

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7, as amended by Resolution VIII.13 of the Conference of the Contracting Parties.

Note for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.
2. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Bureau. Compilers are strongly urged to provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of maps.

1. Name and address of the compiler of this form:

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Designation date

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Site Reference Number

2. Date this sheet was completed/updated:

17 January 2006

3. Country: Romania

4. Name of the Ramsar site:

Mureş Floodplain

5. Map of site included:

- a) **hard copy** (required for inclusion of site in the Ramsar List): **yes**
- b) **digital (electronic) format** (optional): **yes**

6. Geographical coordinates (latitude/longitude):

North part: 46°19' 01" North Latitude / 20°50' 05" East Longitude
Est part: 46°18' 89" North Latitude / 20°49' 94" East Longitude
South part: 46°07' 15" North Latitude / 20°91' 89" East Longitude
West part: 46°16' 82" North Latitude / 21°27' 72" East Longitude

7. General location:

It is situated in western Romania, in Arad and Timiș counties, exactly near the town of Arad (its centre lies at 4 km from the easternmost point of the area) which has a population of 173,000 inhabitants.

8. Elevation:

The average altitude is 100 m.

The minimum elevation is 82.5 m

The maximum elevation is 110 m

9. Area: 17.166 ha

10. Overview:

The area is situated within the Mureș Floodplain Natural Park which received this status at the beginning of 2005. It includes the whole surface of the River Mureș downstream from Arad to the Hungarian border.¹ On this sector, there are 40 isles on the river which also crosses a dammed area and an area bordered by high terraces, periodically flooded. It is an area mainly covered by ash and oak stands (afforested area is over 6,000 ha) and by many arable plots of land and pastures, with old river beds which are filled with water or covered by *Scirpo-Phragmitetum* associations. In 1988, 12.000 ha from this area were proclaimed as an internationally important bird habitat in Europe.

11. Ramsar Criteria:

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>
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12. Justification for the application of each Criterion listed in 11. above:

1th Criterion: The site covers the meander zone of the Mures River, with almost closed river loops, as well as oxbow lakes. Representative examples of meander contain quasi-natural or natural ecosystems, such as poplar dominated communities (*Populeta albae*), or associations of ash and poplar (*Fraxineto-Populeta*), covered in large surfaces by wild vine (*Vitis vinifera* sp. *syvestris*) and/or other creepers like *Parthenocissus* sp., *Clematis* sp. and *Humulus lupulus*. Such stands are mainly lost due to forestry activity. Interesting and important wetland habitats are the oxbow lakes, comprising communities with *Trapa natans* – European water chestnut and *Salvinia natans* – water fern, endangered in Europe, as well as the reed-beds which represent a refuge for the large amount of bird species mentioned here.

From the Habitats Directive the following habitat types are present:

3160 Natural dystrophic lakes and ponds

¹ A later recognition as a transboundary Ramsar site with the Hungarian part is possible, but needs time to evaluate all possibilities. (Ramsar AA Romania, D. Cocai)

3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation
3270 Rivers with muddy banks with *Chenopodium rubri* p.p. and *Bidention* p.p. vegetation
40A0 * Subcontinental peri-Pannonic scrub
6240 * Sub-Pannonic steppic grasslands
6250 * Pannonic loess steppic grasslands
9020 * Fennoscandian hemiboreal natural old broad-leaved deciduous forests (*Quercus*, *Tilia*, *Acer*, *Fraxinus* or *Ulmus*) rich in epiphytes
9080 * Fennoscandian deciduous swamp woods
91F0 Riparian mixed forests of *Quercus robur*, *Ulmus laevis* and *Ulmus minor*, *Fraxinus excelsior* or *Fraxinus angustifolia*, along the great rivers (*Ulmion minoris*)
91G0 * Pannonic woods with *Quercus petraea* and *Carpinus betulus*

2th Criterion: The site includes many endangered, vulnerable or threatened species from the World Red List – 2000: otter - *Lutra lutra* (VU), pygmy cormorant – *Phalacrocorax pygmaeus* (LR), ferruginous duck – *Aythya nyroca* (LR), white-tailed eagle - *Haliaeetus albicilla* (LR), corncrake - *Crex crex* (VU), imperial eagle - *Aquila heliaca*, European pond terrapin - *Emys orbicularis*, European fire-bellied toad - *Bombina bombina*, common tree frog - *Hyla arborea*, northern crested newt - *Triturus cristatus*, asp - *Aspius aspius*, Balkan loach - *Cobitis elongata*, white-finned gudgeon - *Gobio albipinnatus*, schraetzer - *Gymnocephalus schraetzer*, streber - *Aspro streber*. Besides, many species of European concern inhabit and use this site.

A complete list of endangered, vulnerable or threatened species is presented in the RIS annex.

3th Criterion: The site is considered to be among the last quasi-natural or natural forest wetland habitats of the European temperate region. In the same time, the site includes a high biodiversity, characteristic associations (Populeto albae, Fraxineto-Querceteae, Phragmiteto-Scirpetum, etc) and species.

4th Criterion: A lot of bird species arrive here, in their migration: corncrake – *Crex crex*, Anser albifrons, *Scolopax rusticola*, *Tringa erithropus*, nesting: *Vanellus vanellus*, *Picus canus*, *Ixobrychus minutus*, or for wintering: white-tailed Eagle - *Haliaeetus albicilla*, common snipe - *Gallinago gallinago*, great white egret - *Egretta alba*, northern harrier - *Circus cyaneus*.

The large mammals (red deer - *Cervus elaphus*, wildboar - *Sus scrofa*, roe deer - *Capreolus capreolus*) find here an optimal environment for reproduction and protection against hunters, the site being surrounded by hunting areas.

The list comprising all bird species is presented in the RIS annexes.

5th Criterion: 196 bird species, from the total of about 500 European bird species, inhabit the site, breeding, nesting, wintering or in migration.

The list comprising the bird species which inhabit characteristic humid areas, which make altogether more than 20,000 individuals is presented in the RIS annex.

7th Criterion: 45 fish species, many of them mentioned in the World Red List – 2000 or in European conservation conventions and directives, inhabit water covered areas in the site.

All fish species are presented in the RIS annex.

13. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

a) biogeographic region:

It is part of Palaearctic Region, Euro-siberian sub region, Central European sub-province Pannonic province, plain area, forest steppe area.

Please use also the biogeographic regionalisation scheme of the EU Habitat Directive/ Emerald Network

Continental – Emerald Network

Panonian – Emerald Network

b) biogeographic regionalisation scheme (include reference citation):

Călinescu R. (1969) Biogeografia României, Editura Academiei Române , București

Continental – Emerald Network

Panonian – Emerald Network

Please refer to the regionalisation scheme of the Habitats Directive/ Emerald Network

14. Physical features of the site:

The water-bearing formations around Arad are geologically comprised in the sediment covering of the Pannonic Basin. The foundation of this basin consists of crystalline, sediment and igneous groups, among which the Palaeozoic and Mesozoic ones are to be mentioned.

The area is part of the Plain of the River Mureș and has a much reduced level difference. From a tectonic point of view, it is part of the Pannonic depression. It is completely covered by quaternary deposits which are about 100 m thick. The lithologic sub-layer in the floodplain area consists of alluvial deposits (sand and gravel with intercalations of clay), and, outside the floodplain, loessial deposits and loess. Morphogenetically, it is a recently formed plain and it is characterized by the presence of undifferentiated meadows, buried terraces, frequent old river beds with still water and marshes.

All the types and subtypes of soil that have been identified are meadow soils from forest steppe and they have an alluviation character. The regular surplus of nutrients and organic matter represents a benefit for the soils, and the land slowly absorbs the water from floods.

The Mureș is by far the most important river (1,443 ha), accompanied in its major stream bed by a network of canals, some of which are old beds of the river (the Dead Mureș and Aranca), and others are artificial canals built to remove the water excess. The Aranca water stream springs near Sâmpetru German from the pore waters of Mureș and it heads south-westwards, and The Dead Mureș has its origin in the same pore waters from the east of Arad.

The discharge of the Mureş River is of 154 m³/s. The maximum discharges of the river can reach over 2,000 m³/s (2,330 m³/s during the flood from 1975). But the use of its waters is restricted by their quality and by the fact that the river here approaches the end of the drainage area, gathering pollutants which make it useful only for industry and agriculture. Still, in this sector the river Mureş has improved its quality parameters in the last years. Thus from the point of view of the categories of quality: oxygen concentration (dissolved O₂, CBO₅, CCOMn and CCO-Cr), mineralization degrees (MG), special indicators and indicators of toxicity (zinc, phosphorus, ammonium), and general characterization, the river is included in the first category of quality. Unlike the river Mureş, the Dead Mureş canal, whose waters are almost entirely part of the protected area, is included in the category of quality “D” (degradation) from the point of view of oxygen concentration, respectively dissolved O₂, CBO₅, CCOMn and CCO-Cr.

Old maps and documents dating from before the 15-th century show that Mureş in its lower reach was divided in more channels which caused the creation of a chain of isles. Thus in the 12-th century, the present Dead Mureş canal used to create a large isle in the west of Arad, on the actual site occupied nowadays by Ceala Forest. A map from 1723 shows the presence of 52 isles between Arad and Cenad.

Considering the hydrological data referring to historic, important waters during a period of 350 years, between 1526 and 1872, it can be concluded that the frequency of water inrush was one in ten years. In the 19th century the frequency of floods increases (12 floods in 10 years); the floods in 1864, 1870, 1871, 1879, 1893 and 1897 are to be mentioned. Frequency of floods increased in the first half of the previous century and it tended to remain stable until 1981 – 1983, when the years of drought interrupted the succession of floods. The latest flood in the area occurred in 2004. The explanation for the increase of frequency lies in the massive deforestation from the basin of the river Mureş, which happened mainly in the 17th – 19th centuries and which cancelled the natural water flow regulation effect that forests have. The clearing of these forests, which was caused by populating the plain, had a series of negative effects on environment, the whole plain becoming an anthropic forest steppe, which by the cutting down the trees, disturbed the equilibrium humidity-evapotranspiration from the soil. This led to the increase of the phreatic level almost up to the surface, creating large marshes or areas with humidity excess. Removal of the water excess was achieved only in the 19th century, with the carrying out of the first river improvement works.

In time, the Mureş river improvement works have mainly had three aims: defence against floods, removal of humidity excess in marshes and maintenance of navigation. Among the hydrotechnical works on Mureş, there should be mentioned the ones that started in 1845-1872, when 33 meander removals were performed to ease water flow during water inrush. The consequences were: the lowering with one meter of the level of high waters, the shortening with about 90 km of the river bed route between Lipova and the junction with Tisa and the increase of water speed from 0.24 m/s before 1845 to 0.73 m/s in 1872 and 0.8 m/s at present. Nowadays, inside the protected area, the meanders of Mureş are still very well preserved in Pecica – Semlac area. All these have completely changed the natural equilibrium of the river bed, thus destroying its stability. After the floods in 1879, on Mureş there have been performed especially bank consolidation and river bed cleaning works, mainly aimed at maintaining navigation. When damming was performed, the width of the major streambed was established at 400 m. This was the period when dams

were built from Arad to the frontier. Between 1822 and 1844, the inhabitants, guided by the local authorities, built the dam on the left bank of Mureş, from Felnac to the inflow of the river in Tisa, with a length of 92 km, from which 66 km belong to the Romanian territory.

The vegetation in this area grows in a continental climate, with warm summers and moderate winters. The annual average temperature is 10.5°C. The maximum average temperature is recorded in July (+21,4°C), and minimum average in January (+1,4°C). The absolute maximum temperature was recorded in 1952 (40.4°C), and the absolute minimum in 1954 (-30.1°C). The annual average rainfall is 550 mm, with high variations: 275 mm in 1952 and 853 mm in 1915.

15. Physical features of the catchments area:

The beginnings of the hydro-geological aspects of the Mureş coincide with the formation of the Transylvanian basin and its spur mountain regions in the Tertiary period. Later the rise of the ranges of the Eastern Carpathians and the Transylvanian Mountains finalised the formation of the Transylvanian basin. The inferior of the Transylvanian basin was further formed by the slow rotation of the volcanic and the inside blocks accompanying the movements in the mountain structure.

In the beginning of the Pliocene the lowland section of the Mureş was still covered by Miocene lake. In the central territory of the Transylvanian river significant bay-lake depressions formed. Even in the beginning of the Pliocene, shorter streams were later taken up and further deepened by Pleistocene Old Mureş. An important rise in the drainage area of the Mureş at the end of the Pleistocene caused a recession in the inner lakes. By the end of the Tertiary period the Mureş had become a quick river, carrying the water of the Transylvanian inner lake to the significantly lower Hungarian Plain. In the Holocene period the Mureş settled in the Transylvanian basin and its horizontal bed changes became insignificant compared to the previous stages. The present bed was basically formed by the regulation of the river, since before this, in the Holocene, it also supplied the Aranca brook system.

The Mureş drainage area has a surface of 29,500 km² and the length of the main river course is of 749 km, from which 27,890 km², respectively 761 km are included in the Romanian territory; thus it is the longest inner river course and one of the most significant rivers of the Carpathian basin. The Mureş drains the Transylvanian basin in a westerly direction and it meets the Tisa River at Szeged. The main tributaries of the river are: Târnavă, Arieş, Sebeş, Strei, Cugir and Cerna. The Mureş drainage basin includes all forms of relief: mountains (23%), hills and plateaux (25%), and plains (52%) with altitudes varying between 2,500 m in Retezat Mountain and under 100 m in the West Plain.

The temperature and rainfall of the Mureş drainage basin are influenced by air masses from the Atlantic Ocean, the Mediterranean and Eastern Europe. Among the physical-geographic characteristics of the basin, the continental climate is one of the most important, met both in the west and in the east. The continental climate (semi-arid continental pannonian climate type VII- zone steppe climate) is characterized by dry and

hot summer period and great seasonal oscillation of rainfall. The annual average temperature varies between 5.4°C in Toplița and 10.8°C in Sânnicolaul Mare. The recorded average multi-annual rainfall varies between 450 mm in Arad and 1400 mm in mountainous areas. The forests in the basin cover a surface of 915,000 ha, the afforestation percent being of 31.1%. This percent is inferior to the optimum value (33-55%), but it is higher than the afforestation percent in the country (27%). The biggest water inrush in the Mureș drainage basin occurred in the years 1932, 1970, 1975 and 1981.

The environment of the riverbed is varied by terrace formations of different ages. Of these, the Old Holocene terrace can be found occasionally 10 meters higher than the average water level of the river. These terraces are not covered by the highest flood. The Holocene terrace is made up of mainly alluvium piled up in the Pleistocene, through and restructured by the floods of the river. Several upper Pleistocene terraces do not form a continuous terrace system. These are 20 m higher than the river flats. A coarse pebbly layer containing loess and red clay covers the Pleistocene terraces.

On the surface of the Hungarian Plain drainage basin there are sandy and clayey formations, while in the basin and in the mountains crystalline volcanic and clayey impermeable formation occurs. On the flood plain of the Mureș River, four groups of soils were distinguished: alluvial protosoils on the active flood plain with a low retaining and filtering power, alluvial soils on the greatest part of the floodwater-free higher level of the river plain, gley soils on the marginal deep lying areas of the flood plain, and peaty soils in the upper course of the river.

Main human activity is agriculture; hence land is covered with fields and pastures.

16. Hydrological values:

As the Inferior Floodplain of Mureș situated between Arad and the inflow of Mureș in Tisa is bordered by dams and high terraces, it is subjected to all benefits and damage caused by floods. The regular surplus of nutrients and organic matter represents a benefit for the soils, and the land slowly absorbs the water from floods. The soils of the floodplain, in particular those of the active flood plain, are of great importance for aquatic biocoenoses, generally for the state of running water, for many reasons. First of all, the soil cover is an important natural filter, which retains in large quantities the waste products. Its efficiency depends considerably on certain soil characteristics affecting permeability, cation mobility, such as clay, humus, pH, and their integration as cation-exchange capacity. Secondly, as a component of riverside biotopes, the soils of the floodplain determine to a great extent the nature, the structure of biocoenoses. Many plants in the area need the period of flooding in order to germinate and to consume the nutrients freshly dissolved in the water.

17. Wetland Types

Marine/coastal:

A	B	C	D	E	F	G	H	I	J	K	Zk(a)
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Inland:

L	<u>M</u>	N	O	P	Q	R	Sp	Ss	<u>Tp</u>	<u>Ts</u>	U	Va	Vt	W	<u>Xf</u>	Xp	Y	Zg	Zk(b)
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Human-made:

<u>1</u>	2	3	<u>4</u>	5	6	<u>7</u>	8	<u>9</u>	Zk(c)
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b) dominance:

Xf	4	M	Ts	9	Tp	1	7
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18. General ecological features:

The site consists of a high variety of ecosystems, a mixture of meadows and almost compact woodland situated along Mureş river between Arad and the Hungarian border. The woods are interspersed with clearings, pastures and permanent small marshes and lakes. Flooding occurs almost in each spring.

Water biotopes:

- River – the ecosystem of the lower Mureş River, on the 88 km segment in question, has a rich fish population, both in quality and quantity, a very diverse bird population and macrophytes. The benthos and plankton richness is limited.
- Lowland permanent and intermittent lakes and pools (shallow standing freshwater), united by the flooding mainly in springtime. This ecosystem is diverse and constituted in different types of vegetation, forest dominated by willow - *Salix alba* and poplar - *Populus alba*, or by ash - *Fraxinus excelsior* and oak - *Quercus robur*. These forest associations are quasi-natural and very representative for the region, being in the same time among the few examples of this type of habitat remained in Europe. This type of ecosystem with a high diversity can be found mostly in the “Prundul Mare” wetland.
- Old river bed ecosystem is extremely interesting and surprising for its bird and macrophytes diversity. These biotopes are changing permanently due to their fast dynamics, offering important and outstanding information for the fields of eco-physiology and population ecology.
- Channels, permanently or temporarily linked with the Mureş River. Dominated by shrubs, they are important nesting places for birds and also represent ecological corridors.
- The fresh-water drainage system also preserves the typical lowland habitats and acts as ecological corridors.

Terrestrial habitats:

The terrestrial habitats are dominated by lowland forests, situated along the Mureş River. These forests are situated in between the dams built about 150 years ago, the maximal distance from the river bank to the dams being of 4 km. The forests are subjected to seasonal flooding, mainly in spring time when large areas of forests and arable lands can be covered.

- a) The most important native biotope is the fluvial forest, made up of poplar (*Populus* sp.) and willow (*Salix* sp.). *Populus alba* are dominant in native stands and in mixture with *Quercus robur*, *Salix alba*, *Fraxinus excelsior*, *Ulmus laevis* and *Populus nigra*. The ratio of main species varies strongly.
- b) Riparian willow formations (including swamp forests) – is a young biotope. They are formed mainly of *Salix alba*.
- c) The most frequent forest is the alluvial ash dominated one (*Fraxinus excelsior*, about 32%), in association with oak (*Quercus robur*, 31%). They form an association of *Fraxino quercetae*.
- d) Artificial mono-dominant plantations of *Robinia pseudacacia*, *Fraxinus excelsior*, *Juglans nigra*, *Quercus robur* and *Quercus cerris*.

Native meadows:

Vast marshes disappeared here after anthropogenic landscape transformation.

- a) Tall-herbaceous lowland meadows are mainly renewed habitats and abandoned lands, (communities with *Poa pratensis*, *Agrostis gigantea*, *Phleum pratense*, *Alopecurus pratensis*).
- b) Lowland pastures are covered first of all by communities of *Lolium perenne*, *Poa pratensis* and *Agrostis stolonifera*.
- c) Wet meadows and fens are maintained in the Prundul Mare area and along the riverside in some plots. The main associations are *Cariceta acutiformis* and *Alopecureta aequalis*.
- d) Reedbeds (*Phragmiteta australis*, *Typheta angustifoliae*, *Scirpetus tabernaemontani*, etc.) occupying areas in the permanent and intermittent ponds and along drainage channels.

Agricultural arable lands:

Include mainly fields of annual crops and orchards.

19. Noteworthy flora:

There are mentioned over 1000 plant species in the inferior valley of Mures river. Among these, rare plants, protected by the Bern Convention are: European water-chestnut - *Trapa natans*, floating moss - *Salvinia natans*, false pimpernel - *Lindernia procumbens*, European water-clover - *Marsilea quadrifolia*. Species protected by the Habitats Directive and other conventions: Scottish dock - *Rumex aquaticus*, graceful cattail - *Typha laxmannii*, bird's nest orchid - *Neottia nidus-avis*, bog orchid - *Orchis laxiflora*, lesser butterfly-orchid - *Platanthera bifolia*, greater butterfly-orchid -

Platanthera chlorantha, snowdrop - Galanthus nivalis, wall hawk's-beard - Crepis tectorum, common ragwort - Senecio jacobaea (ssp. gotlandicus).

The site is considered to be among the last quasi-natural or natural forest wetland habitats of the European temperate region and includes characteristic associations (Populeto albae, Fraxineto-Querceteae, Phragmiteto-Scirpetum, etc) and species.

20. Noteworthy fauna:

Vertebrate fauna population includes: (i) 29 mammal species, from which at least 2 bats, (ii) 196 bird species, from which more than half are migrants and seasonal visitors, (iii) 6 reptile species, (iv) 8 amphibian species, and over 45 fish species. The invertebrate fauna is well represented by gastropod species, some of them endemic.

Rare molluscs. Chilostoma banaticum – endemic species, Helix lutescens, vine snail - Helix pomatia, thick shelled river mussel - Unio crassus.

Rare insects. Species from the Romanian Red List: stag-beetle - Lucanus cervus, scarce swallowtail - Iphiolides podalirius, oil beetle - Meloe proscarabeus, paper wasp - Polistes gallicus, queen of Spain fritillary - Issoria lathonia, Cerambix cerdo, Bumblebee - Bombus sp., death's head hawkmoth - Acherontia atropos.

Rare mammals: World Red List-2000: common otter - Lutra lutra, pine marten - Martes martes, noctule bat - Nyctalus noctula. European concern species: ermine - Mustela erminea, brown long-eared bat - Plecotus auritus, european wildcat - Felis silvestris, red deer - Cervus elaphus, common hamster - Cricetus cricetus.

Rare birds: World Red List-2000: pygmy cormorant - Phalacrocorax pygmaeus, corncrake - Crex crex, ferruginous duck - Aythya nyroca, white-tailed eagle - Haliaeetus albicilla, black stork - Ciconia nigra, great egret - Egretta alba, little egret - Egretta garzetta, purple heron - Ardea purpurea, squacco heron - Ardeola ralloides, peregrine falcon - Falco peregrinus, merlin - Falco columbarius, Crane - Grus grus, lesser spotted eagle - Aquila pomarina, marsh harrier - Circus aeruginosus, osprey - Pandion haliaetus, glossy ibis - Plegadis falcinellus, spoonbill - Platalea leucorodia, white-fronted goose Anser albifrons, bittern - Botaurus stellaris, tawny owl - Strix aluco, kingfisher - Alcedo atthis, bee-eater - Merops apiaster, middle spotted woodpecker - Dendrocopos medius, sand martin - Riparia riparia.

The site is important for breeding, passage and wintering waterbirds and raptors.

Rare amphibians and reptiles: World Red List-2000: fire-bellied toad - Bombina bombina, common tree frog - Hyla arborea, European pond terrapin - Emys orbicularis, green lizard - Lacerta viridis, slow worm - Anguis fragilis, dice snake - Natrix tessellata.

Rare fish: lots of fish species of European concern may be found especially in the Mureş river: sterlet - Acipenser ruthenus, Balkan loach - Cobitis elongata, Rumanian loach - Sabanejewia romanica, Southern barbel - Barbus meridionalis, Greek barbel - Barbus peleoponnesius, white-finned gudgeon - Gobio albipinnatus, schraetzer -Gymnocephalus schraetzer, zingel - Aspro zingel, streber - Aspro streber, wels - Silurus glanis.

Besides the animal species listed here many species to be found in the proposed site are also listed in the annexes of the Bern Convention, the Bird Directive and/or in the Habitat Directive: 19 mammal species, 166 bird species, 4 reptile species, 7 amphibian species and 22 fish species.

All the animal and plant species are mentioned in the lists annexed to the RIS.

21. Social and cultural values:

The two counties, Arad and Timiș have a population of about 1,000,000 inhabitants and are mainly situated in a plain area (which represents 67%, respectively 80% of their surface). In the past the region was populated by numerous nationalities, from which only the Romanians and Hungarians are still present in large numbers. Localities such as Periam or Sâmpetru German used to be populated mostly by Germans, whereas in Felnac there were many Serbians and in Nădlac there were and still are many Slovaks.

The Mureș Floodplain and its vicinity have a very high importance for the local community and the wider region from the aspect of existing and potential social and cultural values. Oil and natural gas harvesting represents one of the main activities that are carried out in this area, together with timber harvesting and hunting. The latter are today regulated by law and are based on principles of suitable management, without threatening the main natural values of the area. Other domains of human activity were, and mostly remained in modern times, livestock husbandry and agriculture. Today most of the arable lands are in private property and mainly used for growing crops. The site contains large agricultural arable areas (main crops are maize, wheat, water and yellow melon, sunflower, etc.), while pastures in public property are used for grazing, which is focused especially on sheep and less on cattle.

The future protected area includes many archaeological sites (about 37 of them in the Arad County), among which there can be found the most important and famous site in the county of Arad, „Șanțul Mare”, a fortified settlement dating from the Bronze Age, superposed by another Dacian settlement, where Ziridava, a Dacian citadel, is supposed to have existed. The contributions to the complete landscape are the Hodoș-Bodrog and Bezdin Monasteries, important objectives for ecumenical tourism.

22. Land tenure/ownership:

(a) within the Ramsar site:

The ownership of the land in the area shows dominance of state and private property. Private areas are spread all over the area; the land owned by the state is mainly covered by forests and water, while the local public property generally consists of pastures. 50.2% (8,606 ha) of the land is state property, 18.4% (3,153 ha) is public property and 31% (5,326 ha) is private property; the percentage of church land is insignificant – 0.4% (81ha).

(b) in the surrounding area:

The property of the area around the protected area of Mureş Floodplain is mixed in structure, with dominance of private property on arable areas and public property in other areas.

23. Current land (including water) use:

(a) within the Ramsar site:

Mureş Floodplain was until now little used for human needs primarily due to its physical characteristics that were unsuitable for agricultural activity. The main domains of human activities are oil and timber harvesting, together with agriculture and grazing. Today the arable lands are cultivated (with cereals, sunflower, melon etc.), but many of them are not used, as they are periodically flooded. Grazing with sheep, and in lesser degree with cattle, takes place on the existing meadows. Illegal grazing takes place on lowland grassy and partly-wooded areas. Orchards occupy much smaller areas. Illegal arable cultivation has not been noted. Fishery and agriculture are no longer intensive. Poaching and illegal fishing occur. Many drained arable lands border the strong protected riverside band along the flood-prevention dam.

However, the agricultural production through enlargement of the plots, sowing monocultures in large areas and especially through the hydromelioration activities (draining), have not managed to significantly negatively influence the protected area of Mureş Floodplain.

(b) in the surroundings/catchments:

Most of the space is used for agricultural production, while a very small area remained covered by pastures.

24. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

(a) within the Ramsar site:

The current situation in lowland has been brought about by the damming of the valley of the Mureş and the consequent, almost total, agricultural transformation; large areas of important meadow spawning grounds have been lost. This has been accompanied by the removal of some lowland forest tracts, however many riverside forests have been planted. The conservation of native forests has been well managed for a long time. The only exotic wood species which has been promoted is black walnut which produces high quantities of quality wood in the area. The spreading of exotic tree species *Acer negundo* (introduced, upstream of protected area in green areas of the cities) is a serious problem in lowland forest.

The dam system causes the drying out of habitat in the Mureş Floodplain in years of low flow and water-logging in high floods, as the dams prevent normal water discharge from flooded areas. Both provoke the degradation of terrestrial, aquatic and intermediate ecosystems.

Major disturbance is caused by overgrazing, which degrades grassland. Oil harvesting sometimes causes local soil pollution. The impact of chemical residues from agriculture is low at present. After destruction of big farms, main livestock population and poultry is in private husbandry (in villages), which causes organic underground water pollution in row of untreated sewage. Various poaching activities take place, primarily illegal hunting and fishing.

(b) in the surrounding area:

The surrounding zone is characterized by extensive land use for arable agriculture, grazing and oil harvesting.

25. Conservation measures taken:

At the beginning of 2005 a surface of 17.166 ha has been declared by government decision as a „natural park” (the category „protected landscape” – the 5th category IUCN). The natural park contains four natural reserves (the 4th category IUCN), „The Cenad Forest”-310.5 ha, „The Cenad Big Isle”-3.0 ha, „The Igriş Isles”-3.0 ha and „Prundul Mare - 654.9 ha. It is a protected area that is continued on the Hungarian territory on a much smaller surface and it s not compact. The protected area from the Mures Floodplain on the Hungarian territory is part of the Koros-Maros National Park which has a surface of 51,125 ha and it was declared as protected in 1997.

26. Conservation measures proposed but not yet implemented:

The Forestry Directorate Arad, the administration of the protected area, will elaborate the management plan of the protected area in maximum 2 years, beginning with January 2006. In the following period, there will be started actions of inventorying the species in the protected area, considering the lack of data concerning the biodiversity of the area.

27. Current scientific research and facilities:

The Mureş Floodplain represents an excellent science polygon, which must be testified by numerous research and scientific works, primarily by geographers, ornithologists and botanists. In the future, it should be insisted that scientists and experts of various profiles be gathered together for further interdisciplinary work in this area. A common Romanian – Hungarian plan to collect data from the protected area of the Mureş Floodplain is to be elaborated starting with the spring of 2005.

The content of scientific research at the protected natural property is determined primarily by present diversity and richness of fauna, and specific flora characteristic for wetland. Having in mind the status of the protected natural property, directions and the goal of science research in the program of research of the protected area that will be made in university and the scientific research institutions, should be planned so they include an array of scientific research themes. The future administration has acquired a great number of equipments for inventorying and monitoring the biotic and abiotic factors, starting with automatic meteorological stations, an air quality monitoring station, 0.6 m resolution satellite imagery of the area and GIS software necessary for their processing (acquired at the beginning of 2005), high quality binoculars, portable Dissolved Oxygen Meter, portable water analysis kit, spotting scope, sweep nets, aquatic nets, Peterson dredge, Eckmann dredge, plankton nets, bird nets, digital vernier calliper, bat detector, balances, flow meter, video and photo equipment, etc.

28. Current conservation education:

An important activity in area of Mureş Floodplain should be directed toward the education of visitors and especially the young local community. In the area of the Reserve Prundul Mare there will be organized eco-camps for researchers, as well as "schools in nature", through organization of one-day visits to the Reserve, together with lectures, for which an expertise program will be prepared.

Beginning with the end of 2005 the protected area will have a visiting centre and two information points. The visiting centre Ceala, which will be situated near the town of Arad, will also be an important centre for ecological education by its being supplied with a school-like laboratory and a conference room. Many actions of ecological education have been performed in this area, lasting from one day to one week, coordinated by the Forestry Directorate Arad. Thus, at the beginning of September 2004, for a whole week, 22 students from over 10 schools from the county of Arad participated in activities of ecological education, guided by some specialists.

Education activities may be realized through organized visits of smaller groups from elementary and high schools as well as colleges. It is especially important that college students of natural sciences (biology, forestry, agriculture) should be introduced to these unique and especially vulnerable ecosystems. Such actions of ecological education will also be carried on in 2005; the participants will have the opportunity to use a great range of equipments acquired for this particular purpose: portable pH meters, educational clinometers, navigation GPS, stereo microscopes, microscopes, guidebooks for identification of species (plants, reptiles, amphibians, birds, etc.), guidebooks for identification of species by analyzing tracks, binoculars, etc. To help the organization of educational activities, there have printed leaflets for identification of trees in the Mureş area by analyzing their bark and leaves; the number of publications of type will increase in the year 2005. The activities of ecological education are also promoted on the site of the park www.luncamuresului.ro.

29. Current recreation and tourism:

The Ceala Forest situated near Arad, the Periam Port Area and Igriş are examples of leisure places for the population of the two counties. In such areas the infrastructure has been and will be improved by modernization of approaching roads, setting of new informative panels, building of parking places and better management of waste resulted from leisure tourism. There have also been investments in ecological tourism by building a watchtower to observe wild animals at large. Because it is placed in an old river bed of Mureş, a lot of common herons, little egrets and wild ducks feed here, after flooding; so this tower watch is ideal for an ornithological tourism.

In fact, future investment will focus on another such watchtower in the park especially built to allow observation of birds. The first tourist tours have been decided on, including motor boat trips, visiting of isles, observation of wild animals at large, following nature trails, visits of archaeological sites and of the two monasteries situated within protected area. Beginning with the year 2005, tourists will also have the opportunity of enjoying routes by riding bicycles or rowing boats. At the moment, the acquisition used for both administrative and tourist activities consist of: an off-road vehicle, a motor boat, two pneumatic boats and a few bicycles; the plan is to acquire another motor boat, kayaks, another off-road vehicle and a minibus, all by the end of 2005. All these are expected to contribute to development of ecological tourism in the area. There also have been issued many publications that promote ecological tourism in the area and the elements of ecological interest, in order to counterbalance the traditional economic activities in the area: grazing, timber harvesting, oil and natural gas harvesting, hunting and fishing, etc. Beginning with January 2005, there have been concluded the first contracts of partnership with investors in the area, aiming at promoting ecological tourism.

The cultural and educational function of the protected natural property will be accomplished according to the specialized programs and the target groups of visitors and users of the protected area. Monasteries and numerous archaeological sites can be included in such ecological tourism programs.

With that in mind, investment into tourist arrangement and organization, with the adequate promotion, should contribute to placing this activity together with all the others into one of the main ones in the future development, matched primarily with conservation of main natural values.

30. Jurisdiction:

The area is situated on the administrative territory of more localities Arad, Zădăreni, Felnac, Secuşişiu, Pecica Semlac, Şetin and Nădlac in Arad County, and of Sânnicolaul Mare, Cenad, Sâmpetru Mare, Periam in Timiş County. The respective territories are under the jurisdiction of the county councils of Arad and Timiş.

The Ministry of Agriculture and Rural Development through The National Forest Administration – Romsilva, The Forestry Directorate Arad and Timiş manages the forests in the area which are 99.5% state property.

31. Management authority:

The National Forest Administration – Romsilva, the Forestry Directorate Arad is the administrator of the protected area. The staff responsible for administration of the protected area work within Forestry Directorate Arad, consisting of 6 people, number that will increase after the protected area has an established administration. These people are: Ovidiu Pîrv -forestry engineer (chief of park) Mihai Pascu –biologist, Paula Zorlințan – accountant, Daniel Simon- IT Expert, Paul Hac – forestry engineer and
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