

CRISTIAN TETELEA

**Participatory Environmental Management
on conservation of Special Bird's Protection
Areas in Iron Gates Natural Park
Romania**

**FINAL
REPORT**

1st June 2005

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1. Introduction

The project “*Participatory Environmental Management on conservation of Special Bird’s Protection Areas in the Iron Gates Natural Park*” was implemented between May 2005 – June 2006, by a joint group of researcher and civil servant that are active in the field of environmental protection in different Romanian institutions. In this way both the wetland and species inventory and public participation to Special Bird’s Protection Areas were accomplished as a result of these institutions capacities to act in the environmental protection field.

The main goal of the project was to conserve and manage the most important Special Bird’s Protection Areas within the Iron Gates Natural Park – Romania, by establishing of coherent conservation measures. Elaboration of such measures was done by assessing wetland ecological functions and inventory of bird species and habitat and their distribution. Special attention was given to the species listed in the Birds Directive/Bern Convention: *Botaurus stellaris*, *Phalacrocorax pygmaeus*, *Aythya nyroca*, *Egretta garzetta*, *Nycticorax nycticorax*, and *Anser erythropus*.

Elaboration of conservation measures focuses on participatory environmental management of local people and enhanced awareness campaign. The main objective was to propose local institutional measures to promote wise use of wetland resources that can considerably improve the quality of habitats and effective conservation of birds’ species existing here.

Participatory environmental management was done by appealing authorities and local people to debates concerning wetland protections necessity and assessments the context in which proposed protection measures and local development needs will not generate major opposite interests in the future.

Although the avian fauna from the Iron Gates Natural Park is not very well studied, the existing old literature mention only some birds species that passing or hibernating in this area. The project was an opportunity to verify the already existing data (from literature and reports of different institutions) but also to build a framework for wetland protections in the Iron Gates Natural Park that can be wide used for other wetlands in Romania.

As the main goal of the project was to offer precise information on the species and habitats existing here, a Romanian extended final report was submitted to the Iron Gates Natural Park Administration, Caras-Severin EPA, Pojejena and Moldova Noua City Hall and Water Management District from Dr. Tr. Severin (the body responsible with the monitoring and protection of the Danube River).

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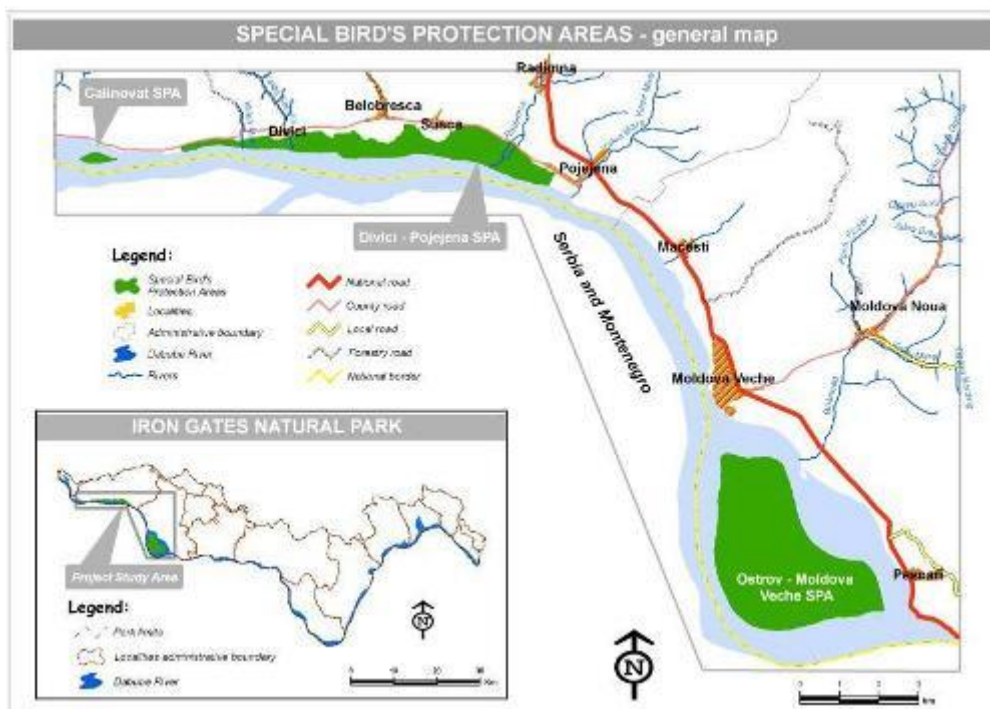
2. Study area

Iron Gates Natural Park is situated in the south-western part of Romania, on the border with the Republic of Serbia and Montenegro, occupying an 115655.80 ha surface. The project implementation lies in the South-western part of Romania within the Caras-Severin County boundaries. The project area is included in the Banat-Western Development Region and the Danube-Mures-Tisa Euro region. The area is also included in the Iron Gates Natural Park with the administration established in Orsova Town, Mehedinti County.



The region that the project focuses on consists of several distinct areas from the western part of the Iron Gates Natural Park, along the Danube River, representing a 1.85% of the park surface, as it follows:

- **Calinovat Island Special Protection Area** (23,73 ha) includes Calinovat Island, positioned on the Danube River, and the water surface bordering it, up to a 2 m depth. Administrative unit: Pojejena, Caras –Severin County.
- **Divici – Pojejena Special Protection Area** (497,50 ha) includes the water surface that borders the river shore up to a 1.5 m depth, the bogs (a number of 5) and the shrubs and herbal formations area in which the groundwater level is very close to the soil surface. Administrative unit: Pojejena, Caras –Severin County
- **Moldova Veche Island Special Protection Area** (1627,06 ha) includes the Moldova Veche Island, positioned on the Danube River and the water surface bordering it, up to a 2 m depth. Administrative unit: Moldova Noua, Caras –Severin County.



3. Current conditions

The wetlands represent fragile ecosystems in point of the ecological balance and their relation with the human communities, thus wetlands in Romania are not yet very well studied and their importance and values being unacknowledged. This situation leads to the unfeasibility of efficient conservation measures for the wetlands habitats and protected birds existing here.

From this point of view, the wetlands within the Iron Gates Natural Park are not making any exception. The value of their gene pool, and also the fact that they represent a migration corridor for many of the avian fauna protected or strictly protected representatives at European level, determined the establishment in 2004 of three new special protection areas included in the park area (see the map).

After constructing the "Iron Gates" Dam on the Danube River, an artificial lake was created; in the western part of the lake, 130 km upstream from the dam, the initial habitats were transformed into veritable wetlands. Mutation at social and all functional and structural level of fragile aquatic or terrestrial ecosystems occurred. Examples are the changes on the wetlands and riparian ecosystems, changes in vegetation land cover, water budget and socio-economic implications (the increase of water level causes important loss of local people's agricultural lands situated along the Danube shore; habitat fragmentation).

The main administrative units on the project study area are Moldova Noua (including the villages of Macesti, Moldovita and Moldova Veche City) and Pojejena (including the villages of Divici, Susca, Radimna and Belobresca). Due to serious social and economic problems, the area is included in the Anina-Moldova Noua disadvantaged area (the unemployment rate is over 40 %).

From the social and economic points of view, the project area is characterized by: a reduced number of inhabitants (22500, of which 15000 inhabitants only in Moldova Noua), a regression of the population number in the past 15 years of about 10% (due to the difficult economic situation), the poor services and endowments, and the lack of development alternatives. The area has a great ethnic diversity: Romanians, Czechs, Serbs, Roma) and religious diversity. This situation imposes a specific territorial use, and a higher flexibility regarding the acceptance of territorial development or conservation alternatives.

The most frequent economic activities are: agriculture, fishing, tourism and ore and minerals extraction (on the process of closing). The agriculture is subsistence-type and is realized in the lower altitude areas and in the Danube's shore neighbourhood, thus having a negative impact to the wetlands and to the landscape. These activities are characterized by low productivity due to low soil fertility (4th bonity class), leading to frequent use of fertilizers. Fishing is a traditional activity developed in the settlements along the Danube shore. Unfortunately, the fish productivity decreased significantly in the past years due to intensive fishing, poaching and use of inappropriate techniques (electric fishing and small diameter nests) and also due to the decrease of the economic important species, such as *Acipenser ruthenus*.

Tourism is mostly related to the angling activities, and greatly developed in the past 15 years by the construction of cottages near the Danube River, inside or in the vicinity of SPA's.

The water surface is the state property (Danube River) but 123 ha, some ponds and pools and some flooded areas, are the property of the Moldova Noua and Pojejena Cities Halls.

This facts impose a close cooperation between local and regional institutions in order to assure the protection of the SPA, s



4. Problem issues

Because of the lack of an integrated management plan and conservations actions for the Special Bird's Protected Areas, these SPA's are threatened by human activities and natural disturbance of wetland functions. The main problems encountered can be summarized as follow:

- ***Inconsistent management of conservation of SAP's***

Conservation of wetlands as ecosystems and protection of their structure and functions is not adequately provided by the Romanian legislation. Only those wetlands that are SPA's or have other protection status can benefit of conservation measures!

Local authorities of the localities don't take account of the SPA's in to their local development plans, they even don't have these area delimited on their maps. Thus the designation of buffer zones for some SPA's or the development alternatives for local people is difficult to complete.

Electro fishing and poaching in key areas and period lead to over exploitation of natural resources and changes in the structure of communities, thus affecting the balance and functions of the wetlands ecosystem.

Local or regional monitoring systems' inefficiency in assessing the wetlands' functions and establishing viable conservation measures for the SPA's. There are no legal protocols regarding monitoring indicators for wetlands in Romania and no institution nominated to carry on these activities.

- ***Physical modifications and destruction of habitat***

The SPA's riparian vegetation decreases year by year due to human activities as tourism and agriculture, thus increasing the transformation of wetlands into terrestrial habitats and habitat fragmentation.

Changes of riparian vegetation occurred in the past years due to grazing, cutting the trees, trail formation or small roads construction and extension of agricultural lands. Establishment of some dumping sites in the SPA's or in the vicinity, extraction of sand or gravel, reed from the SPA's are important factors that affects habitats and induce wetland's physical local structure modification. Placement of materials to raise the area above the water table and using it for construction is the most common impact on the wetland hydrology.





Photos illustrating local people extracting sand and gravel from the Divici-Pojejena SPA during the low level of water (left) and establishment of a dumping site in the vicinity (same SPA's – right).

- **Pollution and change of the chemical components of wetlands**

Inexistence of wastewater treatment plants for the city of Moldova Noua and all the villages in the surrounding area. Hardly degradable toxic substances and heavy metals from current or the past mining activities are still present in the aquatic or terrestrial ecosystems situated in the vicinity of the SPA's.

Intensive usage of fertilizers, manure and pesticides together with washing of nutrients due to local agricultural practices contributed to the eutrophication processes, thus affecting the wetland functions.

5. Activities carried out during the project

Scientific fieldwork methodology included two kinds of approaches that are compatible with the temperate environment: inventory and survey. Due to limited time resources (directly related to bird's life cycle and vegetative periods) the main method used to achieve the project's objectives was the inventory.

Inventory activities represent a mere "*count of the number of individuals present in a population and is a straightforward method for conservation purposes*" (Primack, 1998). By repeating the inventory over successive time intervals (usually at season level), it can be determined whether a population is stable, increasing or decreasing. The level of intensity for conducting this inventory was the "presence/not detected" type. "Presence/not detected" is the simplest measurement of a population. Generally there are two goals of a presence/not detected inventory: *to make a species list for a study and/or to determine species/habitat associations*. The former can be used to determine species richness and location, while the latter helps to clarify the distribution and habitat association of a species.

Field survey activities involved repeatable sampling methods in order to estimate the number of species and/or individuals of the same species in specific regions. Such methods were used for the targeted species and we focused on specific habitats that we considered to be most suitable for these species.

Both of these methods proved to be successful in elaborating a preliminary map of habitats and bird's distribution and help us delineate conservation measures for the SPA's.

In order to obtain necessary data the method mentioned above where combined during the field trips with the following practical techniques:

- Bird watching and visual observations – direct observation with the binocular of the water surfaces and the areas where the access proved to be difficult, and where we can't apply other methods; visual observation of inundation.
- Sampling and collecting of different materials from the field and the determination of them in the laboratory, that help conclude on the presence of species and wetland functions (ex. pH, dissolved oxygen, conductivity, nutrients, flowers, leaves, seeds, feathers, bones, abandoned or unused nests, broken shells).



C. Tetelea monitoring of water indicators (left) and bird watching in the observatory (right)

- The transect scheme – used on specific habitats to estimate the abundance of different species (ex: Moldova Noua Island);
- The bird's sing – useful on some habitats when the accessibility or visibility does not permit researchers to use other methods;
- Photography – used whenever was possible for all the species.
- Mapping – delineating the SPA's and habitat limits with the help of the GPS and introducing the data into GIS software to realize the maps. Landsat TM satellite imagery was used for mapping the habitats and to complete the different versions of local management plan proposals when available.
- Field indicators used for wetland hydrology and hydrodynamics (soil saturation within 30 centimetres of the surface, watermarks, sediment deposits, etc.) – In the absence of direct hydrologic measurement, wetland hydrology field indicators are readily observable evidence that an area was inundated or saturated recently, even though the exact timing, frequency, and duration of wet conditions may be unknown. Visual observation of inundation and droughts, their periods and extension were observed every season during the project implementation.



V. Bagrinovschi during the hydrological observations

- Wetland functions assessment using hydrogeomorphic classification and inventory of extractable resources in order to complete wetland values.

Public debates, teaching lessons and field trip with the pupils in to the SPA's where the mains activities performed to achieve the others objective of the project, respectively participatory management and raising awareness of the local people.



Photos illustrating wetland's hydrology: high level of water on a Moldova Noua Island pool during the spring (left) and low levels during the summer associated with the dam's influence along the Danube River (right).

5.1 Detailed description of activities

Because the contract was signed on the 30th of May 2005 the activities proposed to take place at the beginning of the project were reconsidered and realized starting with July 2005. In order to obtain an accurate image of the wetland function we performed several stage field trips in key period of water level fluctuation, floods and birds migration. In this way we covered both the inventory of species and habitats looking to optimize every field trip and to accomplish our objectives without neglecting the agreed methods.

In the same time with these activities we started discussions with local people and administrations (Pojejena City Hall, Moldova Noua City Hall, Park Administration) in order to locate their perceptions and attitude within the necessity of SPA's protection. This approach gives us the possibility to better organize the debates with local people, to propose conservation measures and negotiate development alternatives for those villages situated in the SPA's vicinity.

The periods of activities carried out during the project implementation were as follow:

July 2005 – 8 days at the end of the month in which 3 team member performed the habitat and bird's inventory at the Calinovat and Moldova Noua Island as well as Divici - Pojejena SPA. A preliminary discussion with the major of Pojejena City Hall and the Park Administration staff were done to inform about the project activities and the necessity of participatory management of the SPA's. Preliminary data were obtained: established of transects for vegetation inventory, wetland assessment procedures, bird inventory and socio-economic aspects.

September 2005 – 10 days at the end of the month in which 3 team member and a ranger performed habitat and bird's inventory at the all SPA's. Preliminary discussions with the local schools teachers in the field of geography and biology were done in order to prepare the lesson plans. A field trip with local school's pupils was performed. Wetland assessment (water sampling and hydrological measurement and observation), habitat and bird's inventory were also other activities carried out in this field stage.

October 2005 – 5 days at the middle of the month in which wetland functions and birds inventory were assessed.

November 2005 – 8 days at the end of the month were allocated to bird watching and discussions with local people. A lesson about wetland importance and bird's life at the Pojejena local school was presented by tree members of our team.

December 2006 – 2 of our team member were invited at the Iron Gates Natural Park Consultative Council annual meeting. A short presentation of the project and participatory environment management on conservation of species and habitats within the park area was the outline of the meeting. The necessity of the establishment of prior conservation measures through local development plans was delineating.

January 2006 – 7 days at the middle of the month in which 4 team members perform a bird census and wetland assessment. A debate with the Pojejena Local Councils was also carried out.

April 2006 – 6 days at the beginning of the month we performed birds and habitats inventory in order to complete the existing list and wetland functions. The distribution map of the bird's species was confirmed. A walk at the observatory and a lesson plan was done with the pupils from the Susca and Belobresca schools.

May 2006 – 2 days at the beginning of the month in which 2 members of our team meet Pojejena City Hall and Park Administration staff in order to discuss the final version of the proposed conservation package. On the 26th of May we participate at the Iron Gates Natural Park Consultative Council and we propose new measures to be integrated in the Management Plan.

5.2 Habitat inventory

Wetland vegetation often differs markedly in both growth form and species composition from that of the surrounding uplands. This is the case of vegetation in the project study area, where the SPA's vegetation, comparing to the surrounding landscape change definitely. Composition of the plant community is changing gradually across some sites as individual species occupy different portions of the moisture gradient. This is the case of uncultivated lands for more than a year in the SPA's surrounding area.

Wetland vegetation is found on the hydric soils with organic deposits on the surface. They are poor hygrophilous species, living in different surfaces near the pool shore in all the SPA's or in the vicinity of pools and sheltered waters along the Danube River. The dominance, percent cover and density were established for every type of association of vegetation.

The hygrophilous vegetation is dispersed in the Danube River floodplains tributaries, in the pools (like those in Divici -Pojejena or in the islands), or along the river mouths (Radimna, Valea Mare, Susca). The hygrophilous vegetation is also composed from many species of trees like willow (*Salix alba*, *Salix fragilis*, *Salix triandra*, *Salix purpurea*), poplar (*Populus alba*, *Populus nigra*), alder (*Alnus glutinosa*), *Rubus caesius*.



Photos illustrating the Calinovat SPA (left) and wetlands from the western part of Moldova Noua SPA (right)

The natural lakes are in different phases of biogenetic accumulation because of the invasion of *Trapa natans* species, and of the input of chemical substances used in agriculture by the local people, which favour the development of abundant vegetation in the conditions of the Iron Gates accumulation lake, controlled by humans, with daily variation of low amplitude.

The vegetation inventory was done following the methods proposed by Central-European Schools and in concordance with the methods and principles elaborated by J. Braun-Blanquet (1921) and adapted by A. Borza (1934) for Romanian territory. The vegetation association's names were adopted in conformity with the Fithosociological Names Code procedures (J.J. Barkman and all, 1986) and Notions fundamentals de phytosociologie (J.M. Gehu, S. Rivas-Martinez, 1981).

After performing this inventory we establish the habitat type in conformity with the book "Romanian's habitats" which offer a unitary description of the main types of habitats found in Romania. According to this book habitats identification is made by recognizing the characteristic phytocenozes and considering the dominant species or ecological indicatory species. The name of the habitat has been given using three characteristic elements for the natural habitats: **i)** land cover type; **ii)** geographic domain where it occurs; **iii)** plant species characteristic to the habitat type. For every habitat type the book present the habitat description and their correspondence to other classification systems of habitats. For our purpose we consider the Habitat Directive classification in order to help the Iron Gates Natural Park Administration completes the management plan and standard data forms for establishing the Natura 2000 sites.

Following these methods and procedures, 12 aquatic and palustrine vegetation associations, distributed within 5 alliances, 4 orders and 3 classes were identified. These are:

1. *Lemnetum mminoris* Oberd ex. T. Muller and Gors 1960

2. *Lemo-Spirodeletum polyrhizae* Koch 1960

These associations include the floating plants that are found in stagnant waters, big sheltered pools with insignificant deep down currents. The coverage area of this association include the pool within Calinovat Island and those founded in Divici – Pojejena SPA's (here this association is protected by the palustrine vegetation).

3. *Hydrocharitetum morsus-ranae* van Langendonck 1935

4. *Ceratophylletum demersi* Hild 1956

5. *Salvin-Spirodeletum* Slavnic 1956

These associations include emerge and submerge vegetation (*Hydrocharitetum morsus-ranae*, *Ceratophyllum demersum* ssp. *Demersum*, *Ceratophyllum submersum*, *Salvinia natans*) from the Calinovat Island, Divici-Pojejena SPA's pools and some areas along the Danube River. The pools and marshes are in different phases of biogenic accumulation because of the invasion of *Trapa natans* species, and of the input of chemical substances used in agriculture by the local people, which favour the development of abundant vegetation.

6. *Potamogetonnetum nodosi* (Soo 1960) Segal 1964

This association includes emerge and submerses aquatic plants with the roots on the bottom of the pools or near shore where the waters content of CaCO₂ is variable. The diagnostic species are *Potamogeton perfoliatum*, *Potamogeton crisous*, *Potamogeton nodosus*, *Myriophyllum spicatum* can be found along the Danube River in the entire SPA's and at the rivers mouths.

7. *Polygonno-Potametum natantis* Soo 1964

8. *Trapetum natantis* Karpati 1963

These associations find good ecological conditions in all the pools or lakes from Moldova Noua and Calinovat Islands and Divici-Pojejena SPA's. The *Trapa natans* species is very well represented in the Danube River, lakes, some pools, gulfs and rivers mouths.

9. *Phragmitetum vulgaris* Soo 1927

10. *Typhetum angustifoliae* Pignatti
1953

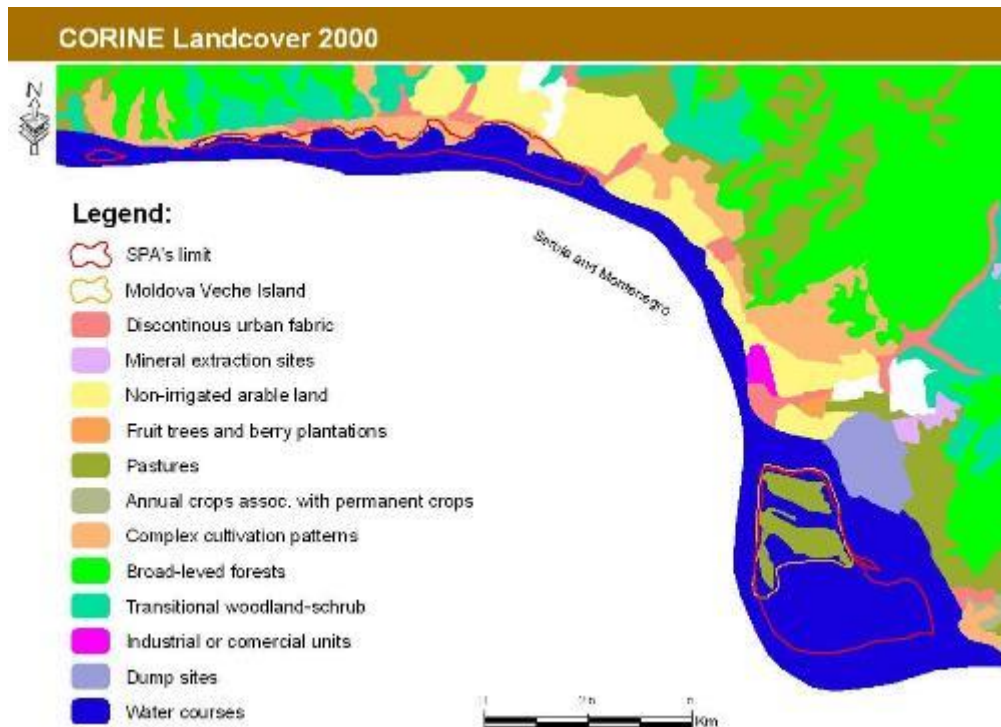
11. *Typhetum latifoliae* Lang 1953

12. *Glycerietum aquatica* Hueck
1931

Even the study area is proposed to be declared Natura 2000 - SPA's and the main purpose of protection it will be the birds listed in the Bird's Directive, we consider the identification of habitats very important for both research and the conservation actions. The vegetation inventory, together with satellite imagery, leads us to mapping at a certain detail the habitats established in the Habitat Directive:



- ❖ Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) – high importance for conservation;
- ❖ *Salix alba* and *Populus alba* galleries – high importance for conservation
- ❖ Natural eutrophic lake with *Magnopotamion* or *Hydrocharition*-type vegetation – great and moderate importance for conservation;



During the elaboration of the national list of Natura 200 sites performed by Ministry of Environment and Water Management (MMGA) between May to November 2006 (<http://n2000.biodiversity.ro>), the Iron Gates Natural Park Administration propose the Calinovat islands, Divici –Pojejena and Moldova Veche Islands to become Natura 200 sites-SPA's. Because the decision will be done until the end of the year 2006, before Romanian accession to EU, the proposal is still analyzed. In our opinion the MMGA by administrative and financial reason will declare the entirely park area as Natura 200 site.

5.3 Birds inventory

Nycticorax nycticorax (L.) 1758

Night heron – can be found in groups together with grey heron (*Ardea cinerea*) and egrets. Rare in the park area.

Comments: Mediterranean specie present during nesting period; the specie was mentioned in the scientific literature by Nadra Emil, Matei Talpeanu (1975); ecological conditions of wetlands are good for this specie but in the SPA's area it is very rare.

Inventory: Moldova Veche Island SPA one exemplar.



Botaurus stellaris (L.) 1758

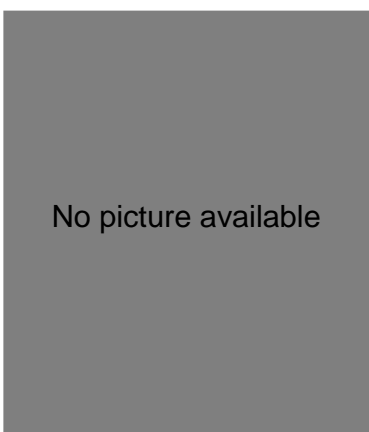
Bittern – very rare



Comments: Mediterranean specie present during nesting period; in the scientific literature was not mentioned; the only documents that mention the specie in the Park area were the reports of the Romanian Ornithological Society (SOR) and bird's census from a LIFE Nature project implemented by University of Bucharest during 2001- 2004.

Inventory: the only mention about the specie during the project period was one of the rangers who identify it by sing. The data was checked by the team but no significant inputs were reached. Need future assessment!

Aythya nyroca (Guldenst.) 1770



Ferruginous duck – the specie is common in the SPA's area mostly on those years with very cold winter in the north.

Comments: European specie present in the area during nesting period; the scientific literature didn't mention this specie; there were mentioned by the SOR and the University of Bucharest bird census report's.

Inventory: Moldova Veche Island SPA (18 exemplars); Divici –Pojejena SPA pools (8exemplars); along the Danube River 7 exemplars

***Phalacrocorax pygmaeus* (Pall.)1773**

Pygmy cormorant – the specie is very common on the Danube River finding good ecological condition for wintering in all the SPA's.

Comments: this Mediterranean species is present in the park area during nesting season.

Inventory: many exemplars at Moldova Noua, Ostrovul Moldova Veche (aprox. 30 along the Danube shore, staining on the gnarls in the water), Bazias, Pescari, Moldova Veche Islands (aprox. 20 exemplars)



Pygmy cormorant use the fisher's places to heat and rest for another dive

***Egretta garzetta* (L.) 1766**



Egretta garzetta

Little egret – very common on wetland's along the Danube River; represent a Mediterranean specie being in the area during nesting period

Comments: the specie was mention in the scientific literature only in 1975; some Local Environmental Protection Agency reports mention it but without performing a census. Romanian Ornithological Society (SOR) mentions in his yearly records the area is having a large number of *Egretta garzetta*; the specie is listed on the

Bird's Directive but isn't considered as conservation priority on the Priority Bird's List of Romania (elaborated by SOR).

Inventory: 21 exemplars at Moldova Veche Island SPA – the specie is found especially on the south-eastern part of the island and on pools; inventoried in January/April 2006; 15 exemplars on Divici – Pojejena SPA - in open waters along the Danube during January/April 2006.

Other species:



A mallard's nest on Moldova Veche Island SPA, and group of storks at Divici - Pojejena SPA



Grey heron (*Ardea cinerea*) at Moldova Veche Island SPA (left) and at Divici-Pojejena SPA during low water level (right)



A flying pochard across the Danube River - *Aythya ferina* (left) and a black stork - *Ciconia nigra* on the Moldova Veche Island SPA (right)



Himantopus himantopus on Moldova Veche Island (left), and *Podiceps cristatus* at Divici – Pojejena SPA.



Grey heron (left) and a cormorant (*Fulica atra*) on a pool at Divici – Pojejena SPA (right)

5.4 Wetlands' functions assessment

The project study area includes riverine wetlands and depressional wetlands. Riverine wetlands occur in the Danube floodplains, islands surroundings or riparian corridors in associations with streams channels (common to Divici –Pojejena SPA's and along the shore of islands on the Danube River – Calinovat and Moldova Noua). Dominant water sources are overbank flow from the Danube or tributary rivers, hydraulic connections between the river's channel and wetlands (ground water inflow). Additional sources of water are overland flow from adjacent uplands, tributary inflow and precipitation. The wetlands lose water especially when floodwater returns to the river after flooding, during rainfall events by surface flow, and subsurface water discharge to the channel and evaporation.

Depressional wetlands occur mostly in the Moldova Noua Island were existing topographic depressions with closed elevation contours allow the accumulation of surface water and forms permanent shallow lakes and pools. These wetlands are a consequence of construction works for establishment in the 80's of sledge pools necessary for the mining activities. The wetlands existing here lose water by subsurface discharge to the river, especially when the level of the river is low, or by evaporation.



Photos illustrating the riverine wetlands (left on the Divici – Pojejena SPA) and depressional wetlands types (right on the Moldova Veche Island SPA)

The predominant hydrodynamics are vertical fluctuations that range from diurnal to seasonal and directly linked to the Danube River. Because of the river influence these wetland can be categorized also as lacustrine wetlands.

The wetlands function's was assessed using the hydrogeomorphic approach proposed by M. Brinson in 1993. In this scope array of geomorphic settings were assessed by direct observations and records of discharge and stage height that illustrate the Danube River hydrologic variation (from the Water Management District from Dr. Tr. Severin). Considering this approach wetland's functions were categorized by type of wetland (depressional or riverine), category of ecological scale (population, ecosystem and biosphere) and position in the landscape in order to establish the human impact (riparian wetland, ponds and lakes, open waters). The actual research reveals that the most frequent wetland's functions are: temporary flood storage, inflow retain, provide waterfowl and amphibian's habitats, shoreline and channel stabilization, maintain surface and subsurface water supply (groundwater recharge).



Photos illustrating a pool from Moldova Noua SPA (left) and a marsh at Susca from Divici-Pojejena SPA

Because the wetlands have also values determined not only by their functions but by human perceptions, the location of the wetland and the extent of the available resources, and because the project focuses on the participatory management, we estimate also these values of wetland in order to be considered during the awareness activities and management plan. In this scope we explain and underline the followings wetland's value/principles to the local peoples and local authorities: wetlands are multiple value systems (they perform many processes and therefore they provide a suite of values for humans); the relationship between wetland and marginal areas is complex (economics supports the general concepts that the less there is of some commodity, the more valuable it is); commercial values are finite, whereas wetlands provide values in perpetuity; values are influenced by cultural bias and economic system; short term economic gain from non wetland commercial use (as is here the case) against long term values (economic gain of selling the land is much more desirable instead of acceptance cost effective measures).

Furthermore our proposals for the local development plans try to take into considerations, after performing the wetland's functions and value, some general principles in order to assure the best measures of conservations for the SPA's. These principles are: the scale principle, the marginal value paradox, the hydrogeomorphic principle and the ecosystem substitution paradox.

In order to balance the effort of conservation and the needs of local people we propose the reduction within the legal limit 3% to 6 % of the Divici-Pojejena SPA's. The proposal includes the reduction of the western and eastern extremities were the actual limit is just near to the entrance to the villages of Susca and Divici.

This will give to the local authorities and villagers the possibility to protect their houses from floods and to facilitate their access to the river. In our opinion in the context of declaring the park area as Natura 2000 site or the SPA's it will be better to facilitate the administrative approval of some works whenever these are mandatory. According to pure judgment and wetland assessment these extremities actually representing open waters of the Danube, do not provide the same function as the pools and marshes (nesting or feeding places, trapping of sediments, etc). In fact these areas are continually eroding the shore advancing during the spring flood into the people's garden. The problem need to be reconsider into the future development plan in order to avoid to balance the action in favour of conservation without satisfying the minimal needs of local people.



Land reclamation - the area proposed to be reduced from the actual limit of Divici pojejena SPA's is bordering the garden of the villagers

5.5 Awareness activities



During the project several meetings took place with the occasion of field trips or organized meetings by the Iron Gates Natural Park Administration. One of the most important meetings was the meeting of the Iron Gates Natural Park Administration Council. The issued discussed during the meeting was the elaboration of new development plans for all the villages within the park area. New chapters of these plans will need to address the wetland conservation as well as other conservation and protection measures.



Children from Belobresca school learning about bird species and their importance in the ecosystem. Using special fact sheet for wetland ecosystem and panels for birds recognising they try to get identify the ecological value of wetlands pattern.

Explanations about plant adaptation to wetland condition and water influence through landscape were given on the field trip to the observatory near Susca marsh.

The educational package made within the project includes fact sheet about wetland ecosystem and migratory birds species as well plant adaptation to water regime.

These materials we gave it to local schools and to the administration of the Iron Gates Natural Park.



5.6. Participatory management and conservation activities

The proposal of a **Conservation measures package** was submitted to local authorities and Park Administration in order to promote wise use of wetlands and to protect SPA's within the Iron Gates Natural Park by supporting the development of legal institutional cooperation. This package contains general measures structured according to the followings issues with related activities:

1. Conservation and management of wetland's ecosystems

a) *Implement extensive conservation measures and maintain the current nature like wetland ecosystem and halt their destruction* – land acquisitions from the private owners by the local City Halls, Park Administration or local NGO and use of these

lands as buffer zone or to limit the direct impact of agriculture or house buildings in the wetland vicinity it will be most efficient and quickly measures that will conduct to SPA'S conservation. Limitation of some activities and reduction of others, in time with key important periods (like floods, bird's wintering/ passing/ reproduction) was drowned for local development plans and can be used also in the Iron Gates Natural Park Management Plan or SPA's management plan (ultimately).



b) *Provide for intersectorial coordination of management of aquatic and wetlands ecosystem* – integrated and comprehensive monitoring system, including monitoring of hydromorphological and biological compounds of surface waters, in accordance with WFD 2000/60/EC. This can be done by WMA and LEPA in cooperation with PA. Other state universities or private institutes/organization research programmes will be much helpful.

c) *Prevent future spreading of invasive alien species and geographically non-indigenous organism (case of *Trappa natans* and *Litrium salicaria*)* – action needs a monitoring plan and measures to limit the current populations of these species; involving the local population is much needed.

d) *Introduce a system of measures to prevent eutrophication, erosion and excessive transport of sediments in the landscape* – the action needs future assessment and study in order to apply the best management practices. It is connected with majority of measures provided in the conservation package and it will be the most important measure providing new issues in SPA's conservation. The LDP must comply with

some of these actions (limitation area for farming, construction area delimited, etc.) and linked with landscape development at local and regional level.

e) Maintain varied hydromorphological formations in wetland ecosystems, allow their occurrence and existence and provide for their conservation – this action is related to limitation area for construction (sand removal and ditch/dam creation related with house building) and buffer delimitation.

f) Renew the continuity of the wetland network by removing unused and non-functional water works and provide for passage of fish through functional and necessary structures by means of fish ladders. Where feasible, enable contact of surface and ground water and contact between the aquatic and terrestrial environment by interconnecting valley meadows with water courses, and enable all natural processes related to regular flooding.

2. Limitation of unfavourable impact of local development (tourism, agriculture and fishing) of wetland ecosystems.

a) Completion of an efficient system of wastewater treatment for all the villages in the area – the Cities Halls must include this necessity into their Local Development Plan.

b) Reduce and control the use of fertilizer and pesticides and, thus, support the reduction of intensity of pollution of the aquatic environment from diffuse sources – the Cities halls must distribute the fertilizer according to a scheme in agreed by local farmers and in concordance with legal regulation. This scheme must be elaborated after a detailed study on the diffusion and retention time of an amount of pesticides in the groundwater per unit square. The MEWM and WMA will be the responsible for the study and the implementation collaborated with other compensation schemes.



c) Ensure sustainable farming in the landscape, with respect to the principles of good agricultural practices and with support for development of organic farming – these sets of measures include facilities for farmers in order to assess the ecological practices of farming. Special measures will be provided by Park Administration through Iron Gates Natural Park management plan. This set of measures will be linked directly to the compensation schemes. The measures can be sustained at local, regional and national levels through different programmes and institutions. The Park Administration and Cities Halls must facilitate and attract such of investments in the area.

d) Reduce the risk of pollution of groundwater and surface water from old environmental burdens and ecological accidents – LEPA and WMA will be responsible with the authorization of all the economical activities in the area. They will monitor the strictly compliance with the set emission limit values. Compensation schemes in order to encourage local people to accept sustainable farming (measures provided in to the SPA”S management plan) must be established at the national level

by the MEWM. This will provide to local authorities with the procedures and financial flow.

e) *In open waters, respect the interests of aquatic communities and economically unimportant species of aquatic organism in the framework of selective fishing and introduction of economically important species of fish – provide for fish breeding under sustainable environment and economic management conditions.*

Conclusions

Following the inventory activities of the bird populations and their habitats, some conclusions occurred:

- The Danube River is a permanent wetland with a rich specific biodiversity. The aquatic birds' populations are part and parcel of this biological diversity.
- Nesting birds' population's numbers can be characterized as relatively low, both in terms of the number of species and number of individuals. The larger the number of species and/or individual is the more special is the hiemal period (January - February).
- The species observed here are nesting in the Central, Eastern and Northern Europe, sometimes even in the tundra. Considering this fact, and using the data obtained during the bird's inventory, it was possible to estimate the status and the dynamic of the populations from Europe, in both qualitative and quantitative terms, for the discussed year. We also were able to realize a preliminary map of bird's distribution in the SPA's that will be updated early by other inventory (with the help of park rangers and other researchers). Therewith, these data complete the databases on the aquatic birds, data that are annually renewed, during the winter censuses, through synchronous observations.
- The SPA's became the main wintering and stationing place during the migrations along the Danube in this region. This is the result of the fact that the Danube River water is rarely freezing entirely; the climate of this area is relatively warm during the cold season; water flow, the amount and quality of food is satisfactory and specific to each species.
- This wetland functions influence the formation, maintenance and stationing of the aquatic birds wintering groups. The wetlands values are given on the one hand by the people that use these types of habitats and on the other hand by the values that these habitats provide to ecosystem.
- Their functioning is endangered by human impact, lack of an integrated management plan for the Danube River and riverine area and by the lack of legal and institutional concern.
- Integrating general regulations into the local development plan can assure more effective measures of protecting these ecosystems and migratory birds' species and long lasting conservation efforts in the Iron gates Natural Park. Furthermore the proposal is emphasise the land reclamation by the people in order to assure their houses against flood and propose them an alternative of tourism as an alternative of revenue for local budget.

Financial statement

Description	Price (EURO)*
Field materials	
water sampling kit	86
digital camera and accessories	673
water proofs for camera	25
boots	118
nests	33
	Sub-total
	935
Travel allowance	
train and bus tickets	890
gas	765
	Sub-total
	1655
Accommodation	
hotel in November 2005 (3 pers X 8 days X 11€)	264
hotel in January 2006 (4 pers X 7 days X 13€)	364
hotel in April 2006 (3 pers X 6 days X 13€)	234
	Sub-total
	862
Per diem	
3,5 X 5 pers X 76 days	1330
	Sub-total
	1330
Consumable materials	
photos	230
printing lesson plans and fact sheet	165
chemicals substances	200
	Sub-total
	595
External assistance	
designing materials	200
information panels	750
	Sub-total
	950
Other costs	
phone and fax	150
internet	160
	Sub-total
	310
TOTAL COSTS	
	6637

* the exchange rate of the European Central Bank were used