

FINAL REPORT OF THE PROJECT "INTEGRATED MANAGEMENT OF BIODIVERSITY IN SLATIOARA GRAVEL PIT"



"The Quarry Life Award" Scientific and Educational Contest, 4th edition (2018)

1. Contestant profile

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2. Project overview

Title:	Integrated management of biodiversity in Slatioara gravel pit
Contest: (Research/Community)	Research
Quarry name:	Slatioara Pit

3. Abstract

The project „Integrated management of biodiversity in Slatioara gravel pit” is based on 3 incorporated approaches: i) inventory, mapping and detailed evaluation of habitats and species of wild flora and fauna, ii) identification of proper solutions for the ecological restoration and rehabilitation of the site (insurring the conditions for the quality improvement of biodiversity aspects) and iii) promoting suitable ethics for a proper/sustainable management of the exploitation of natural resources that would lead to a strong sustainable development at a local and regional level.

In this context, the project entailed the study of biodiversity (habitats, plants, invertebrates, amphibians, reptiles, fish, birds and mammals) and the pressure/threats existing/developing on these biodiversity groups, as well as the study of degraded habitats with high ecological potential for the biodiversity elements within Slatioara gravel pit (feeding, reproduction and rest habitats for fauna species). The project also includes solutions for the ecological rehabilitation and restoration of degraded habitats in order to assure a reduction of the negative impacts on habitats, wild flora and wild fauna (including those resulting from activities of exploitation of mineral aggregates).

Based on: a) data collected on the field throughout the development of the project (January – September 2018), b) environment legislation (national and community) and c) the regulatory documents for the studied gravel pit (Environmental Authorization and Natura 2000 Permit), a Biodiversity Management Plan (BMP) was constructed for the protection of Biodiversity within Slătioara gravel pit.

The results of this project represent strong scientific reasons to create a future project that would promote the local and regional natural values through protection and conservation measures of the biodiversity, based on the concept of sustainable development (the exploitation of the mineral aggregates taking into consideration the support capability of the natural and semi-natural habitats of the site).

Implementing the solutions proposed within the project will allow the creation of a management mechanism, with a sustainable use, for the protection and conservation of the biological diversity within and in the vicinity of the Slatioara gravel pit. This mechanism will provide the tools to stop the loss of wild flora and fauna populations and the degrading of their important habitats, as well as will conserve them for future generations.

4. Introduction

The project „Integrated management of biodiversity in Slătioara gravel pit” was created by Marcel Țîbîrnac and enlisted in the IV edition (2018) of the contest ”The Quarry Life Award”.

The goal of this project was the creation, maintenance and assurance of viable conditions for the improvement of the quality of biodiversity within and in the vicinity of Slătioara gravel pit, through a suitable/sustainable biodiversity management that will consolidate the concept of sustainable development in the region.

The objectives of the project were:

- Detailed evaluation of biodiversity within the gravel pit’s perimeters;
- Developing specific measures for the improvement of the ecological state of natural and semi-natural ecosystems that provide support to habitats and species of flora and fauna within the limits of the site of Slătioara;
- Protection and conservation of biodiversity and natural heritage through the development of management of Slătioara gravel pit.

5. Methods

In order to achieve the proposed objectives, several specific activities were conducted (with several phases), both on the field and at the office. These activities focused on the study of all components of biodiversity (habitats, plants, invertebrates, amphibians, reptiles, fish, birds and mammals) within and in the vicinity of the 2 perimeters of the Slătioara gravel pit. Specific field methods were used during January – September 2018 for habitats, flora and fauna (according to recommendations provided by specialists).

The flora and habitat components were studied on the field during their active fiziological phases, using the method of itinerary for flora, and quadrat sampling for plant communities and habitats (Braun-Blanquet, 1964, Borza et Boșcaiu, 1965, Cristea et al., 2004, Sanda et al., 2008).

The data regarding the number of species and their taxonomy determined in some cases in the field and in other cases based on the scientific literature (Săvulescu, 1952-1976, Ciocârlan, 2009) was processed, systemized and grouped, according to the present phylogenetic system (Tutin et al., 1968, 1972, 1976, 1980, 1993). The list of plant species resulted from this activity was confronted with the Red Book of Vascular Plants of Romania (Dihoru et Negrean, 2009) and the lists from bibliographical sources for invasive species (Anastasiu et al., 2007, 2009, 2011, Anastasiu et Negrean, 2009).

Based on the plant communities observed on the field, was done a correlation between cenotic groups and Natura 2000 habitats, according to the requirements of Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, the Interpretation Manual of European Union Habitats - (versiunea EUR 28, Gafta et Mountford, 2008) and the Romanian classification national-wide system of natural habitats (Doniță et al., 2005).

The fauna study was focused on using active line-transect sampling and direct observation, conducted both at daytime and night time (Fuhn, 1960, Fuhn et Vancea, 1961, Decu et al., 2003, Resh et Carde, 2003, Gillot, 2005, Dietz et al., 2007). The purpose of the activity was the identification of all species and their preferable habitats. The list of species identified in the field was correlated with the Red Book of Vertebrates of Romania (Botnariuc et Tatole, 2005) and the annexes of national and European legislation (Bonn Convention, Bern Convention, Habitat Directive, Birds Directive and Government Emergency Ordinance no. 57/2007). The degraded areas and the locations proposed for the improvement of habitats important for native fauna were mapped using GPS.

Data relevant in the description and characterization of the abiotic environment were also collected during monthly field visits, as well as data regarding specific/present ecosystems. All the field data was collected in an internal data base of the project in order to analyze and interpret the results.

The materials and equipments used for the study of habitats, flora and fauna species were: measuring tape, magnifying glass, binoculars, photographic equipment, GPS, sampling box, identification guides and data analysis software Global Mapper and Arc GIS.

Taking into consideration the fact that the two perimeters of the Slatioara gravel pit largely overlap the natural protected area of ROSPA0106 Valea Oltului Inferior / Lower Olt Valley (part of Natura 2000 Network), the requirements of Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds were included in the BMP.

Therefore, the BMP for the two perimeters of the Slatioara gravel pit applies the legal requirements of Government Emergency Ordinance no. 57/2007 regarding the status of natural protected areas, conservation of natural habitats, flora and fauna, approved with the relevant modifications and adjustments.

The creation process for the BMP of Slatioara gravel pit included the following stages:

- Pre-process of data (identification of legal context and a careful planning of the activities);
- Collection and structuring of needed information for the creation of the management plan;
- Defining the purpose of BMP;
- Identification of main frames of management;
- Identification of general objectives associated to each of the main frames of management;
- Identification of a set of measures that insure the objectives will be reached;
- Identification and planning of activities;
- Prioritization of measures/activities;
- Attribution of human and financial resources for each measure/activity;
- Completion of work plan / work schedule.

The BMP for the two perimeters of Slatioara gravel pit was created in conformity with the present national and European legislation, the requirements of best practice guides in the field, both at a national level and a European one.

6. Results

The cover of the proposed activities within the project insured the following results:

- The Integrated management of biodiversity in Slatioara gravel pit accepted by HeidelbergCement România S.A.;
- The inventory of habitats and fauna species (including the detailed evaluation of these) within and in the vicinity of Slatioara gravel pit;
- A scientific data base with all the identified habitats and species;
- A set of photographs with natural and anthropic elements identified within and in the vicinity of Slatioara gravel pit;
- The inventory of natural, semi-natural and anthropic ecosystems relevant for the studied area;
- A list of present pressures and future threats (including their intensity) on biodiversity within and in the vicinity of Slatioara gravel pit;
- The inventory of abiotic environment (geology, landscape, hidrography, climate and pedology) for the studied area;
- Socio-economical and cultural information (local communities, interested entities, the legal situation of the land, cultural heritage and turist attractions) for the studied area.

7. Discussion

Location of the site. The Slătioara gravel pit, represented by two perimeters (one in the North and the other in the South), with a total area of 218.2 ha, is located in the southern part of Romania, in the development region IV Southwest and the Oltenia Historical Region, which is fully registered on the territory of Olt County, in the central-western part of this county (Annex no. 1).

The Administrative-Territorial Units (ATU) on which the site of the Slătioara gravel pit is located are: Slătioara, Slatina, Găneasa and Curtișoara (Annex no. 2). Of the 4 ATUs in which the two perimeters of the Slătioara gravel pit are registered, one is the city-type county residence, and 3 are of the communal category. Slătioara commune has the largest share of the slopes perimeter of Slătioara – 63.68%, and Curtișoara commune has the lowest share – 0.01%.

Slătioara gravel pit connection with the Natura 2000 ROSPA0106 Valea Oltului Inferior (in translation – Lower Olt Valley). The two perimeters of the Slătioara gravel pit are overlapping with 87.87% (of the total area of 218.2 ha) on the Natura 2000 site limit ROSPA0106 Valea Oltului Inferior (Annex no. 3).

According to the Natura 2000 Standard Form (updated on 11.08.2017) the natural protected area ROSPA0106 Valea Oltului Inferior has an surface of 52789.8 ha and is administratively located in the South and South-West development area, on the administrative territory of of the counties of Teleorman, Vâlcea and Olt (within 52 ATU). ROSPA0106 Valea Oltului Inferior was declared on the basis of the 13 species of birds listed in Annex I of the Council Directive 2009/147/EC and 78 species of birds with regular migration unmentioned in Annex I of Council Directive 2009/147/EC.

Geology. Within the two perimeters of the Slătioara gravel pit, two types of geological formations are distinguished: lake and pebbles and sand. From a geological point of view, the two perimeters of the Slătioara ballast are overlapping with the recent alluvial deposits (quaternary) deposited by the Olt River after the break-up of the Southern Carpathians.

Landscape. From the point of view of the landscape units, the two perimeters of the Slătioara gravel pit fall entirely within the Olt Corridor. The analyzed area is part of the Slatina-Izbiceni sub-sector (the upper limit) representing the entrance of the river Olt in the Romanian Plain, where the valley widens greatly and the degree of meandering is accentuated. From the point of view of the slope exhibition, the slope from Slătioara is reflected by flat surfaces (the presence of aquatic surfaces) with slopes under 2° which occupy over 80% of the total area.

Hydrography. From the hydrographic point of view, the Slătioara gravel pit is part of the VI Olt Hydrological Basin and is part of the Lower Olt river sector (Annex no. 4). In the area of the Lower Olt sector, the Olt riverbed widens, has many abandoned meanders and arms, slopes even falling below 1 ÷ 2 m/km.

Climate. According to the Geographic Monograph of the Romanian People's Republic, the Slătioara gravel pit falls in the continental climate sector - II, characteristic of the southern sub - continent of the A - forest area, in the center of the Romanian Plain – 2-IIAp2.

The area of the project is characterized by a temperate-continental climate and with Mediterranean tones with western, western and eastern influences, generated by tropical air masses in the warm season of African origin. The area of the Slătioara gravel pit sites is characterized by the average temperature annual is 10.6 °C in July, and monthly temperatures are -3 °C in January and 22.5 °C in July, with an amplitude of 25 °C. Multi-year averages are 10.5 °C. Thermal continentalism is reflected in the short pass between winter and summer and a possible 220-day freeze-up period that falls between April 1-11 and December 1.

Atmospheric precipitation within the analyzed area does not vary significantly due to the relief pattern. Thus, the average annual rainfall is between 500-550 mm in Slatina due to the large water surface expansions. In the annual precipitation regime two pluviometric peaks are recorded, May-June, October-November and two minimums - August-September and February-March.

The area under consideration is in terms of atmospheric pressure in the type of continental regime, characterized by a peak in January of about 1050 mb and a minimum in July of about 995 mb, with an average annual amplitude of 6.8–7.2 mb. Precipitation suffers the same continental influence as the air temperature and falls as rain.

Pedology. From the pedological point of view, the perimeters of the Slatioara gravel pit belongs to the category of alluvial soils (including alluvial protosols) with a varied texture of the class of unburned or truncated soil. Soils of hydromorphs and halomorphs are added to this category of soils. The intensity of the gleaning process of the identified soil type within the investigated perimeters of the Slatioara gravel pit is zero - without the danger of excess water.

Ecosystems. According to Corine Land Cover (2012), within the two perimeters of Slatioara gravel pit, 6 land use categories were identified. Of these categories of land use, the highest share is represented by category 512 - Lakes (81.57%), followed by category 121 - Industrial or commercial zones (8.97%). The most insignificant weights are recorded in categories 311 - Deciduous forests (0.78%) and 243 - Areas occupied mainly by agriculture with significant areas of natural vegetation (1.68%).

Based on the direct observations collected from the field, in the two perimeters of the Slatioara gravel pit we identified 5 types of natural and semi-natural ecosystems and 3 anthropic elements (Annexes no. 5-12). Fresh waters represent the category of natural and semi-natural ecosystems most representative of the two perimeters of the Slatioara gravel pit, the share of which exceeds 78% of the entire area investigated.

Habitats. Based on the data gathered on the field on the main structural parameters of the vegetation (floristic composition, Abundance-Dominance indices for each cormophyte species), 5 plant associations were identified (*Trifolium fragifero-Cynodontetum* Br.-Bl. et Balas 1958, *Lemnetum minoris* Soó 1927, *Typhetum angustifoliae* Pignati 1953, *Typhetum latifoliae* G. Lang. 1973 și *Scirpo – Phragmitetum* W. Koch 1926) correspondence of 4 types of national habitats – R1514 - West-Pontic communities with *Trifolium fragiferum*, *Cynodon dactylon* and *Ranunculus sardous*, R2202 - Danubian communities with *Lemna minor*, *Lemna trisulca*, *Spirodela polyrhiza* and *Wolffia arrhiza*, R5305 - Danubian communities with *Typha angustifolia* and *Typha latifolia* and R5309 - Danubian communities with *Phragmites australis* și *Schoenoplectus lacustris* (Annexes no. 13 and 14). These 4 national habitats identified within the areas of Slatioara gravel pit amount to 23.93 ha and represent approximately 10.97% of the total area investigated. None of the identified vegetal associations have any correspondence with any habitat in the Community habitats classification system (Natura 2000).

The R1514 habitat - West-Pontic communities with *Trifolium fragiferum*, *Cynodon dactylon* and *Ranunculus sardous* are xeric meadows and has been associated with a heterogeneous floral composition, which in addition to characteristic species (xeric) has identified many segetal and ruderal species that indicate ruderalization and degradation of this type of investigated habitat. In this context, the conservative value of this national habitat was assessed as low. The other 3 national habitats investigated (R2202 - Danubian communities with *Lemna minor*, *Lemna trisulca*, *Spirodela polyrhiza* and *Wolffia arrhiza*, R5305 - Danubian communities with *Typha angustifolia* and *Typha latifolia* and R5309 - Danubian communities with *Phragmites australis* and *Schoenoplectus lacustris*) were identified on an area of 4.74 ha of fresh water ecosystems. The conservative value of these habitats has been assessed as low and moderate.

Plants. Based on the itineraries under the project implementation period, a total of 138 plant species were identified in the two perimeters of the gravel pit (Annex no. 15). Out of the total of these 138 identified plant species, 12 species belong to the category of cultivated plants that were accidentally or deliberately introduced into the investigated area. From the point of view of the life and growth form, the identified flora is represented by 16 annual species (11.59% of the total species identified), 21 tree species (15.22%), 13 species of shrubs (9.42%), 8 species of bisannuals (5.8%), 4 species of lianes (2.9%) and 76 perennial species (55.07%).

The spectrum of bioforms reflects a good representation of the hemicriptophytes (41 species – 29.71% of the total species identified), the phanerofites (38 species – 27.54%), geophytes (16 species – 11.59%) and the terophytes (15 species – 10.87%). Values below 10% are recorded by hydrophytes (9 species –

6.52%), hydrohelofites and hemiterophites (8 species in each category – 5.8%) and camefites (3 species - 2.17%).

None of the plant species identified has any protection status. However, of the total of 138 plant species identified within the area investigated, 15 species have invasive character (10.87% of all species identified) – *Acer negundo*, *Ailanthus altissima*, *Amorpha fruticosa*, *Aster novi-belgii*, *Azolla filiculoides*, *Conyza canadensis*, *Datura stramonium*, *Elaeagnus angustifolia*, *Erigeron annuus*, *Gleditsia triacanthos*, *Morus alba*, *Morus nigra*, *Oenothera parviflora*, *Robinia pseudoacacia* and *Rumex longifolius*.

In terms of invasive status, of the 15 invasive plant species, 7 species (46.67% of all invasive species identified) have invasive status (foreign plants with a high degree of propagation/reproduction) 5 species (33.33% of all invasive species identified) have the status of naturalized plants (constantly reproducing and supporting populations over several life cycles without direct human intervention) and 3 species (20% of all invasive species identified) have occasional status (foreign plants that reproduce occasionally in an area but require repetitive insertions for their persistence).

Most invasive species have been identified along the road network (the paved road leading to the gravel pit through DN65) and the paved dike.

Invertebrates. Within the two perimeters of the Slatioara gravel pit, 13 species of invertebrates were identified (Annex no. 16). Of the 13 identified invertebrate species, 12 species (92.31%) belong to the native category, and one species (7.69%) - *Anodonta woodiana* is considered foreign (non-native, introduced).

According to IUCN – The International Union for Conservation of Nature, 7 identified invertebrate species (53.85%) have the LC protection status - Least Concern, a species (7.69%) has NT status – Near Threatened, and 5 species have no protection status (not evaluated).

The Roman snail (*Helix pomatia*) is the only species (among those identified in the investigation area) that is mentioned in national and international normative acts (Annex V of the Habitats Directive, Annex 5^A of GEO 57/2007 and Annex III of the Berne Convention). Individuals of *Helix pomatia* were identified in the vicinity of the mesophilic forest and xeric meadows within the two perimeters of the Slatioara gravel pit.

Ichthyofauna. From the ichthyofaunistic point of view, the sites of the Slatioara gravel pit are characterized by the presence of 14 species of fish (Annex no. 16), of which 12 native species (85.71% of the total fish species identified) and 2 ichthyofaunistic species (14.29% of the total fish species identified) that are considered foreign (non-native, introduced).

According to IUCN, 10 fish species (71.43% of the total fish species identified) are LC – Least Concern, one species (7.14%) has VU – Vulnerable status, and 3 species (21.43%) are not evaluated.

The Danube bleak (*Alburnus chalcoides*) is the only species (among those identified in the area investigated) that is mentioned in national and international normative acts (Annex II of the Habitats Directive, Annex 3 of GEO 57/2007 and Annex III of the Berne Convention).

According to the Red Book of Vertebrates of Romania, the species Danube bleak (*Alburnus chalcoides*) and Common dace (*Leuciscus leuciscus*) have endangered status.

Herpetofauna. The Slatioara pit's herpetofauna is characterized by 5 species of amphibians and 8 reptile species (Annex no. 16), all native species. Of these 13 species, 12 taxa (92.31%) have IUCN LC status - Least Concern, and one species (7.69%) is NT – Near Threatened.

Twelve species of herpetofauna identified within the Slatioara gravel pit are mentioned in the national and international normative acts (Habitats Directive 92/43/EEC, GEO 57/2007 and Bern Convention).

According to Habitats Directive, the species *Emys orbicularis* is mentioned in Annex II and Annex IV, and species *Bufo viridis*, *Rana dalmatina*, *Coronella austriaca*, *Lacerta agilis*, *Lacerta viridis*, *Natrix tessellata* and *Podarcis taurica* are mentioned in Annex IV.

According to GEO 57/2007 one species (*Emys orbicularis*) is mentioned in Annex 3, 8 species (*Bufo viridis*, *Rana dalmatina*, *Coronella austriaca*, *Emys orbicularis*, *Lacerta agilis*, *Lacerta viridis*, *Natrix tessellata* and *Podarcis taurica*) are mentioned in Annex 4^A, 2 species (*Bufo bufo* and *Anguis fragilis*) are mentioned in Annex 4^B and 2 species (*Rana esculenta* and *Rana ridibunda*) are mentioned in Annex 5^A.

According to the Berne Convention, 8 species (*Bufo viridis*, *Rana dalmatina*, *Coronella austriaca*, *Emys orbicularis*, *Lacerta agilis*, *Lacerta viridis*, *Natrix tessellata* and *Podarcis taurica*) are listed in Annex II - Strictly Protected Species.

Species of amphibians have been identified in freshwater ecosystems, swamps and their immediate vicinity, and reptile species have been identified within the hedges, xeric meadows and mesophilic deciduous forest.

Avifauna. From the avifaunistic point of view, in the immediate vicinity of the two perimeters of the Slatioara gravel pit, 114 species of birds (Annex no. 16) were identified, of which one species (0.88% of the total bird species identified) with IUCN status of EN – Endangered, 100 species (87.72%) with IUCN LC status – Least Concern, one species (0.88%) with IUCN status of NT – Near Threatened and 12 species (10.52%) with IUCN VU status – Vulnerable.

According to the Birds Directive 2009/147/EC, 23 species are listed in Annex I, 10 species are listed in Annex IIA, 13 species are listed in Annex IIB, 3 species are listed in Annex IIIA and 6 species are listed in Annex IIIB (9 species are mentioned in several Annexes).

According to GEO 57/2007, 22 species are listed in Annex 3, 24 species are listed in Annex 4^B, 23 species are listed in Annex 5^C, one species is listed in Annex 5^D, and 7 species are listed in Annex 5^E (with 7 species mentioned in several Annexes).

According to the Bern Convention, 26 identified bird species are listed in Annex II - Strictly Protected Species, and 5 species are listed in Annex III - Protected Species.

Nine identified bird species are listed in Annex II of the Bonn Convention – Migratory species to be subject to the Agreements.

According to the Red Book of Vertebrates of Romania, one species (*Haliaeetus albicilla*) is critically endangered, 5 species (*Burhinus oedipnemus*, *Egretta alba*, *Egretta garzetta*, *Himantopus himantopus* and *Netta rufina*) are endangered, and 9 species (*Aythya nyroca*, *Bucephala clangula*, *Ciconia ciconia*, *Falco vespertinus*, *Mergus albellus*, *Nycticorax nycticorax*, *Recurvirostra avosetta*, *Tadorna tadorna* and *Upupa epops*) are vulnerable.

Mammals. Within and in the vicinity of the perimeters of the Slatioara gravel pit, 11 species of mammals (Annex no. 16) were identified – all IUCN LC status (Least Concern).

According to the Habitats Directive, 3 species (*Myotis daubentoni*, *Pipistrellus nathusii* and *Vespertilio murinus*) are listed in Annex IV.

According to GEO 57/2007, 3 species of identified mammals are listed in Annex 4^A, one species is listed in Annex 4^B and 6 species are listed in Annex 5^B.

According to the Berne Convention, 2 species of identified mammals (*Meles meles* and *Sciurus vulgaris*) are listed in Annex III – Protected Species. According to the Bonn Convention, among all species identified only *Vespertilio murinus* is mentioned in Annex II.

According to the Red Book of Vertebrates of Romania, one of the species identified within and around the Slatioara gravel pit (*Myotis daubentoni*) is critically endangered, 2 species (*Pipistrellus nathusii* and *Vespertilio murinus*) are endangered and 2 species (*Capreolus capreolus* and *Microtus agrestis*) are vulnerable.

Local communities and stakeholders. In terms of local communities, 88934 inhabitants live in the investigated area (within the ATU overlapping on the two perimeters of Slatioara gravel pit). The area under investigation is characterized by a demographic decline, the percentage variation between the current population and that of the last 10 years is negative. Analyzing the statistical data we can state that in the following period, the demographic decrease trends will be accentuated especially due to the decrease in the birth rate.

Within the 4 Administrative-Territorial Units of the 2 perimeters of the Slatioara gravel pit, there were identified 14 main stakeholders, including 6 public institutions, 5 public authorities, 2 commercial companies and one NGO.

The legal situation of the land. Most of the land located within the two perimeters of the Slatioara gravel pit are state public property, which accounts for 99.06% of the total area.

Cultural heritage. According to the National Heritage Institute, at the level of the Administrative-Territorial Units within the two perimeters of the Slătioara pit there is a large number of historical monuments, the number of which exceeds 50.

The landscape. At the level of the study area, the following two types of landscapes were identified:

- Fluvial-lakeside plain landscapes (including marshland);
- Anthropogenic landscapes due to hydrological constructions (reservoirs) that pigment the entire course of the Olt River.

Landmark. The touristic objectives within the area investigated are:

- Accumulation lakes on the Olt River (including the Olt meadow);
- Historical monuments in Slatina and Găneasa village (Găneasa commune);
- Folklore, traditions and customs.

Present pressures on biodiversity. Within the two perimeters of the Slatioara gravel pit a number of 8 activities with potential impact were identified – extraction of sand and gravel; intensive grazing; deforestation without replanting and natural recovery; the presence of invasive, non-native species; unmanaged fishing and harvesting of aquatical resources; the communication network; garbage and solid waste; and leisure activities. The first 4 present pressures have a medium intensity and the next 4 have a low intensity.

Future threats on biodiversity. For the present time, the North site is closed for sand and gravel extraction. However, it will soon be opened to mineral aggregate, these activities are considered to be a threat of medium intensity.

Purpose of BMP. The purpose of the BMP is to *protect and conserve wildlife habitats and native species in order to improve the ecological status of the natural and semi-natural ecosystems in and around the Slatioara gravel pit through an adequate/sustainable biodiversity management that will lead to the consolidation of the concept for a sustainable development of the area/region.*

General objectives of BMP. The general objectives (GO) of BMP are:

- GO 1 – *Ensure the protection and conservation of native wild flora and fauna habitats and species to improve the ecological status of natural and semi-natural ecosystems;*
- GO 2 – *Completing and updating the information/data base of the native wild flora and fauna habitats and species within the Slatioara gravel pit in order to provide the necessary scientific support for an appropriate management of the sand and gravel operation;*
- GO 3 – *Ensure effective management of all activities to improve the quality of biological diversity;*
- GO 4 – *Raising public awareness and promoting sustainable use of natural resources supporting biodiversity;*
- GO 5 – *Creating opportunities to develop sustainable tourism through natural and cultural values to limit impacts on biodiversity and the environment.*

Activities proposed in the BMP. The set of specific measures within the BMP was established on the basis of all the pressures and threats identified in and within the immediate vicinity of the two perimeters of the Slatioara ballast. These specific measures are ensured through the following activities (A.):

- A. 1.1 – Elaboration of a scientific study on the influence of the exploitation of mineral aggregates on biodiversity;
- A. 1.2 – Arranging support-points (artificial structures to improve nesting conditions) favorable to local native fauna;
- A. 1.3 – Reducing grazing pressure between early April and mid-May in nesting areas (xeric meadows);
- A.1.4 – Carrying out the greening campaigns of the reservoir lake and its banks within the two perimeters of the gravel pit;
- A. 1.5 – Monitoring of non-native invasive (alogeneic) species;
- A. 1.6 – Preventing palustric vegetation fires by putting information and warning boards;
- A. 1.7 – Limiting the driving speed on all roads within the two sites of the gravel pit to 20 km/h;
- A. 2.1 – Completing and updating inventories through detailed biodiversity assessment;
- A. 2.2 – Monitoring population trends for all identified bird species;
- A. 2.3 – Monitoring of all identified pressures;
- A. 3.1 – Compliance with environmental regulatory requirements;
- A. 3.2 – Identification of funding sources;
- A. 3.3 – Ensuring the necessary logistics for implementing the Biodiversity Management Plan;
- A. 3.4 – Evaluation of training needs for the personal involved in the implementation of the Biodiversity Management Plan;
- A. 3.5 – Monitoring of the implementation of the Biodiversity Management Plan and drafting the necessary reports towards the authorities;
- A. 4.1 – Implementation of educational activities (thematic circles, Bird's Day, International Forest Day, Environment Day) to inform the local population about the sustainable use of natural resources that support biodiversity;
- A. 4.2 – Collaboration with some local or national non-governmental institutions and organizations in regular educational and public awareness actions on the sustainable use of natural resources that support biodiversity;
- A. 4.3 – Assessment of the impact of public awareness activities (surveys, sociological questionnaires) on the sustainable use of natural resources that support biodiversity;
- A. 5.1 – Creation of a tourist infrastructure;
- A. 5.2 – Developing partnerships with relevant individuals and institutions.

Timely planning of BMP activities. All activities recommended in the BMP are proposed to be implemented over the next 5 years (in the optimal periods specific to each activity).

Estimation of the resources needed to implement the BMP activities. To achieve the proposed activities within the BMP, the following cost are estimated: a total of 330 days/man and a total budget of 173000 RON (37345 € at the National Bank of Romania's exchange rate of 4.6325 lei/1 € as of 11.09.2018).

The added value of the project for science. The activities carried out within the project contributed to the creation of a research core that raised the awareness of the ecological value of the Slatioara gravel pit and discovered new ways of deepening the knowledge about them. At the same time, through the final results of the project implementation, a scientific database has been created that will serve as a decision-making tool used to define and allocate responsibilities and roles in decision making by the company and public authorities (for the community).

The project team offers (replication and transferability) through the results of this project a model for making biodiversity conservation measures more efficient (improving habitat conditions for native wildlife) to other gravel pits and ballasts in Romania and abroad. The project also provided for the improvement of the health status of ecosystems by reducing direct pressures (impact) and promoting the sustainable use of mining resources (protection and support of local and regional biodiversity).

The added value of the project for the pit/company. Through the implementation of the project, HeidelbergCement demonstrates and ensures the commitment to biodiversity management during extraction by promoting a diversity of local and regional flora and fauna. In this context, the company demonstrates responsibility for the environment and respect for nature.

At the same time, the implementation of the project has substantiated the potential of collaboration (especially on issues related to biodiversity management) between the company and the members of the project team. Thus, the parties involved in the project (company and project team) can conclude collaborative contracts for the proposal and implementation of new environmental/sustainable development projects, including monitoring and reporting biodiversity (BMP implementation).

8. Final conclusions

The project "Integrated management of biodiversity in Slatioara gravel pit" has sought to protect and conserve wildlife habitats and native species by adequate management that maintains the techniques of exploiting mineral resources provided by the natural environment. In this context, the Biodiversity Management Plan has been developed, as a long-term strategic document and constitutes the official Biodiversity Planning, Regulation and Presentation Document within the Slatioara gravel pit. This BMP sets the objectives, measures and human and material resources needed to create, maintain and ensure the conditions for improving the quality of biological diversity within and around the Slatioara Ballast, in the context of the mineral aggregates utilization in relation to the ecosystems support capacity natural and semi-natural.

Thus, the results of the project contribute to the launch of a pilot project (through the implementation of the activities proposed within the BMP) to promote local and regional natural values through actions to protect and preserve biodiversity on the principle of sustainable development. The pilot project will provide scientific activities that will contribute to the continuous adaptation of the conservation and exploitation measures of the natural environments so that the support capacity of the natural and semi-natural ecosystems is not exceeded.

Also, the project results provide a worthy model to be followed among other gravel pits/quarries in Romania and abroad located within or near important biodiversity areas.

Project tags:

<p>Project focus:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Beyond quarry borders <input checked="" type="checkbox"/> Biodiversity management <input type="checkbox"/> Cooperation programmes <input checked="" type="checkbox"/> Connecting with local communities <input checked="" type="checkbox"/> Education and Raising awareness <input checked="" type="checkbox"/> Invasive species <input type="checkbox"/> Landscape management <input type="checkbox"/> Pollination <input checked="" type="checkbox"/> Rehabilitation & habitat research <input checked="" type="checkbox"/> Scientific research <input type="checkbox"/> Soil management <input checked="" type="checkbox"/> Species research <input type="checkbox"/> Student class project <input checked="" type="checkbox"/> Urban ecology <input checked="" type="checkbox"/> Water management <p>Flora:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Trees & shrubs <input type="checkbox"/> Ferns <input checked="" type="checkbox"/> Flowering plants <input type="checkbox"/> Fungi <input type="checkbox"/> Mosses and liverworts <p>Fauna:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Amphibians <input checked="" type="checkbox"/> Birds <input checked="" type="checkbox"/> Insects <input checked="" type="checkbox"/> Fish <input checked="" type="checkbox"/> Mammals <input checked="" type="checkbox"/> Reptiles <input checked="" type="checkbox"/> Other invertebrates <input type="checkbox"/> Other insects <input checked="" type="checkbox"/> Other species 	<p>Habitat:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Artificial / cultivated land <input type="checkbox"/> Cave <input type="checkbox"/> Coastal <input checked="" type="checkbox"/> Grassland <input type="checkbox"/> Human settlement <input type="checkbox"/> Open areas of rocky grounds <input checked="" type="checkbox"/> Recreational areas <input checked="" type="checkbox"/> Sandy and rocky habitat <input type="checkbox"/> Screes <input checked="" type="checkbox"/> Shrub & groves <input checked="" type="checkbox"/> Soil <input checked="" type="checkbox"/> Wander biotopes <input checked="" type="checkbox"/> Water bodies (flowing, standing) <input checked="" type="checkbox"/> Wetland <input checked="" type="checkbox"/> Woodland <p>Stakeholders:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Authorities <input checked="" type="checkbox"/> Local community <input checked="" type="checkbox"/> NGOs <input checked="" type="checkbox"/> Schools <input checked="" type="checkbox"/> Universities
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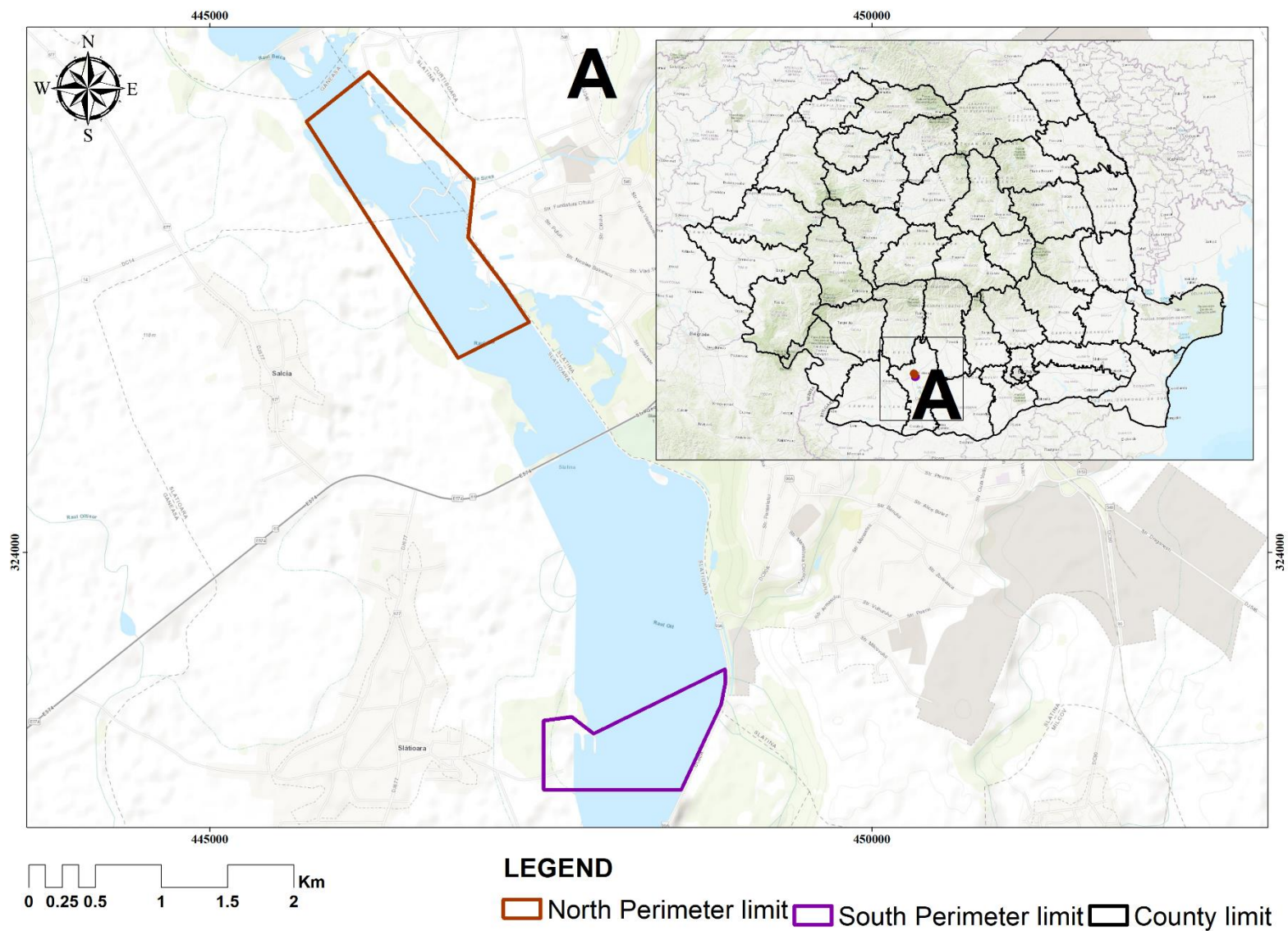
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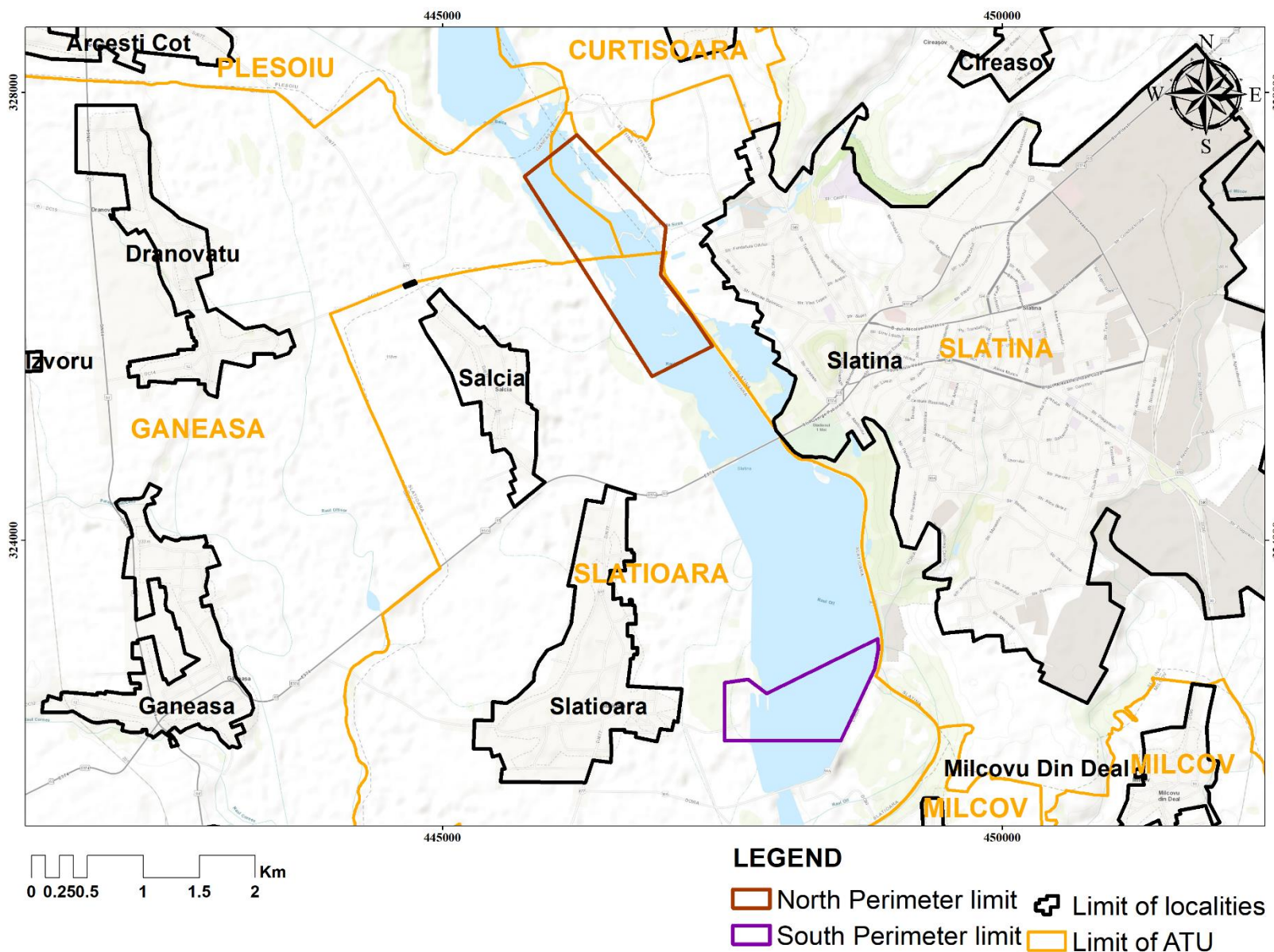
1. Environmental Permit no. 163 of 13.07.2012 and revised on 17.05.2018 issued by the Environmental Protection Agency Olt
2. Notice No. 478 of 03.09.2018 issued by the National Agency for Natural Protected Areas
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4. Berna Convention – Convention of 19 September 1979 on the conservation of European wildlife and natural habitats
5. Habitats Directive – Council Directive 92/43/CEE of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora
6. Birds Directive – Directive 2009/147/CE of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds
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Annexes

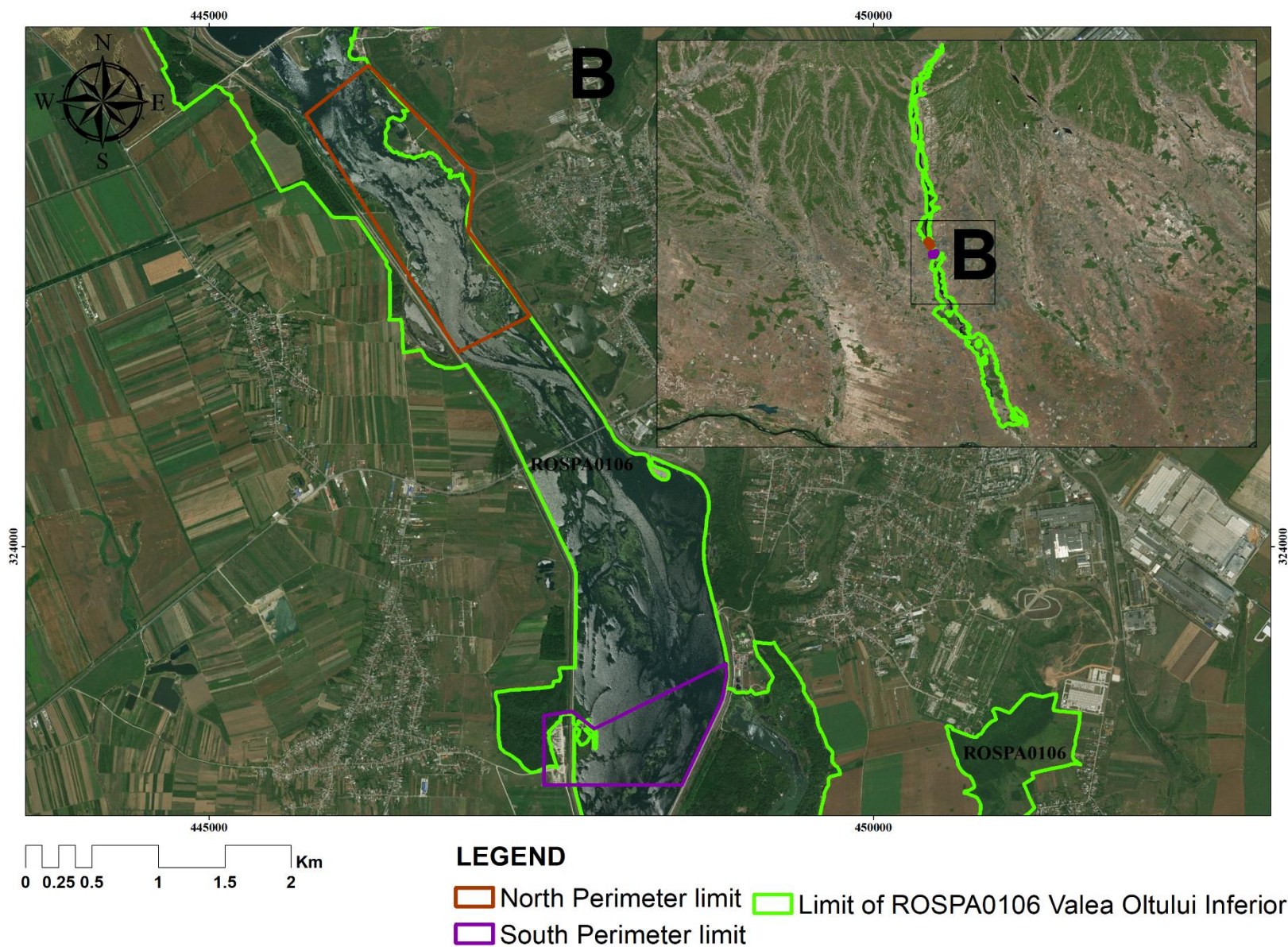
Annex no. 1 The location of the perimeters within the Slatioara gravel pit



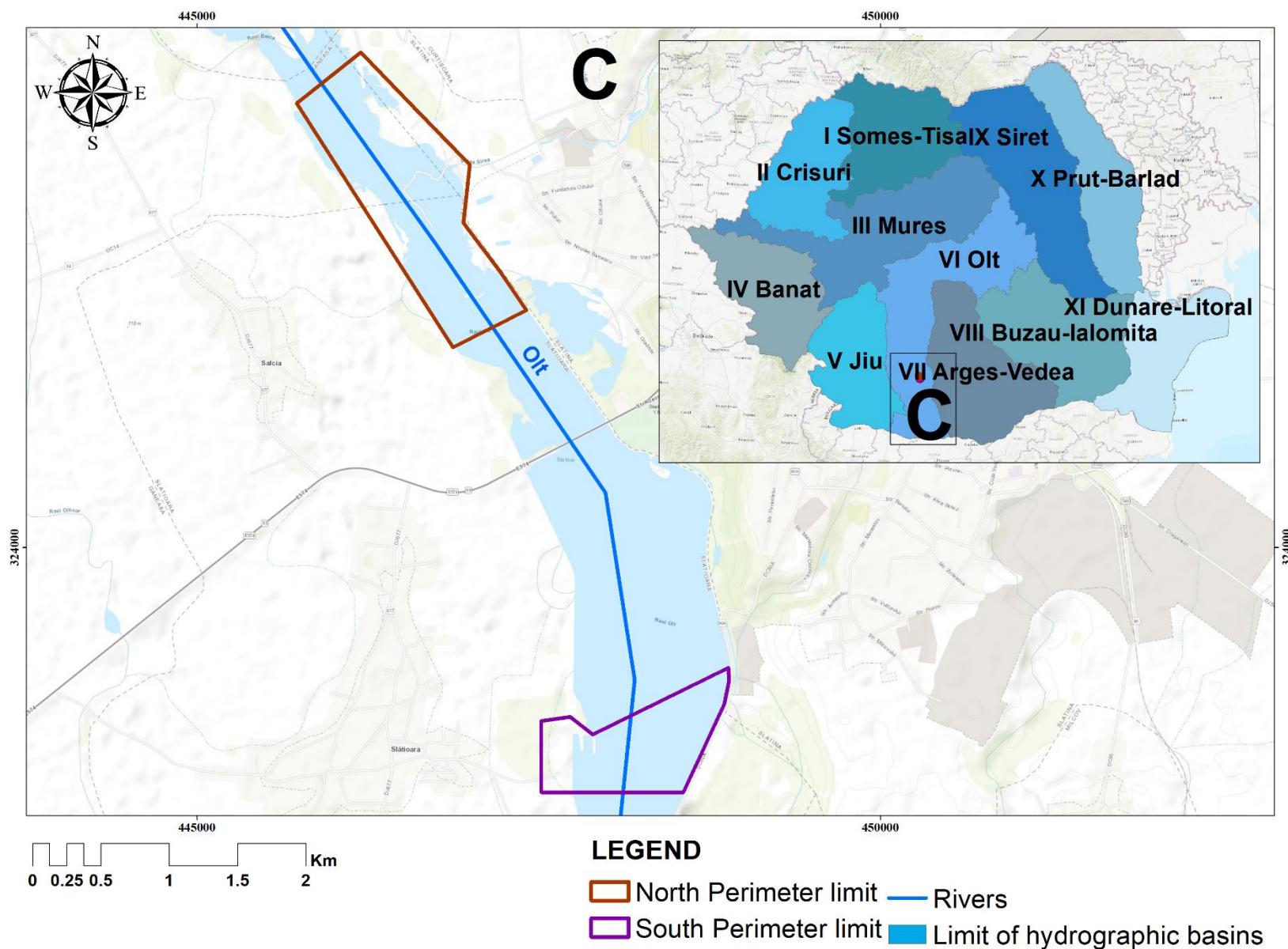
Annex no. 2 The framing of the perimeters within the Slatioara gravel pit in the Administrativ-Territorial Units



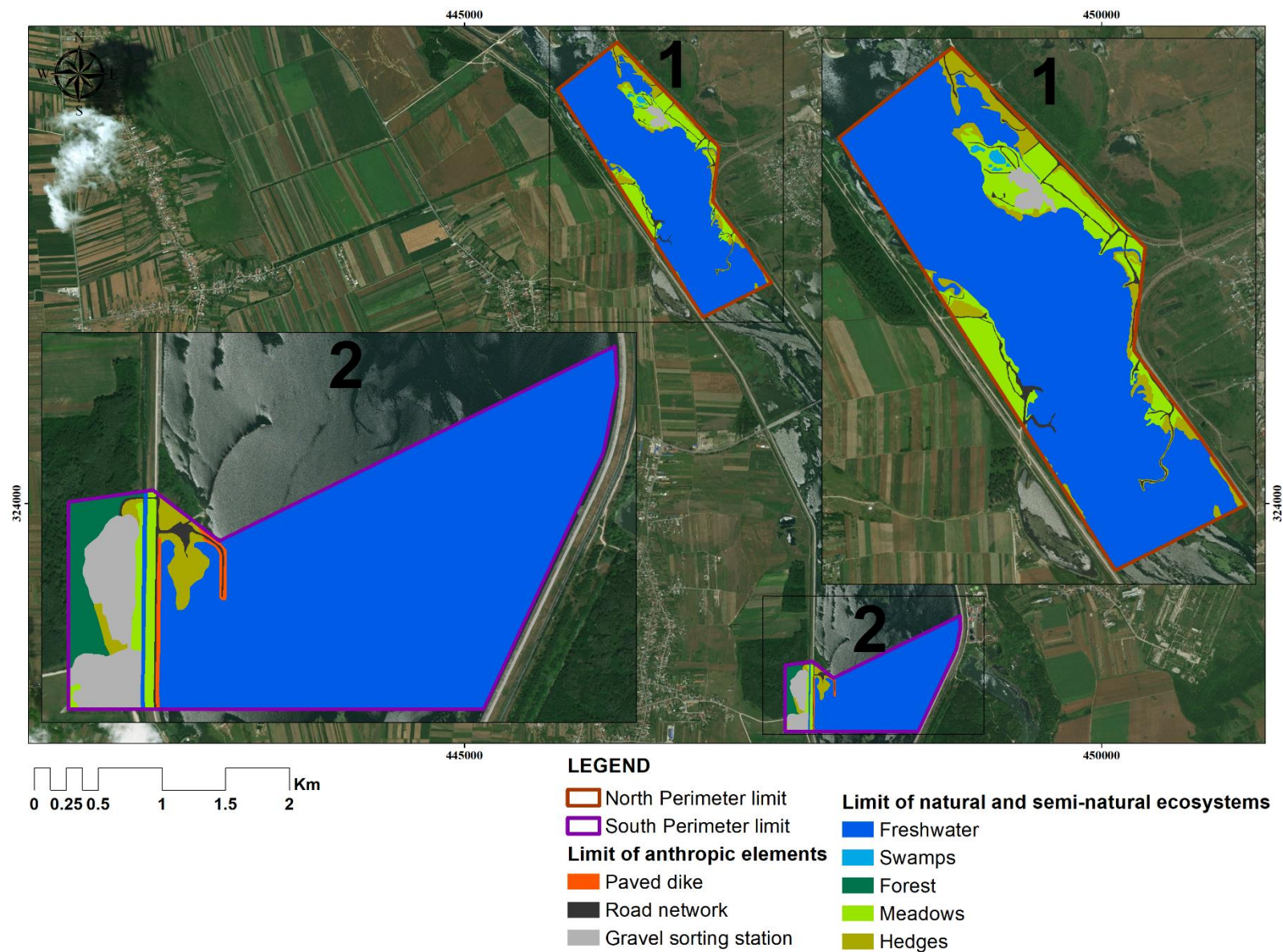
Annex no. 3 The relation of the perimeters within the Slatioara gravel pit with ROSPA0106 Valea Oltului Inferior (Lower Olt Valley)



Annex no. 4 The framing of the perimeters within the Slatioara gravel pit in the national hydrographic network



Annex no. 5 Distribution of natural and semi-natural ecosystems and anthropic elements within the Slatioara gravel pit



Annex no. 6 Aspects about the ballast and the sand and gravel sorting station at Slatioara gravel pit



Annex no. 7 Aspects regarding the freshwater ecosystems identified in the perimeters within the Slatioara gravel pit



Annex no. 8 Aspects regarding the adjacent channel to the accumulation lake identified within the souther perimeter of the Slatioara gravel pit



Annex no. 9 Aspects regarding the scrubs in association with the meadows identified within the Slatioara gravel pit



Annex no. 10 Aspects regarding the forest body identified within the southern perimeter of the Slatioara gravel pit



Annex no. 11 Aspects regarding the communication network (roads) identified within the two perimeters of the Slatioara gravel pit



Annex no. 12 Aspects regarding the paved embankment identified along the accumulation lake within the Slatioara gravel pit



Annex no. 13 Aspects regarding the aquatic vegetation communities identified within the Slatioara gravel pit



Annex no. 14 Aspects regarding the marsh vegetation identified within the Slatioara gravel pit



Annex no. 15 List of plant species – biological and ecological particularities of vascular vegetal taxa identified within the Slatioara gravel pit

No.	Species (Latin)	Life span / growth form	Bioform	Phenology	National level of prevalence	Spreading area
1	<i>Acer campestre</i>	tree	Ph.	V	f.	Eur.
2	* <i>Acer negundo</i>	tree	Ph.	IV-V	f.	Adv. (N. A.)
3	<i>Acer tataricum</i>	tree	Ph.	V-VI	f.	Euras. cont.
4	<i>Achillea millefolium</i>	perennial	H.	VI-VIII	f.	Euras.
5	<i>Agrostis stolonifera</i>	perennial	H.	VI-VII	f.	Circ.
6	* <i>Ailanthus altissima</i>	tree	Ph.	V-VI	f.	China
7	<i>Ajuga chamaeptytis</i>	annual	T.	V-VIII	s.	Centr. eur.-medit.
8	<i>Alisma plantago-aquatica</i>	perennial	HH.	VI-VIII	f.	Circ.
9	<i>Althaea officinalis</i>	perennial	H.	VII-IX	f.	Euras. cont.
10	* <i>Amorpha fruticosa</i>	shrub	Ph.	V-VII	f.	Adv. (N. A.)
11	<i>Arctium lappa</i>	bisannual	Ht.	VII-VIII	f.	Euras.
12	<i>Arum orientale</i>	perennial	G.	III-IV	f.	Pont.-pan.-balc.
13	* <i>Aster novi-belgii</i>	perennial	H.	VIII-IX	f.	Adv. (N. A.)
14	<i>Azolla filiculoides</i>	annual	T.	VII-X	r.	Adv. (N. A.)
15	<i>Ballota nigra</i>	perennial	H.	VI-VIII	f.	Eur. centr.
16	<i>Brachypodium sylvaticum</i>	perennial	H.	VII-X	f.	Euras. (submedit.)
17	<i>Bromus arvensis</i>	annual	T.	V-VII	f.	Euras. (submedit.)
18	<i>Bromus tectorum</i>	annual	T.	V-VI	f.	Euras. cont.
19	<i>Butomus umbellatus</i>	perennial	HH.	VI-VIII	f.	Euras.
20	<i>Calamagrostis epigejos</i>	perennial	G.	VI-VII	f.	Euras.
21	<i>Calystegia sepium</i>	perennial	G.	VI-IX	f.	Euras.
22	<i>Capsella bursa-pastoris</i>	bisannual	T.	IV-VII, X-XI	v. f.	Cosm.
23	<i>Cardaria draba</i>	perennial	H.	V-VI	f.	Euras. medit.
24	<i>Carex spicata</i>	perennial	H.	V-VI	f.	Circ.
25	<i>Cerasus avium</i>	tree	Ph.	IV-V	s.	Submedit.
26	* <i>Cerasus vulgaris</i>	shrub	Ph.	IV-V	f.	Euras.
27	<i>Ceratophyllum demersum</i>	perennial	Hd.	VI-IX	f.	Cosm.
28	<i>Chelidonium majus</i>	perennial	H.	V-IX	f.	Euras.

No.	Species (Latin)	Life span / growth form	Bioform	Phenology	National level of prevalence	Spreading area
29	<i>Chondrilla juncea</i>	bisannual-perennial	Ht.-H.	VII-IX	f.	Euras. cont.
30	<i>Cichorium intybus</i>	perennial	H.	VII-IX	v. f.	Euras.
31	<i>Cirsium arvense</i>	perennial	G.	VI-VIII	f.	Euras.
32	<i>Cirsium vulgare</i>	bisannual	Ht.	VII-X	f.	Euras.
33	<i>Clematis vitalba</i>	liana	Ph.	VI-IX	f.	Eur. centr.
34	<i>Conium maculatum</i>	bisannual	Ht.	VI-VII	f.	Euras.
35	<i>Convolvulus arvensis</i>	perennial	G.	V-IX	f.	Cosm.
36	<i>Conyza canadensis</i>	annual	T.	VI-IX	v. f.	Adv. (N. A.)
37	<i>Cornus mas</i>	shrub	Ph.	III	f.	Pont.-medit.
38	<i>Cornus sanguinea</i>	shrub	Ph.	V-VI	f.	Eur. centr.
39	<i>Crataegus monogyna</i>	shrub	Ph.	V-VI	f.	Medit.
40	<i>Cynodon dactylon</i>	perennial	G.	VI-VIII	v. f.	Cosm.
41	<i>Cyperus serotinus</i>	perennial	G.	VIII-IX	s.	Euras. (submedit.)
42	<i>Dactylis polygama</i>	perennial	H.	VI-VII	s.	Eur. centr.
43	<i>Datura stramonium</i>	annual	T.	VI-IX	f.	Cosm.
44	<i>Daucus carota</i>	annual	Ht.	VI-IX	f.	Euras.
45	<i>Dichanthium ischaemum</i>	perennial	H.	VII-X	f.	Euras. (submedit.)
46	<i>Dipsacus fullonum</i>	bisannual	Ht.	VII-VIII	f.	Submedit.
47	<i>*Elaeagnus angustifolia</i>	tree	Ph.	VI	s.	As. temp.
48	<i>Equisetum fluviatile</i>	perennial	HH.	V-VI	f.	Circ.
49	<i>Erigeron annuus</i>	annual	T.	VII-VIII	f.	Adv. (N. A.)
50	<i>Euphorbia amygdaloides</i>	perennial	Ch.	IV-VI	f.	Eur. centr.
51	<i>Evonymus europaeus</i>	shrub	Ph.	V-VI	f.	Eur.
52	<i>Festuca ovina</i>	perennial	H.	V-VII	f.	Euras.
53	<i>Fragaria viridis</i>	perennial	H.	V-VI	f.	Euras.
54	<i>Frangula alnus</i>	shrub	Ph.	V-VII	f.	Euras.
55	<i>Fraxinus angustifolia</i>	tree	Ph.	V	f.	Medit.
56	<i>Fraxinus ornus</i>	tree	Ph.	IV-V	s.	Submedit.
57	<i>Galium aparine</i>	annual	T.	V-IX	f.	Circ.
58	<i>Geum urbanum</i>	perennial	H.	V-IX	f.	Circ.
59	<i>Glechoma hederacea</i>	perennial	H.	IV-VI	f.	Euras.

No.	Species (Latin)	Life span / growth form	Bioform	Phenology	National level of prevalence	Spreading area
60	<i>*Gleditsia triacanthos</i>	tree	Ph.	VI-VII	f.	Adv. (N. A.)
61	<i>Hedera helix</i>	liana	Ph.	IX-X	f.	Atl.-medit.
62	<i>Hordeum murinum</i>	annual	T.	VI-IX	f.	Euras.
63	<i>Humulus lupulus</i>	perennial	H.	VII-VIII	s.	Euras.
64	<i>Hydrocharis morsus-ranae</i>	perennial	Hd.	VI-VIII	f.	Euras.
65	<i>Hypochaeris radicata</i>	perennial	H.	V-VIII	f.	Eur.
66	<i>Iris pseudacorus</i>	perennial	G.	V-VII	v. f.	Eur.
67	<i>*Juglans nigra</i>	tree	Ph.	V	s.	Adv. (N. A.)
68	<i>Juncus effusus</i>	perennial	H.	VI-VIII	f.	Cosm.
69	<i>Kohlruschia prolifera</i>	annual	T.	VI-IX	f.	Atl.-medit.
70	<i>Lemna minor</i>	perennial	Hd.	V-VI	f.	Cosm.
71	<i>Ligustrum vulgare</i>	shrub	Ph.	VI-VII	f.	Eur. (submedit.)
72	<i>Linaria vulgaris</i>	perennial	H.	VI-IX	f.	Euras.
73	<i>Lolium perenne</i>	perennial	H.	V-IX	f.	Cosm.
74	<i>Lysimachia nummularia</i>	perennial	Ch.	V-VII	f.	Euras.
75	<i>Lythrum salicaria</i>	perennial	H.	VI-IX	f.	Circ.
76	<i>Mentha aquatica</i>	perennial	H.	VI-IX	f.	Eur.
77	<i>Mentha pulegium</i>	perennial	H.	VII-IX	f.	Euras. (submedit.)
78	<i>*Morus alba</i>	tree	Ph.	V	f.	China
79	<i>*Morus nigra</i>	tree	Ph.	V	f.	Medit.
80	<i>Myriophyllum spicatum</i>	perennial	Hd.	VI-IX	f.	Circ.
81	<i>Nasturtium officinale</i>	perennial	HH.	V-VII	f.	Cosm.
82	<i>Oenanthe aquatica</i>	annual	Hd.	VI-VIII	f.	Euras.
83	<i>Oenothera parviflora</i>	bisannual	Ht.	VI-VIII	s.	Adv. (N. A.)
84	<i>*Parthenocissus quinquefolia</i>	liana	Ph.	VII-VIII	s.	Adv. (N. A.)
85	<i>Phragmites australis</i>	perennial	G.	VII-IX	f.	Cosm.
86	<i>Physalis alkekengi</i>	perennial	H.	VI-VIII	f.	Adv. (N. A.)
87	<i>Plantago lanceolata</i>	perennial	H.	V-VIII	f.	Euras.
88	<i>Plantago media</i>	perennial	H.	V-VIII	f.	Euras.
89	<i>Poa angustifolia</i>	perennial	H.	V-VI	f.	Euras.

No.	Species (Latin)	Life span / growth form	Bioform	Phenology	National level of prevalence	Spreading area
90	<i>Poa annua</i>	annual	T.	I-XII	v. f.	Cosm.
91	<i>Polygonatum latifolium</i>	perennial	G.	V-VI	f.	Pont.-pan.-balc.
92	<i>Polygonum amphibium</i>	perennial	HH.	VI-IX	f.	Cosm.
93	<i>Polygonum aviculare</i>	annual	T.	VI-X	f.	Cosm.
94	<i>Populus alba</i>	tree	Ph.	III-V	f.	Euras.
95	<i>Populus nigra</i>	tree	Ph.	III-V	f.	Euras.
96	<i>Populus tremula</i>	tree	Ph.	III-V	f.	Euras.
97	<i>Potamogeton crispus</i>	perennial	Hd.	VI-VIII	v. f.	Cosm.
98	<i>Potentilla argentea</i>	perennial	H.	VI-VII	f.	Euras.
99	<i>Potentilla reptans</i>	perennial	H.	VI-VIII	f.	Euras.
100	<i>Prunella vulgaris</i>	perennial	H.	VI-VIII	f.	Cosm.
101	<i>Prunus spinosa</i>	shrub	Ph.	IV-V	f.	Eur.
102	<i>Pulmonaria mollis</i>	perennial	H.	III-V	f.	Eur. centr.
103	<i>Quercus robur</i>	tree	Ph.	V	f.	Eur.
104	* <i>Robinia pseudoacacia</i>	tree	Ph.	V-VI	f.	N. A.
105	<i>Rorippa amphibia</i>	perennial	HH.	V-VIII	f.	Euras.
106	<i>Rosa canina</i>	shrub	Ph.	VI-VII	f.	Eur.
107	<i>Rubus caesius</i>	shrub	Ph.	V-VI (IX)	f.	Eur.
108	<i>Rumex hydrolapathum</i>	perennial	Hd.	VII-VIII	s.	Eur.
109	<i>Rumex longifolius</i>	perennial	H.	VII-VIII	r.	Circ.
110	<i>Sagittaria sagittifolia</i>	perennial	HH.	VI-VIII	f.	Euras.
111	<i>Salix alba</i>	tree	Ph.	IV-V	f.	Euras.
112	<i>Salix purpurea</i>	shrub	Ph.	III-IV	f.	Euras.
113	<i>Sambucus ebulus</i>	perennial	H.	VI-VIII	f.	Euras. (submedit.)
114	<i>Sambucus nigra</i>	shrub	Ph.	V-VII	f.	Eur.
115	<i>Saponaria officinalis</i>	perennial	H.	VI-IX	f.	Euras.
116	<i>Schoenoplectus lacustris</i>	perennial	G.	VII-VIII	f.	Cosm.
117	<i>Sium latifolium</i>	perennial	HH.	VI-VIII	s.	Euras.
118	<i>Solanum dulcamara</i>	perennial	Ch.	VI-VIII	f.	Euras.
119	<i>Sorghum halepense</i>	perennial	G.	VI-VIII	f.	Medit.
120	<i>Symphytum officinalis</i>	perennial	H.	V-VIII	f.	Euras.

No.	Species (Latin)	Life span / growth form	Bioform	Phenology	National level of prevalence	Spreading area
121	<i>Tamus communis</i>	perennial	G.	V-VI	s.	Euras. (submedit.)
122	<i>Taraxacum officinale</i>	perennial	H.	IV-VI	v. f.	Euras.
123	<i>Trifolium arvense</i>	annual	T.	V-VII	f.	Euras.
124	<i>Trifolium repens</i>	perennial	H.	V-IX	f.	Carp.-balc.
125	<i>Tussilago farfara</i>	perennial	G.	III-V	f.	Euras.
126	<i>Typha angustifolia</i>	perennial	G.	VII-VIII	f.	Circ.
127	<i>Typha latifolia</i>	perennial	G.	VII-VIII	f.	Cosm.
128	<i>Ulmus glabra</i>	tree	Ph.	IV-V	f.	Euras.
129	<i>Ulmus laevis</i>	tree	Ph.	III-IV	s.	Eur.
130	<i>Ulmus minor</i>	tree	Ph.	III-IV	f.	Eur.
131	<i>Urtica dioica</i>	perennial	H.	VI-IX	f.	Cosm.
132	<i>Utricularia vulgaris</i>	perennial	Hd.	VI-VIII	f.	Circ.
133	<i>Verbascum thapsus</i>	bisannual	Ht.	VI-VIII	f.	Euras.
134	<i>Veronica chamaedrys</i>	perennial	H.	IV-VI	f.	Euras.
135	<i>Vicia cracca</i>	perennial	H.	VI-VIII	f.	Euras.
136	<i>Vitis sylvestris</i>	liana	Ph.	VI	s.	Pont.-medit.
137	<i>Wolffia arrhiza</i>	perennial	Hd.	VI-VIII	s.	Cosm.
138	<i>Xeranthemum annuum</i>	annual	T.	VI-VII	f.	Pont.-medit.

Abbreviations used in the table: * – cultivated plant; **Ch.** – Chamaephyta, **G.** – Geophyta, **H.** – Hemichryptophyta, **Hd.** – Hidrophyta, **HH.** – hidrohelophyta, **Ht.** – Hemitherophyta, **Ph.** – Phanerophyta, **T.** – Therophyta; **I-XII** – the floration period, or the spore maturation period in ferns; **v. f.** – very frequent, **f.** – frequent, **s.** – sporadically; **Adv.** – Adventive, **As. temp.** – Asia temperate, **Atl.** – Atlantic, **Medit.** – Mediterranean, **Carp.-balc.** – Carpathian-balkan, **Centr. eur.** – Central-european, **Circ.** – Circumpolar, **Cosm.** – Cosmopolitan, **Eur.** – European, **Submedit.** – Submediterranean, **Euras.** – Eurasiatic, **Euras. cont.** – Eurasiatic continental, **N. A.** – North America, **Pont.-medit.** – Pontic-mediterranean, **Pont.-pan.-balc.** – Pontic-pannonic-balkan.

Annex no. 16 List of fauna species – protection statutes and annexes of normative acts mentioning the fauna species identified within the Slatioara gravel pit

No.	Biotic component	Species (Latin)	IUCN	HD / BD	GEO 57/2007	RBVR	Berna Convention	Bonn Convention	Occurrence
1	Birds	<i>Accipiter nisus</i>	LC	-	-	-	-	-	Native
2	Birds	<i>Acrocephalus arundinaceus</i>	LC	-	-	-	-	-	Native
3	Birds	<i>Acrocephalus palustris</i>	LC	-	-	-	-	-	Native
4	Birds	<i>Acrocephalus schoenobaenus</i>	LC	-	-	-	-	-	Native
5	Birds	<i>Acrocephalus scirpaceus</i>	LC	-	-	-	-	-	Native
6	Birds	<i>Alauda arvensis</i>	LC	Annex IIB	Annex 5 ^C	-	-	-	Native
7	Birds	<i>Alcedo atthis</i>	VU	Annex I	Annex 3	-	Annex II	-	Native
8	Birds	<i>Anas acuta</i>	VU	Annexes IIA and IIIB	Annexes 5 ^C and 5 ^E	-	-	-	Native
9	Birds	<i>Anas crecca</i>	LC	Annexes IIA and IIIB	Annexes 5 ^C and 5 ^E	-	-	-	Native
10	Birds	<i>Anas penelope</i>	VU	Annexes IIA and IIIB	Annexes 5 ^C and 5 ^E	-	-	-	Native
11	Birds	<i>Anas platyrhynchos</i>	LC	Annexes IIA and IIIA	Annex 5 ^C	-	-	-	Native
12	Birds	<i>Anas strepera</i>	LC	Annex IIA	Annex 5 ^C	-	-	-	Native
13	Birds	<i>Anser albifrons</i>	LC	Annex IIB	Annexes 5 ^C , 5 ^D and 5 ^E	-	-	-	Native
14	Birds	<i>Anthus pratensis</i>	VU	-	-	-	-	-	Native
15	Birds	<i>Anthus spinoletta</i>	LC	-	-	-	-	-	Native
16	Birds	<i>Anthus trivialis</i>	LC	-	-	-	-	-	Native
17	Birds	<i>Ardea cinerea</i>	LC	-	-	-	-	-	Native
18	Birds	<i>Asio otus</i>	LC	-	-	-	-	-	Native
19	Birds	<i>Aythya ferina</i>	VU	Annexes IIA and IIIB	Annexes 5 ^C and 5 ^E	-	-	-	Native
20	Birds	<i>Aythya fuligula</i>	LC	Annexes IIA and IIIB	Annexes 5 ^C and 5 ^E	-	-	-	Native
21	Birds	<i>Aythya nyroca</i>	LC	Annex I	Annex 3	Vulnerable species	-	-	Native
22	Birds	<i>Botaurus stellaris</i>	LC	Annex I	Annex 3	-	Annex II	Annex II	Native
23	Birds	<i>Bucephala clangula</i>	LC	Annex IIB	Annex 5 ^C	Vulnerable species	-	-	Native

No.	Biotic component	Species (Latin)	IUCN	HD / BD	GEO 57/2007	RBVR	Berna Convention	Bonn Convention	Occurrence
24	Birds	<i>Burhinus oedichnemus</i>	LC	Annex I	Annex 3	Threatened species	Annex II	Annex II	Native
25	Birds	<i>Buteo buteo</i>	LC	-	-	-	-	-	Native
26	Birds	<i>Calidris alpina</i>	LC	Annex I	Annex 3	-	Annex II	-	Native
27	Birds	<i>Carduelis cannabina</i>	LC	-	Annex 4 ^B	-	Annex II	-	Native
28	Birds	<i>Carduelis carduelis</i>	LC	-	Annex 4 ^B	-	Annex II	-	Native
29	Birds	<i>Carduelis chloris</i>	LC	-	Annex 4 ^B	-	Annex II	-	Native
30	Birds	<i>Carduelis spinus</i>	LC	-	Annex 4 ^B	-	Annex II	-	Native
31	Birds	<i>Chlidonias leucopterus</i>	LC	-	-	-	Annex II	-	Native
32	Birds	<i>Ciconia ciconia</i>	LC	Annex I	Annex 3	Vulnerable species	-	Annex II	Native
33	Birds	<i>Circus cyaneus</i>	LC	Annex I	Annex 3	-	-	-	Native
34	Birds	<i>Coccothraustes coccothraustes</i>	LC	-	Annex 4 ^B	-	Annex II	-	Native
35	Birds	<i>Columba livia</i>	LC	-	-	-	-	-	Native
36	Birds	<i>Columba palumbus</i>	LC	Annexes IIA and IIIA	Annex 5 ^C	-	Annex III	-	Native
37	Birds	<i>Coracias garrulus</i>	LC	Annex I	Annex 3	-	Annex II	Annex II	Native
38	Birds	<i>Corvus corone</i>	LC	-	Annex 5 ^C	-	-	-	Native
39	Birds	<i>Corvus frugilegus</i>	LC	Annex IIB	Annex 5 ^C	-	Annex III	-	Native
40	Birds	<i>Cuculus canorus</i>	LC	-	-	-	-	-	Native
41	Birds	<i>Cygnus cygnus</i>	LC	Annex I	Annex 3	-	Annex II	-	Native
42	Birds	<i>Cygnus olor</i>	LC	-	-	-	-	-	Native
43	Birds	<i>Delichon urbica</i>	LC	-	-	-	-	-	Native
44	Birds	<i>Dendrocopos syriacus</i>	LC	Annex I	Annex 3	-	-	-	Native
45	Birds	<i>Egretta alba</i>	LC	Annex I	Annex 3	Threatened species	-	-	Native
46	Birds	<i>Egretta garzetta</i>	LC	Annex I	Annex 3	Threatened species	Annex II	-	Native
47	Birds	<i>Emberiza hortulana</i>	LC	Annex I	Annex 3	-	-	-	Native
48	Birds	<i>Erithacus rubecula</i>	LC	-	Annex 4 ^B	-	Annex II	-	Native
49	Birds	<i>Falco vespertinus</i>	VU	Annex I	Annex 3	Vulnerable species	-	Annex II	Native
50	Birds	<i>Fringilla coelebs</i>	LC	-	-	-	-	-	Native
51	Birds	<i>Fringilla montifringilla</i>	VU	-	-	-	-	-	Native

No.	Biotic component	Species (Latin)	IUCN	HD / BD	GEO 57/2007	RBVR	Berna Convention	Bonn Convention	Occurrence
52	Birds	<i>Fulica atra</i>	LC	Annexes IIA and IIIB	Annexes 5 ^C and 5 ^E	-	-	Annex II	Native
53	Birds	<i>Garrulus glandarius</i>	LC	Annex IIB	Annex 5 ^C	-	Annex III	-	Native
54	Birds	<i>Haliaeetus albicilla</i>	LC	Annex I	Annex 3	Critically threatened species	-	-	Native
55	Birds	<i>Himantopus himantopus</i>	LC	Annex I	Annex 3	Threatened species	-	-	Native
56	Birds	<i>Hirundo rustica</i>	LC	-	-	-	-	-	Native
57	Birds	<i>Ixobrychus minutus</i>	LC	Annex I	Annex 3	-	Annex II	Annex II	Native
58	Birds	<i>Lanius excubitor</i>	VU	-	-	-	-	-	Native
59	Birds	<i>Lanius minor</i>	LC	Annex I	Annex 3	-	-	-	Native
60	Birds	<i>Larus cachinnans</i>	LC	-	-	-	-	-	Native
61	Birds	<i>Larus canus</i>	LC	-	-	-	-	-	Native
62	Birds	<i>Larus michaelis</i>	LC	-	-	-	-	-	Native
63	Birds	<i>Larus minutus</i>	LC	Annex I	Annex 3	-	Annex II	-	Native
64	Birds	<i>Larus ridibundus</i>	LC	-	-	-	-	-	Native
65	Birds	<i>Locustella fluviatilis</i>	VU	-	Annex 4 ^B	-	-	-	Native
66	Birds	<i>Locustella luscinioides</i>	LC	-	Annex 4 ^B	-	-	-	Native
67	Birds	<i>Luscinia megarhynchos</i>	LC	-	-	-	-	-	Native
68	Birds	<i>Mergus albellus</i>	LC	Annex I	-	Vulnerable species	Annex II	-	Native
69	Birds	<i>Mergus merganser</i>	LC	-	-	-	-	-	Native
70	Birds	<i>Merops apiaster</i>	LC	-	Annex 4 ^B	-	Annex II	Annex II	Native
71	Birds	<i>Miliaria calandra</i>	LC	-	Annex 4 ^B	-	-	-	Native
72	Birds	<i>Motacilla alba</i>	LC	-	Annex 4 ^B	-	-	-	Native
73	Birds	<i>Motacilla cinerea</i>	LC	-	Annex 4 ^B	-	-	-	Native
74	Birds	<i>Motacilla flava</i>	LC	-	Annex 4 ^B	-	-	-	Native
75	Birds	<i>Muscicapa striata</i>	LC	-	Annex 4 ^B	-	-	Annex II	Native
76	Birds	<i>Netta rufina</i>	LC	Annex IIB	-	Threatened species	-	-	Native
77	Birds	<i>Nycticorax nycticorax</i>	LC	Annex I	Annex 3	Vulnerable species	Annex II	-	Native
78	Birds	<i>Oenanthe oenanthe</i>	LC	-	-	-	Annex II	-	Native
79	Birds	<i>Oriolus oriolus</i>	LC	-	Annex 4 ^B	-	Annex II	-	Native

No.	Biotic component	Species (Latin)	IUCN	HD / BD	GEO 57/2007	RBVR	Berna Convention	Bonn Convention	Occurrence
80	Birds	<i>Parus major</i>	LC	-	-	-	-	-	Native
81	Birds	<i>Passer montanus</i>	LC	-	-	-	-	-	Native
82	Birds	<i>Phalacrocorax carbo</i>	LC	-	-	-	-	-	Native
83	Birds	<i>Phalacrocorax pygmaeus</i>	LC	-	-	-	-	-	Native
84	Birds	<i>Phasianus colchicus</i>	LC	Annexes IIA and IIIA	Annex 5 ^C	-	-	-	Native
85	Birds	<i>Philomachus pugnax</i>	EN	-	-	-	-	-	Native
86	Birds	<i>Phoenicurus ochruros</i>	LC	-	Annex 4 ^B	-	Annex II	-	Native
87	Birds	<i>Phoenicurus phoenicurus</i>	LC	-	Annex 4 ^B	-	Annex II	-	Native
88	Birds	<i>Phylloscopus collybita</i>	LC	-	Annex 4 ^B	-	-	-	Native
89	Birds	<i>Phylloscopus sibilatrix</i>	LC	-	Annex 4 ^B	-	-	-	Native
90	Birds	<i>Phylloscopus trochilus</i>	LC	-	Annex 4 ^B	-	-	-	Native
91	Birds	<i>Pica pica</i>	LC	Annex IIB	Annex 5 ^C	-	Annex III	-	Native
92	Birds	<i>Podiceps cristatus</i>	LC	-	-	-	-	-	Native
93	Birds	<i>Prunella modularis</i>	LC	-	Annex 4 ^B	-	-	-	Native
94	Birds	<i>Pyrrhula pyrrhula</i>	LC	-	-	-	-	-	Native
95	Birds	<i>Recurvirostra avosetta</i>	LC	Annex I	Annex 3	Vulnerable species	-	-	Native
96	Birds	<i>Regulus regulus</i>	NT	-	Annex 4 ^B	-	-	-	Native
97	Birds	<i>Riparia riparia</i>	LC	-	-	-	-	-	Native
98	Birds	<i>Saxicola rubetra</i>	LC	-	-	-	Annex II	-	Native
99	Birds	<i>Saxicola torquata</i>	LC	-	-	-	-	-	Native
100	Birds	<i>Sterna hirundo</i>	LC	Annex I	Annex 3	-	Annex II	-	Native
101	Birds	<i>Streptopelia decaocto</i>	LC	Annex IIB	Annex 5 ^C	-	-	-	Native
102	Birds	<i>Sturnus vulgaris</i>	LC	Annex IIB	Annex 5 ^C	-	Annex III	-	Native
103	Birds	<i>Sylvia atricapilla</i>	LC	-	-	-	-	-	Native
104	Birds	<i>Sylvia borin</i>	LC	-	-	-	-	-	Native
105	Birds	<i>Sylvia curruca</i>	LC	-	-	-	-	-	Native
106	Birds	<i>Tachybaptus ruficollis</i>	LC	-	Annex 4 ^B	-	-	-	Native
107	Birds	<i>Tadorna tadorna</i>	LC	-	-	Vulnerable species	Annex II	-	Native
108	Birds	<i>Turdus iliacus</i>	VU	Annex IIB	Annex 5 ^C	-	-	-	Native

No.	Biotic component	Species (Latin)	IUCN	HD / BD	GEO 57/2007	RBVR	Berna Convention	Bonn Convention	Occurrence
109	Birds	<i>Turdus merula</i>	LC	-	-	-	-	-	Native
110	Birds	<i>Turdus philomelos</i>	LC	Annex IIB	Annex 5 ^C	-	-	-	Native
111	Birds	<i>Turdus pilaris</i>	VU	Annex IIB	Annex 5 ^C	-	-	-	Native
112	Birds	<i>Turdus viscivorus</i>	LC	Annex IIB	Annex 5 ^C	-	-	-	Native
113	Birds	<i>Upupa epops</i>	LC	-	Annex 4 ^B	Vulnerable species	-	-	Native
114	Birds	<i>Vanellus vanellus</i>	VU	-	-	-	-	-	Native
115	Amphibians	<i>Bufo bufo</i>	LC	-	Annex 4 ^B	Almost threatened species	-	-	Native
116	Amphibians	<i>Bufo viridis</i>	LC	Annex IV	Annex 4 ^A	Almost threatened species	Annex II	-	Native
117	Amphibians	<i>Rana dalmatina</i>	LC	Annex IV	Annex 4 ^A	Vulnerable species	Annex II	-	Native
118	Amphibians	<i>Rana esculenta</i>	LC	-	Annex 5 ^A	-	-	-	Native
119	Amphibians	<i>Rana ridibunda</i>	LC	-	Annex 5 ^A	-	-	-	Native
120	Reptiles	<i>Anguis fragilis</i>	LC	-	Annex 4 ^B	Vulnerable species	-	-	Native
121	Reptiles	<i>Coronella austriaca</i>	LC	Annex IV	Annex 4 ^A	Vulnerable species	Annex II	-	Native
122	Reptiles	<i>Emys orbicularis</i>	NT	Annexes II și IV	Annexes 3 and 4 ^A	Vulnerable species	Annex II	-	Native
123	Reptiles	<i>Lacerta agilis</i>	LC	Annex IV	Annex 4 ^A	-	Annex II	-	Native
124	Reptiles	<i>Lacerta viridis</i>	LC	Annex IV	Annex 4 ^A	-	Annex II	-	Native
125	Reptiles	<i>Natrix natrix</i>	LC	-	-	-	-	-	Native
126	Reptiles	<i>Natrix tessellata</i>	LC	Annex IV	Annex 4 ^A	Almost threatened species	Annex II	-	Native
127	Reptiles	<i>Podarcis taurica</i>	LC	Annex IV	Annex 4 ^A	Almost threatened species	Annex II	-	Native
128	Invertebrates	<i>Anodonta woodiana</i>	LC	-	-	-	-	-	Introduced
129	Invertebrates	<i>Carabus intricatus</i>	NT	-	-	-	-	-	Native
130	Invertebrates	<i>Cepaea vindobonensis</i>	LC	-	-	-	-	-	Native
131	Invertebrates	<i>Coenagrion puella</i>	LC	-	-	-	-	-	Native
132	Invertebrates	<i>Dorcus parallelipipedus</i>	LC	-	-	-	-	-	Native
133	Invertebrates	<i>Iphiclidus podalirius</i>	LC	-	-	-	-	-	Native
134	Invertebrates	<i>Helix pomatia</i>	LC	Annex V	Annex 5 ^A	-	Annex III	-	Native

No.	Biotic component	Species (Latin)	IUCN	HD / BD	GEO 57/2007	RBVR	Berna Convention	Bonn Convention	Occurrence
135	Invertebrates	<i>Hirudo verbana</i>	-	-	-	-	-	-	Native
136	Invertebrates	<i>Geotrupes stercorarius</i>	-	-	-	-	-	-	Native
137	Invertebrates	<i>Gonepteryx rhamni</i>	-	-	-	-	-	-	Native
138	Invertebrates	<i>Meloe proscarabeus</i>	-	-	-	-	-	-	Native
139	Invertebrates	<i>Papilio machaon</i>	LC	-	-	-	-	-	Native
140	Invertebrates	<i>Pedestredorcadion pedestre</i>	-	-	-	-	-	-	Native
141	Fishes	<i>Abramis brama</i>	LC	-	-	-	-	-	Native
142	Fishes	<i>Alburnus chalcoides</i>	NA	Annex II	Annex 3	Critically threatened species	Annex III	-	Native
143	Fishes	<i>Carassius auratus</i>	LC	-	-	-	-	-	Introduced
144	Fishes	<i>Carassius gibelio</i>	NA	-	-	-	-	-	Native
145	Fishes	<i>Cyprinus carpio</i>	VU	-	-	-	-	-	Introduced
146	Fishes	<i>Knipowitschia longicaudata</i>	NA	-	-	-	-	-	Native
147	Fishes	<i>Leuciscus borysthenticus</i>	LC	-	-	-	-	-	Native
148	Fishes	<i>Leucaspis delineatus</i>	LC	-	-	-	-	-	Native
149	Fishes	<i>Leuciscus leuciscus</i>	LC	-	-	Critically threatened species	-	-	Native
150	Fishes	<i>Perca fluviatilis</i>	LC	-	-	-	-	-	Native
151	Fishes	<i>Petroleuciscus borysthenticus</i>	LC	-	-	-	-	-	Native
152	Fishes	<i>Rutilus rutilus</i>	LC	-	-	-	-	-	Native
153	Fishes	<i>Scardinius erythrophthalmus</i>	LC	-	-	-	-	-	Native
154	Fishes	<i>Squalius cephalus</i>	LC	-	-	-	-	-	Native
155	Mammals	<i>Capreolus capreolus</i>	LC	-	Annex 5 ^B	Vulnerable species	-	-	Native
156	Mammals	<i>Lepus europaeus</i>	LC	-	Annex 5 ^B	-	-	-	Native
157	Mammals	<i>Meles meles</i>	LC	-	Annex 5 ^B	-	Annex III	-	Native
158	Mammals	<i>Microtus agrestis</i>	LC	-	-	Vulnerable species	-	-	Native
159	Mammals	<i>Myotis daubentonii</i>	LC	Annex IV	Annex 4 ^A	Critically threatened species	-	-	Native
160	Mammals	<i>Pipistrellus nathusii</i>	LC	Annex IV	Annex 4 ^A	Threatened species	-	-	Native
161	Mammals	<i>Sciurus vulgaris</i>	LC	-	Annex 5 ^B	-	Annex III	-	Native
162	Mammals	<i>Sus scrofa</i>	LC	-	Annex 5 ^B	-	-	-	Native

No.	Biotic component	Species (Latin)	IUCN	HD / BD	GEO 57/2007	RBVR	Berna Convention	Bonn Convention	Occurrence
163	Mammals	<i>Talpa europaea</i>	LC	-	-	-	-	-	Native
164	Mammals	<i>Vespertilio murinus</i>	LC	Annex IV	Annexes 4 ^A and 4 ^B	Threatened species	-	Annex II	Native
165	Mammals	<i>Vulpes vulpes</i>	LC	-	Annex 5 ^B	-	-	-	Native

Abbreviations used in the table: IUCN – The International Union for Conservation of Nature: **EN** – Endangered, **LC** – Least Concern, **NA** – Not Applicable, **NT** – Near Threatened, **VU** – Vulnerable; **HD/BD** – **Habitats Directive / Birds Directive: Annex II of the HD** – Animal and plant species of community interest whose conservation requires the designation of special areas of conservation, **Annex IV of the HD** – Animal and plant species of community importance requiring strict protection, **Annex V of the HD** – Animal and plant species of community importance whose sampling and exploitation may be subject to management measures; **Annex I of the BD** – Species that constitute subject to special conservation measures for their habitats in order to ensure their survival and reproduction in the spreading area, **Annex IIA of the BD** – Species which may be hunted in the geographical sea and land area where this Directive applies, **Annex IIB of the BD** – Species that can only be hunted in some member states indicated in the Directive, **Annex IIIA of the BD** – Species for which sale, transport for the purpose of sale, retention for sale and offering for sale of live or dead birds and any parts of birds which are easily recognizable are not prohibited provided that the birds have been killed or caught by means legal or have been obtained by legal means, **Annex IIIB of the BD** – Bird species for which some member states may allow the sale, transport for the purpose of sale, retention for sale and offering for sale of live or dead birds and any portions of birds or avian products easily recognizable on their territory, establishing certain restrictions, provided that the birds have been killed or caught by legal means or have been obtained by legal means; **GEO 57/2007** – Government Emergency Ordinance 57/2007 on the regime of protected natural areas, conservation of natural habitats, wild flora and fauna: **Annex 3** – Species of community interest. Species of animals and plants requiring strict protection, **Annex 4^A** – Species of national interest. Species of animals and plants requiring strict protection, **Annex 4^B** – Species of community interest. Species of plants and animals of community interest, except bird species, whose sampling of nature and exploitation is subject to management measures, **Annex 5^A** – Animal species of national interest whose sampling and exploitation of which are subject to management measures, **Annex 5^B** – Species of community interest whose hunting is permitted, **Annex 5^C** – Species of birds of community interest whose marketing of which is permitted; **Annex 5^D** – Species of birds of community interest whose marketing of which is permitted under special conditions; **Annex 5^E** – Methods and means of capture and killing and prohibited for capture or killing; **RBVR** – The Red Book of Vertebrates in Romania; **Berna Convention: Annex II** – Wild species strictly protected, **Annex III** – Protected fauna; **Bonn Convention: Annex II** – Migratory species to be the subject of the agreements.