandatory in the management plan of SPA.

Therefore, as a response to the negative consequences of human activities on bird communities, we have developed some solutions for the improvement and rehabilitation of the species and populations of birds (Table 4).

This requires full cooperation and active involvement of the land owners in the area and the custodian and local communities; it is also necessary that all activities, plans, projects and programs proposed to take place inside or near the site, with significant impact on the species present here, should be carefully considered. Correct and complete measures have to be proposed to diminish the impact on the existing species and habitats, thereby reducing anthropogenic pressure in the site and providing a sustainable development of natural areas with high potential for the birdfauna.

CONCLUSIONS

The Natura 2000 site ROSPA 0013 Calafat-Ciuperceni-Danube includes the terrestrial and aquatic ecosystem complex (river kilometers 760-714), in this area being located three protected areas of national interest: Desa-Ciuperceni ornithological reserve, Lata Pool, Neagră Pool.

The mosaic of biotopes within the site (ponds, streams, wetlands, deciduous forests, scrub-forest transition areas, grassland, arable land), gives a complex composition to the birdfauna. There is a range of human activities (economic and recreational), which directly influences the qualitative and quantitative spectrum of the ecosystems of the site. Therefore, we need to develop measures to improve human impact on the rehabilitation of the communities of birds and on their habitats. These measures are mandatory in the management plan of the site and allow a long-term exploration and development of floodable zones.

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Table 4. Anthropogenic activities, their impact on the birds of Ciuperceeni-Calafat Danube SPA and measures proposed in order to reduce negative effects.
Tabel 4. Activități antropice, consecințele lor asupra păsărilor din SPA Calafat-Ciuperceeni-Dunăre și măsuri de ameliorare a efectelor negative.

Anthropogenic activities	Consequences within SPA	Affected bird species	Amelioration measures proposed
<p>FORESTRY</p> <p>1. The replacement of spontaneous mixed forests (<i>Salix</i>, <i>Populus</i>, <i>Quercus</i>, <i>Fraxinus</i> etc.) with monospecific plantations of <i>Populus canadensis</i>;</p> <p>2. Deforestation or selective removal of old trees in the process of drying and / or already dried;</p> <p>3. Chemical combat of harmful insects.</p>	<p>Qualitative and quantitative reduction of the food resources (on all levels of the trophic pyramid) and of the nesting sites;</p> <p>a simplified structure of bird communities;</p> <p>Loss of nesting sites (hollows and holes / cavities);</p> <p>The reduction of the trophic sources by removal of some links (decay and insect defoliation).</p> <p>Intoxication of the birds by ingestion of insects and other poisoned invertebrates; workforce reduction.</p>	<p>The entire community of birds of the forest ecosystem (tree and terrestrial species, phytophagous and zoophagous)</p> <p>Species nesting in hollows and holes / cavities: <i>Columba oenas</i>, <i>Bubo bubo</i>, <i>Otus scops</i>, <i>Syrinx aluco</i>, <i>Asio otus</i>, <i>Coracias garrulus</i>, <i>Upupa epops</i>, <i>Sitta europaea</i>, <i>Parus</i> spp.</p> <p>Insectivore species or with mixed trophic regime (Meropidae, Coraciidae, Upupidae, Picidae, Turdidae, Sylviidae, Muscicapidae, Paridae ș.a.</p>	<p>Maintaining or planting mixed tree species associations containing all floors of vegetation, which provide vital needs (food and reproduction) of all categories of birds.</p> <p>Protecting clusters of old trees (oak, mulberry, willow);</p> <p>Mounting hollows and nutrition artificial nests to attract as many birds as possible, especially insectivores, throughout the entire year.</p> <p>Reducing pollution sources.</p>
<p>AGRICULTURE</p> <p>1. The extension of agricultural lands through drainage and land deforestation;</p> <p>2. The elimination of the shrubs and bushes.</p> <p>3. Monocultures;</p> <p>4. Agricultural mechanization;</p> <p>5. Chemification works;</p> <p>6. Deliberate killing of species that feed on agricultural land planted with cereals.</p> <p>7. Intensive grazing with sheep, goats, cattle;</p> <p>8. Early mowing.</p>	<p>Loss or reduction of natural habitats (swamps, marshes, forest belts, scrubs);</p> <p>Disappearance of nesting sites;</p> <p>Deterioration of living conditions for birds that feed and nest on the ground;</p> <p>Soil (and air) pollution, removal of some trophic links (wild plants, insects);</p> <p>The decrease in flocks of the birds that are parking or are wintering on the land site.</p> <p>Destruction or endangerment of the nests with eggs and / or chickens that have no time and possibility to depart.</p>	<p>Aquatic (Ardeidae, Anatidae, Rallidae) and terrestrial species (Motacillidae, Turdidae, Sylviidae, Laniidae, Emberizidae etc).</p> <p><i>Perdix perdix</i>, <i>Coturnix coturnix</i>, <i>Galerida cristata</i>, <i>Motacilla flava</i>, <i>Anthus campestris</i>, <i>Emberiza calandra</i>, <i>E. hortulana</i> ș.a.</p> <p>White-fronted geese, geese (<i>Anser</i> spp.)</p> <p><i>Crex crex</i>, <i>Burhinus oedicephalus</i>, <i>Glareola pratensis</i>.</p>	<p>Practicing organic farming within the site and adjacent lands;</p> <p>Maintaining the culture of isolated shrubs and trees.</p> <p>Awareness of the role of trees in enhancing soil quality, vegetation, reduce erosion and wind strength, as well as in maintaining the ground water reserves.</p> <p>Awareness of the pollution caused by pesticides and chemical fertilizers;</p> <p>Providing material compensation to the owners of the lands planted with cereals, on which northern geese winter.</p> <p>Demarcation / reservation of the areas within the site that are suitable for nesting endangered species, prohibiting grazing and mowing in early perimeter reserved.</p>
<p>INFRASTRUCTURE</p> <p>1. The construction of dams and hydro-facilities;</p> <p>2. Isolation of the households, constructions.</p>	<p>Limiting the natural flooding of the furnished rivers and interdures between Ciuperceeni and Desa.</p> <p>Rapid succession of different ecosystems (semi-aquatic → aquatic → terrestrial), not working on a long-term; dysfunction in the breeding of the bird communities.</p>	<p>Especially aquatic species</p>	<p>Rehabilitation of the dammed zones to stabilize the ecological balance in aquatic ecosystems, ensuring a hydrological optimal reproduction of aquatic species;</p> <p>Reducing overall disturbance.</p>
<p>INCIDENTAL WASTE STORAGE</p>	<p>Soil and water pollution;</p> <p>Endangerment of birds caused by bird nets, wires, hooks, fishing wires, etc.</p>	<p>All species</p>	<p>Providing facilities for waste storage;</p> <p>Water quality monitoring.</p>

<p>INTENSIVE FISHING 1. Management of fisheries. 2. Fishing with nets and boats.</p>	<p>Disturbing the nesting (if fishing activities coincide with periods of nesting), reduction of nesting areas, limiting the opportunities for feeding.</p>	<p>Most of the aquatic species</p>	<p>Marsh vegetation maintenance, monitoring nesting species, and banning fishing during the nesting periods and sites; Granting some compensations to the administrators of the fish ponds, which provide protection of birds and colonies that nest</p>
<p>INDIVIDUAL FISHING</p>	<p>Disturbing birds either during passing or nesting over riverbanks, which are temporarily avoided as feeding or nesting areas, even if environmental conditions are optimal.</p>	<p>Podicipedidae, Anatidae, Ardeidae, Sternidae ș.a.</p>	<p>Monitoring camp, feeding and nesting sites, the delimitation of areas where recreational fishing is allowed.</p>
<p>HUNTING</p>	<p>Accidental shooting or by inability to correctly identify the protected species.</p>	<p>The species from Annex 1 of Birds Directive (ex. <i>Phalacrocorax pygmeus</i>, <i>Egretta</i> spp., <i>Aythya nyroca</i>, <i>Circus aeruginosus</i>, <i>Sterna hirundo</i>, <i>Chlidonias hybridus</i> ș.a.)</p>	<p>Prohibition of hunting in ornithological reserve and buffer zones; Correct identification of species of hunting interest; Correct information on the hunting schedule and hunting restrictions.</p>
<p>POACHING</p>	<p>Hunting off the allowed season, catching / hunting birds protected by the law.</p>	<p>Most of the species</p>	<p>Ban and severely punish poaching; Respect the legislation in force.</p>
<p>VARIOUS ECONOMIC ACTIVITIES, PLANS, PROJECTS, PROGRAMS</p>	<p>Damage of the ecosystems in the site, restricting habitats, temporary/permanent disruption of the continuous vital activities of birds.</p>	<p>All species</p>	<p>Careful analysis of the possible negative impacts on the site, species and habitats, proposing mitigation measures, the change of location for economic activities in certain situations.</p>
<p>UNORGANIZED TOURISM 1. Recreational activities 2. Abandoned waste 3. Makeshift roads, paths;</p>	<p>Disruption of vital activities of birds;</p>	<p>All species</p>	<p>Arrangement of facilities for camping; Marking of access roads; Prohibition of abandonment of waste Mounting boards concerning the importance of the site and the restrictions within the SPA and SCI.</p>