Romanian section

Date: August 30 , 1996

Country: Romania

Name of the Wetland: Upper Tisa

Geographical coordinates:

-at the upper (entrance) end: Valea Vişeului situated on the Romanian - Ukrainian border:
47^0 55' N, 24^0 10' E
-at its exit: downstream Piatra, on the Romanian - Ukrainian border:
48^0 15' N, 23^0 33' E

Altitude: The altitude of the Upper section of River Tisa at its entrance to Romania upstream Valea Vişeului is 337 m, and at the point of leaving the country downstream Piatra it is 190 m above Black Sea level.

Area:: 3710 ha

Commune	Protected areas	Areas with minimal activities	Buffer areas	Regene-rated areas	Total
1. Remeți	184	96	530	-	810
2. Săpânța	123	73	485	-	681
3. Câmpulung la Tisa	51	42	515	8	616
4. Sarasău	68	35	227	-	330
5. Sighetu Marmației	74	51	130	-	225
6. Bocicoiu Mare	107	140	460	-	707
7. Rona de Sus	23	-	120	-	143
8. Bistra	36	15	117	-	168
Total	**666**	**452**	**2584**	**8**	**3710**

Overview: the studied area belongs to the Maramuresh Depression crossed by the rivers Săpânța, Iza, Vişeu (all being River Tisa's affluents), and by the Upper Tisa.

The land is made up of low terraces, alluvial meadows, terraces with clogged backwaters, or water, swamps, ponds, and is partly covered by forest vegetation or agricultural crops.

River Tisa represents the type of Carpathian mountain river form which is characterized in this area by an upper stream nature, steep banks with high-velocity courses, quite large water volume due to the frequent rainfalls in the

area, categorized as oligothrophic water with an important transport of solid material.

This river belongs to the category of less polluted rivers. As to the mineral and oxygen contents, River Tisa belongs to the first rank water quality (class 1), consequently its water can be used for salmoniculture and for drinking water supplies, if properly treated.

Wetland Type: M,N,O,P,W,X,Z

Ramsar Criteria: 1.c, 2.b, 2c

Map of site included: yes

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Justification of the criteria selected under *Ramsar Criteria:* The protected areas under study fulfil the international criteria established by the Ramsar Convention and the indications from the Montreux Conference, July 1990, in the followings:

-The Romanian Upper Tisa region, measuring an area of 666 hectares, plays an important hydrological, biological and ecological role in a system of wetlands with adjoining similar areas in Ukraine, Hungary and Slovakia.

1.C criterium.

-By enlisting this wetland, the following objectives will be achieved:

-The protection of the unique ichthyofauna, especially of the Huchen (*Hucho hucho*), through an international cooperation meant to stop pollution, to rationalize and control fishing. Should there be dams built, the characteristics of the biocenosis must remain unchanged, pond draining and deforestation must be discontinued.

-The avifauna and especially bird migrations are very characteristic and are of international importance, mainly because of the repeated predsence of rare species such as the Osprey (*Pandion haliaetos*), the Arctic Loon (*Gavia arctica*), the Red-crested Pochard (*Netta rufia*), the Shoveler (*Anas clypeata*), the Common Scoter (*Melaintta nigra*), etc. At migration time thousands of birds traveling from Eastern Europe and the northeast towards Western Europe and the southwest. Species such as the Bean Goose (*Anser fabalis*), the Greylag Goose (*Anser anser*), the Mallard (*Anas platyrhynchos*) and the Green-winged Teal (*Anas crecca*) pass over and rest here in masses of thousands.

Hundreds of thousands of Rooks (*Corvus frugilegus*) pass over these wetlands in October during the migration period when the populations from the eastern part of the continent fly over the valley of River Tisa towards the west.

Around the end of August and early September White storks (*Ciconia ciconia*) migrate in large flocks numbering hundreds of individuals from the west towards the east. They cross over the valley of River Tisa and fly up to the confluence

with River Iza where the valley turns to the northeast and the storks to the southeast.

The waters of the Upper Tisa system never get frozen completely during wintertime, a fact that allows many waterfowls to winter in the area, out of which the most predominant is the Mallard (*Anas platyrhynchos*), with its numbers often exceeding several thousands. The Green-winged Teal (*Anas crecca*) is also important, but other species such as Mute swans (*Cygnus olor*), Goosanders (*Mergus merganser*) or Goldeneyes (*Bucephala clangula*) and Tufted Ducks (*Aythya fuligula*), etc. also appear here.

Regions adjacent to the suggested "Upper Tisa" protected area play a significant role in assuring necessary food supply during the migration of these bird populations.

General location: The Upper Tisa collects its water from the south-western parts of the Carpathians from Tatra Mountain up to Rodna Mountain, in a geographic area situated on the territories of Romania, Slovakia, Ukraine and Hungary. The Romanian area of the Upper Tisa is situated in north-northwestern Romania, entirely within Maramuresh County. The Upper Tisa borders Romania and Ukraine along a length of 62 km, directed from east to west, with the width of its upper flood plain varying between 50-150 m and the lower flood plain between 150-700 m. Settlements situated along the Upper Tisa on Romanian territory, from its entrance to the country to its exit, are as follows:

Name of settlement	Distance from River Tisa (m)
1. Valea Vişeului - village, (Bistra commune)	50
2. Lunca la Tisa - village, (Bocicoiu Mare commune)	50
3. Bocicoiu Mare - commune residence	50
4. Crăciuneşti - village, (Bocicoiu Mare commune)	300
5. Tisa - village, (Bocicoiu Mare commune)	800
6. Sighetu Marmaţiei - municipality	50
7. Sarasău - commune	300
8. Câmpulung la Tisa - commune	500
9. Săpânţa - commune	900
10.Remeţi - commune residence	100
11.Teceu Mic - village, (Remeţi commune)	50
12.Piatra - village, (Remeţi commune)	700

All the places mentioned above are situated at the border of the proposed wetland and have direct influence upon it through human activities taking place there.

By their nature, the protected areas are mostly lands on which human activities cannot be carried out, except for occasional usage; oxbow lakes, areas of ponds covered by forest vegetation on gravel grounds, banks, alluvial gravel grounds, etc.

Physical features: within the boundaries of the hydrographic basin of the Upper Tisa, there is a varied relief belonging to major geomorphological units appertaining to:
- mountain zones
- hills, plateaus and piedmonts
- depressions with meadows and terraces.

In the north-west of the Maramuresh Mountains, one of its branches (Muncelul: 1318 m) looks over the confluence or River Vişeu and River Tisa, dating back to the upper cretaceous (grit stones, limestones, diorite sands, pudding stones).

The straits River Tisa crosses between Valea Vişeului and Lunca la Tisa, are marked on the Romanian side by Măgura Obcina (the Obcina Hill) and Măgura Voloseanca (the Voloseanca Hill), that constitute the cretaceous-oligocene piedmont. Leaving the mountain zone and coming out from the straits, River Tisa enters the Maramuresh Depression in whose structure we will find, besides other depressions, the Sighet Depression extending from Lunca la Tisa to Săpânța, and the Săpânța-Teceu Depression, the lowest part of which is the bank of River Tisa. Along this depressional route we can find varied relief forms grouped in high hills, depressions, valley passages, small basins and piemonts having a complex origin: tectonic, sedimentary and differential erosive.

The Upper Tisa collects all its tributary streams from the western part of the Maramuresh Mountains, from the north of the Rodna Mountains, and also from the numerous northern and eastern streams arriving from the volcanic mountains Oas, Ignis, Gutâi and Ţibles.

The important tributary streams of the Upper Tisa are:

- River Vişeu. The area of its hydrographic basin is 1580 km^2, its length is 79 km. Its altitude is 2303 m (upstream at Pietrosul Rodnei Peak), and 330 m (at the confluence with River Tisa). The density of the Vişeu drainage basin has values of 0.7-1 km/km^2, due to the high amount of precipitation measuring over 1,000 mm a year. River Vişeu and its affluents cross montane regions with very steep slope falls (20-50 m/km).

Characteristic flow measurements at the Bistra hydrometric station are as follows:
- the highest flow with 1% probability is 1120 m^3/s;
- the multiannual medium flow is 32.14 m^3/s
- the minimum flow with 95% probability is 5.5 m^3/s.

There are no hydroelectric power plants in the Vişeu system.

- River Iza. The area of its hydrographic basin is of 1303 km^2, the length of the river is 83 km. Its altitude is 1839 m (upstream at Ţibles Peak), and 268 m (downstream at the confluence with River Tisa, westward from Sighetu Marmaţiei). River Iza crosses regions made up of eocene and oligocene deposits, and passes through deposits of the tortonian age, consisting of salt mountains.

Characteristic flow measurements at the Vad hydrometric station are as follows:
- the highest flow with 1% probability is 790 m^3/s;
- the multiannual medium flow is 16.8 m^3/s
- the minimum flow with 95% probability is 0.62 m^3/s.

- River Săpânța. The area of its hydrographic basin is of 135 km^2, the length of the river is 20 km. Its altitude is 1240 m (upstream at Rotundu Peak), and 228 m

(downstream at the confluence with River Tisa). In the montane region the sloping reaches 80-90 m per km.

River Săpânța has an impressive multiannual flow of 3.41 m^3/s, owing to a climate with high humidity and annual precipitation exceeding 1300 mm. These conditions have favoured marsh formation on the upper reaches. Here there are over 20 of eutrophic and oligotrophic mountain marshes ("tinoave") where the prevailing vegetation is peat moss (*Sphagnum*). The so-called "tinoave" are true live museums preserving numerous glacial relict species and they represent an ecological and fitohistorical importance.

In their natural conditions, most of the rivers that flow into the Upper Tisa have very favourable hydrochemical parameters. These stream waters are generally pollution-free with some exceptions on the lower parts of the rivers Mara, Cosău, Rona and Iza, which recieve salty water originating from the Ocna Şugatag and Costiui salt pits. The water quality of the rivers is also affected by the mining enterprises situated on the upper part of the Vişeu hydrographic basin, and by wastewaters dumped directly into them.

The water quality of River Tisa has been studied by means of laboratory analyses performed by specialized Romanian organizations which possess a data base of over 30 years. Also, international research and measurement programmes were also carried out for the study of the water quality of River Tisa at low flows, in which specialists from Romania, Ukraine and Hungary took part. The results obtained can be found in Appendix 1 where one can see the evolution of oxygen-content and dissolved CCO-Mn, CBO_5 values obtained on the analysed rivers belonging to the Upper Tisa basin.

In these control areas a good correlation among the values obtained for O_2,, COD-Mn, BOD_5 can be observed, owing to the load of organic substances from dumped domestic wastewaters.

River Tisa presents very high values along the entire analysed section.

The evaluation of the values of inorganic nitrogen (NH_4 , NO_2 and NO_3) on River Tisa shows that the high values of the NH_4 and NO_3 ions are evident in the Teceu section (area), owing to the evacuated wastewaters of the Sighetu Marmației filter station and to the fact that they belong to the main inorganic constituents of domestic pollution.

As for the level of toxicity, River Tisa is degraded. Metal ions that lead to this phenomenon come from the River Vişeu (Baia Borsa and Repedea) and from River Iza in which water from the S. C. Mecanica Sighetu Marmației Galvanizing Section is evacuated (Zn, Cu, Pb, Cd, As, Fe, Mn). The loading of River Tisa with such metals at low flows favours the emergence and development of algal colonies.

From data in Table and from materials mentioned in the bibliography it follows that River Tisa (which is a less polluted river) can be framed between the following categories of quality

- between the Vişeului Valley and Sighetu Marmației (30 km): degraded
- between Sighetu Marmației and Teceu (32 km): category 2

Water chemical investigation of the River Tisa and its some tributaries [1](September, 1992)

Sampling sites	rkm	O_2diss.	COD_{Mn}	BOD_5	Cond.	Total residual	NH_4	NO_2	NO_3	As	Zn	Cu	Pb	Cd	Fe total	Mn
		mg/l	mg/l	mg/l	uS/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Someş at -Ulmeni	163	12,40	9,1	7,9	380	681	0,32	0,260	6,40	0,002	0,036	0,018	0,017	0,000	1,10	0,27
-Cicârlău	123	10,50	7,1	4,9	255	558	0,32	0,110	3,30	0,358	1,500	1,594	0,318	0,008	7,30	1,24
-Satu Mare	68	7,30	15,0	3,5	811	568	2,67	0,180	4,57	0,128	1,018	0,565	0,121	0,005	6,03	1,96
-Oar	55	7,10	7,4	4,0	730	545	3,75	0,730	7,29	0,008	0,881	0,407	0,106	0,006	5,32	1,87
-Csenger	48	9,12	8,2	7,4	506	380	0,54	0,153	7,17	0,013	0,253	0,056	0,014	0,001	1,60	0,96
-Tunyogmatolcs	3	13,19	9,5	8,3	500	370	0,58	0,114	6,35	0,014	0,258	0,006	0,018	0,002	2,34	0,87
Lăpuş at -Bușag		10,70	10,4	9,88	130	431	0,33	0,090	3,50	0,420	3,370	2,200	0,383	0,018	13,95	2,09
Săsar at -Baia Mare		11,60	13,9	10,8	500	388	1,10	0,160	5,80	0,403	2,775	1,660	0,915	0,019	14,83	3,68
Vişeu at -Bistra		11,10	5,9	5,1	200	235	0,10	0,003	2,90	0,024	1,080	0,184	0,203	0,007	4,18	0,27
Iza at -Sighetu M.		10,40	6,1	5,1	295	304	0,10	0,01	2,60	0,112	0,341	0,143	0,156	0,002	12,20	0,32
Tisa at -Rachiv, above	882	14,30	3,1	1,6	223	193	0,32	0,030	3,10	0,000	0,180	0,008	0,005	0,001	2,55	0,16
-Rachiv, below	868	13,08	5,1	3,5	214	190	0,32	0,020	3,00	0,000	0,125	0,004	0,003	0,000	0,83	0,10
-Bocicoiu	855	12,40	6,0	4,5	205	176	0,60	0,020	2,80	0,027	0,340	0,106	0,087	0,001	12,85	0,53
-Sighetu M.	844	10,50	5,7	5,0	303	275	0,20	0,030	2,40	0,075	0,988	0,297	0,066	0,005	12,20	0,50
-Teceu Mic	810	11,70	4,8	1,1	208	171	0,60	0,028	7,40	0,024	0,269	0,095	0,075	0,002	24,10	0,78
-Hust	785	11,96	3,4	1,7	231	199	0,70	0,040	5,60	0,000	1,840	0,010	0,007	0,002	2,18	0,58
-Vilok	751	11,10	3,7	1,5	209	178	0,80	0,025	6,20	0,000	0,144	0,027	0,020	0,000	3,25	0,14
-Tiszabecs	744	9,45	1,4	1,0	250	188	0,25	0,107	5,03	0,000	0,055	0,003	0,002	0,000	0,53	0,49
-Borzhava, above	725	10,40	0,9	0,7	268	180	0,12	0,049	3,43	0,000	0,051	0,003	0,000	0,000	0,38	0,06
-Jánd	693	10,95	3,8	1,4	205	148	0,46	0,063	5,85	0,000	0,579	0,012	0,010	0,004	1,79	1,24
-Vásárosnamény	684	10,90	4,6	1,6	211	148	0,58	0,059	5,88	0,002	0,204	0,013	0,009	0,000	1,85	0,58
-Aranyosapáti	670	9,69	6,2	2,7	371	286	0,59	0,114	4,27	0,010	0,275	0,062	0,017	0,001	2,69	0,51
-Záhony	628	9,69	7,8	5,2	417	298	0,79	0,153	5,23	0,009	0,283	0,047	0,004	0,002	3,49	0,57
-Tuzsér	620	9,75	7,4	4,1	412	286	1,01	0,163	7,06	0,008	0,210	0,039	0,016	0,001	2,82	0,45
-Dombrád	593	10,20	5,8	3,7	428	286	0,94	0,176	6,52	0,004	0,140	0,017	0,007	0,001	1,69	0,17
-Tiszabercel	569	9,99	5,0	4,0	434	308	0,33	0,187	6,89	0,003	0,124	0,018	0,006	0,001	1,45	0,13
-Balsa	553	9,03	3,2	2,7	434	332	0,32	0,164	5,74	0,004	0,127	0,014	0,006	0,002	0,78	0,11
-Tokaj, above	543	9,62	5,9	6,2	418	272	0,06	0,170	6,40	0,003	0,062	0,013	0,004	0,001	0,59	0,08
-Tokaj, below	542	7,90	5,0	3,4	388	254	0,12	0,140	6,40	0,004	0,050	0,012	0,006	0,000	0,63	0,10
-Tiszalök	525	7,50	5,5	4,0	372	272	0,28	0,150	6,90	0,002	0,082	0,012	0,004	0,001	0,059	0,11
-Tiszadob	508	7,10	4,5	3,5	3,27	248	0,20	0,140	5,40	0,002	0,060	0,009	0,003	0,001	0,40	0,09

1. By Laboratory of the Environmental Authority, Nyíregyháza, Hungary

The depth of River Tisa is 1.8 - 2.5 m on average, at the fords it is only 0.5-0.8 m, and at high floods it reaches 5-15 m. More important floods were recorded in 1888, 1925, 1933, 1949, 1953, 1960, 1970 (maximum) and in 1974.
The temperature of River Tisa varies between $+4^0$C and $+18^0$C, in accordance with the succession of seasons.
Freezing time extends over December, January and February with all the winter phenomena included: bank ice, ice bridges, floating ice, sometimes even with thaws.
Meadows in the River Tisa area are strewn with many ponds originating from dead arms of the river, some of them with permanent water and significant depths, others existing only in clogging time. Most of them stretch over 5-10 hectares.
Permanent ponds are at Drăghicioaia, Piatra, Teceu, Remeți, Săpânța, Câmpulung la Tisa, Sarasău (Ciarda) and Tisa-Teplița (an artificial recreation area on the geothermic River Teplița);
Abandoned arms (dead backwater branches) with occasional water are at Teceu Mic, Remeți, Săpânța, Câmpulung la Tisa, Sarasău and Crăciunești.

Main soil types
The pedographic soil substratum is made up of sedimentary rocks. Soils are extremely varied; as a result of the effect of vegetation, different degrees of podzol and genetic soil types occur.
Gleic soils are to be found in the meadows of the River Tisa area, on small terraces. They are represented by clay and various clay types that are weakly drained, leading to the formation of marshes.
Marsh soils established where there was excess water originating either from the phreatic water level or from depressed or plain surface. Gleic soils are used as arable lands or hayfields depending on their degree of drainage, especially in rainy years.
-Alluvial soils and alluvial deposits are found in the easily flooded meadows of River Tisa. Alluvial deposits are very poorly developed coarse deposits with little nutritive contents. Alluvial soils with structured substratum and high nutritive contents have good biological, chemical and physical qualities: among fertile soils fine sands are dominant, while argillaceous soils and clays are represented in a smaller proportion. On these soils potato, barley, wheat, etc. are grown.
The climate is of a moderate temperate continental type. The climate of this section of River Tisa is similar to that characteristic of the Maramuresh Depression (the north area), having a protected topoclimate, but comparatively cold and wet:
-medium annual temperatures of $+8.5^0$C
-in January -5^0C and -3^0C
-in July $+16^0$C and $+18^0$C
-medium rainfalls 800-1000 mm
- 75-120 snowy days.

Hydrological values: From a biophysical point of view, the importance of River Tisa lies in its considerably high water output, the average flow being 85% = 6.5-7 m^3/sec. During the spring high floods evoked by snow melting and rains, the output can reach 2500-3000 m^3/sec.

One major importance of this river is its hydropower potential; hydroelectric power stations with an output of about 12-18 MW/h could be built here.

The biophysical conditions of River Tisa offer the possibility to preserve the **huchen** and **salmonids**, and to use the water for domestic purposes.

The subsoil waters in the River Tisa Meadow are captured, in order to supply Sighetu Marmației with industrial and drinking water.

Ecological features: On the wetlands of the Upper Tisa (meadows) being subject to natural influences as well as subsequent anthropogenic activities, the following habitats can be differentiated:

-riverside meadows where the local vegetation still survives with venerable trees, and where human influence is minimal;

-at some places these riverside meadows of gallery type are interrupted by patches invaded by adventitious plants (Appendix, Charts 7 and 8), creating thick thickets that are hardly crossable;

- some rather important areas are covered by shrubs which, based on their origins, can be classified into two sub-units:

a) shrubs of the original riverside meadows from where tall trees have been cleared out

b) shrubs also consisting of local species, invading the gravel grounds;

-hygrophilic pastures, which are periodically covered with water; these areas are used as pastures and grazing fields, and important areas are turned into farming lands used for growing different crops: corn, barley, potato, cabbage, vegetables and other plants whose products are consumed locally. These farmlands along the River Tisa meadows keep extending against natural regions;

-ponds originating from drained dead arms: these constitute habitats for aquatic and hydrophilic plants, and are extremely important habitats for many other living organisms.

-in the place known as "Livada" ("the orchard", Săpânța commune), a wooded islet has remained on the second terrace of River Tisa, covering 21 hectares and containing aged oak-trees, with a phytogenesis characteristic of oak groves. In this place the Forest Enterprise from Sighetu Marmației organized a dendrological park with 39 species of trees, out of which we mention Common Pine (*Pinus silvestris*), Black Pine (*Pinus nigra*), Larch (*Larix decidua*), Common Spruce (*Picea abies*), Black Walnut (*Juglans regia*), *Thuja orientalis*, Mountain Ash (*Sorbus aucuparia*), American Bird Cherry (*Padus serotina*), etc.

-on the second terrace of River Tisa in the village Tisa (Bocicoiu Mare commune), there are some species of exotic trees in the school park, surviving from the park founded by the former owner. Such are, for example: Tulip Tree (*Liriodendron tulipifera*), Black Walnut (*Juglans nigra*), etc.

-in the River Tisa strait where the river crosses the Măgura ("Hills") region, the mountain slope streaching down the river bank was once covered by beech

forests. Today these forests are intersected by pastures and grazing lands. The forest offers, besides wood, a series of secondary products (forest fruits, mushrooms, herbs, etc.). The woods in the Upper Tisa basin were put under forest jurisdiction in 1730 by "Regia Cameralis", the administration supervising a limited level of forest operations and providing wood material for transportation rafts carrying salt coming from the salt pits in Costiu and Ocna Sugatag.
The types of shrubs growing in the Upper Tisa basin, adjacent to the wetland, are:
-oak forests located at altitudes of 200-800 m;
-beech forests at altitudes between 500-1300 m, which sometimes, on northern slopes, grow even as low as at 300 m and can stretch on the southern slopes up to 1600 m.
-spruce-fir forests are found at altitudes of 1000-1700 m, and in some regions as down as 400 m.
Alpine pastures are on the upper region of the mountains and they can be:
-low alpine sub-zones between 1600-2000 m, also characterized by the presence of forestry vegetation;
-upper alpine sub-zones between 2000-2300 m, containing special open-zone plants and rare forest species.

Noteworthy flora: The vegetation of the Upper Tisa between Miceu, the Piatra village, and the village Valea Vişeului is varied, specific to the areas with streams, hill and mountain rivers. It is populated with plants ranging from inferior plants growing in the floodplains, some species attached to the substratum, others floating freely (filamentous green algae), to ligneus superior plants that form meadows and hardly crossable thickets woven thick by Weil associations.
Based on their biological forms most of the Macromicetes are lignicolous, while based on their ecological forms they are lignicolous saproparasitical and lignicolous saprophytic fungi. We can mention the preponderant presence of *Polysporus* and *Agrocybe*, and, among the species belonging to ground forms, the most frequent species are members of the genera *Coprinus*, *Stropharia*, *Panaeohus*, *Pluteus*.
Out of the hygrophytic plant populations we can mention various moss species (*Polytrichum sp.*, *Strium sp.*, etc.), ferns (e.g. *Dryopteris thelypteris*), Wood Horsetail (*Equisetum sylvaticum*), Yellow Marigold (*Caltha lueta*), Yellow Iris (*Iris pseudacorus*), Water Mint (*Mentha aquatica*), Spring Snowflake (*Leucojum vernum*), various species of sedge (*Carex sp.*).
Along the dead branches of River Tisa, in the pond waters we meet associations of hygrophytic plants including Ivy-leaved Duckweed (*Lenmna trisulca*), Broad-leaved Pondweed (*Potamogeton natans*), Common Water Plantain (*Alisma plantago-aquatica*), Bogbean (*Menyanthes trifoliata*), Common Water Crowfoot (*Ranunculus aquatilis*); (*Batrachium fluitans*), (*Scirpus lacustris*), Flowering Rush (*Butomus umbellatus*). Such associations border the ponds together with willows and alders.
The undisturbed natural meadows consist of the following most common species: White Willow (*Salix alba*), Osier Willow (*Salix viminalis*), Red Willow (*Salix purpurea*), Black Poplar (*Populus nigra*), White Poplar (*Populus alba*), Alder

(*Alnus glutinosa*), Hornbeam (*Carpinus betulus*), Bird Cherry (*Padus racemosa*), etc.

The shrub layer is also rich in species, out of which the most common are: Guelder Rose (*Viburnum opulus*), Common Elder (*Sambucus nigra*), Privet (*Ligustrum vulgare*), Dog Berry (*Cornus sanguinea*), Hazel (*Corylus avellana*), Rose (*Rosa sp.*), etc.

The weil associations climb up till they interweave with the crowns of the trees. In such associations climbers such as the Wild Hop (*Humulus lupulus*), the Traveller's Joy (*Clematis vitalba*) or the Woodland Grape (*Vitis silvestris*) can be present, and the willow bushes, locations with osier are overgrown by *Sicyos angulatus*, Hedge Bindweed (*Calystegia sepium*), Wild Cucumber (*Echinocystis lobata*: an adventitious plant).

Locations cleared of trees are invaded by thick associations made up of Jerusalem Artichoke (*Helianthus tuberosus*) and an adventitious plant originating from Japan: *Polygonum cuspidatum*.

In lighter places, both in riverside coppices and their borders, among the weeds we can find Meadowsweet (*Filipendula ulmaria*), Dropwort (*Filipendula vulgaris*), Moth Mullein (*Verbascum blattaria*), Common Tansy (*Chrysanthemum vulgare*), Self-heal (*Prunella vulgaris*), Hedge Bedstraw (*Gallium mollugo*), Purple Loosestrife (*Lythrum salicaria*) and Marsh Wounwdort (*Stachys palustris*).

In natural hayfields and at the edges of fields, herbaceous associations are made up of colourful flowers such as sage and clary species (*Salvia nemorosa, Salvia pratensis*), Small-flowered Catchfly (*Silene gallica*), False London Rocket (*Sisymbrium loeselii*), White Amaranth (*Amaranthus albus*), Ragweed (*Ambrosia artemisifolia*), Alkanet (*Anchusa officinalis*) and Common Meadow-rue (*Thalictrum flavum*).

In the River Tisa strait the vegetation is inlaid. It consists of beech forests interspersed with hayfields and, in the form of a narrow line on the bank, by osier plots. Out of the most common species we can mention the Beech (*Fagus sylvatica*), the Sycamore Maple (*Acer pseudoplatanus*), the Hornbeam (*Carpenus betulus*), the Common Ash (*Fraxinus excelsior*), under which Hazel (*Corylus avellana*), Blackthorn (*Prunus spinosa*) and hawthorn (*Crataegus sp.*), enter the forest associations. In the grassy bed there are: Dog's-tooth Violet (*Erythronium dens-canis*), Transsylvanian Hepatica (*Hepatica transylvanica*), European Ginger (*Asarum europaeum*), Wild Strawberry (*Fragaria vesa*), Alpine Squill (*Scilla bifolia*), Large Yellow Ox-eye (*Telekia speciosa*), Comfrey (*Symphytum officinale*), Corydalis (*Corydalis*), Toothwort (*Dentaria bulbifera*), etc.

Herbaceous plants are listed in Appendix, Chart No. 7, and ligneous plants (trees, shrubs and bushes) from the Upper Tisa land appear in Appendix, Chart No. 8.

In the Upper Tisa area there are a number of herbaceous and ligneous plants protected by Romanian law: Appendix, Chart No. 9.

Noteworthy fauna: The Upper Tisa Wetlands constitute good habitats for many vertebrate species living in forest and water environments.

As to the fishes, 33 species have been found in River Tisa among which even rare species, endemical species and natural monuments such as the Huchen (*Hucho hucho*) are found, as well as ice-age relic species with a limited area such as the Strömer (*Leuciscus soufia agassizi*). In this comparatively small area of River Tisa, rheophilic species characteristic of mountain rivers, such as the Common River Trout (*Salmo trutta fario*), the Grayling (Thymallus thymallus), the Bullhead (*Cottus gobio*), etc. occur together with species characteristic of slow-flowing waters of lower river sections, such as the Pike (*Esox lucius*), the Carp (*Cyprinus carpio*), even the Sheatfish or Catfish (*Silurus glanis*), and, lately in large numbers, the Bream (*Abramis brama*). This ichthyofauna can be maintained by preserving the biophysical quality of the waters of River Tisa. The updated list of confirmed species is shown in Appendix, Chart No. 1.

Out of the amphibians the Carpathian Newt (*Triturus montadoni*) is worth mentioning, occurring at altitudes of 300 m on the River Tisa terraces near Sighetu Marmației. These locations are the westernmost and lowest occurrences of this endemic species of the Eastern Carpathians. For the amphibians the River Tisa meadows with ponds formed in deserted riverbeds are also places of reproduction. For example, thousands of Common Toads (*Bufo bufo*) have been reported to occur in the lakes near Câmpulung la Tisa (Appendix, Chart No. 2).

Out of the reptiles the European Pond Terrapin (*Emys orbicularis*) in Maramuresh County founds a favourable habitat only in the River Tisa ponds. The suppression of these habitats brings about the disappearance of the species from this region (Appendix, Chart No. 3).

It is believed that over 90 bird populations nest near River Tisa and the above mentioned ponds, as well as in the well outlined meadows (that, at places, take a jungle aspect owing to climbing species such as the Traveller's Joy (*Clematis vitalba*) creating Weil associations), out of which 23 are closely linked to aquatic or wetland environments, and 67 to forests: Lesser Spotted Eagle (*Aquila pomarina*), Goshawk (*Accipiter gentilis*), Hobby (*Falco subbuteo*), etc.

In Appendix, Chart No. 4 bird species associated with wet and aquatic environment are listed, such as the Little Grebe (*Podiceps ruficollis*), the Little Bittern (*Ixobrychus minutus*), the Mallard (*Anas platyhrynchos*), etc. Appendix, Chart No. 5 conains the list of bird species that are not directly linked to aquatic environment, yet the favourable meadow biocenoses permits the nesting of several bird species in far greater density than in other bush or forest biocenoses. The particular density of the Fieldfare (*Turdus pilaris*) in the River Tisa meadows is worth mentioning The Fieldfare is a species noticed as a nesting bird of the Carpathians first in 1972.

The Tisa Valley is of utmost importance, even at international level, from the aspect of bird migration and the winter residence of northern species. The Carpathian native populations, mainly the passerines, simply fly downstream along the side valleys towards the River Tisa Valley leaving which they follow westwards through the Maramuresh depression, towards the Pannonian Plain. In autumn the migration of Rooks (*Corvus frugilegus*) and Jackdaws (*Corvus monedula*), is quite spectacular with hundred of thousands of birds flying above to rest in the River Tisa Valley. In autumn large flocks (thousands of birds) fly

over: Greylag Goose (*Anser anser*), Bean Goose (*Anser fabalis*) and duck species. It is only the growing number of birds that proves that northern populations also arrive here. In spring the direction is opposite, from southwest towards northeast. During the passage a number of rare species can be seen such as the Osprey (*Pandion haliaetus*), the Red-throated Diver (*Gavia stellata*), the Shoveler (*Anas clypeata*), the Red-crested Pochard (*Netta rufina*), the Common Scoter (*Melanitta nigra*), etc.

As far as the mammals are concerned, they lack scientific list, but we can notice that most mammals confirmed to exist in Maramuresh County exist here too, and we have conclusive proofs concerning big mammals such as the Carpathian Red Deer (*Cervus elaphus carpathicus*), the Roedeer (*Capreolus capreolus*), the Wild Boar (*Sus scrofa*), the Red Fox (*Vulpes vulpes*), the Hare (*Lepus europaeus*), etc.

We must also mention that through the River Tisa Valley the Muskrat (*Ondathra zibethica*) entered the fauna of the Maramuresh Depression, and the Mink (*Mustela lutreola*) survived in the River Tisa region.

As a conclusion we can notice that the River Tisa Valley (the River and the meadows) has a very rich vertebrate fauna in the examined area. Over 60% of the vertebrates confirmed in Maramuresh County exist within an area of only 2% of the whole depression. The occurrences of the above mentioned species are strongly confirmed, and the most uncommon species are mentioned in documents in the Maramuresh Museum.

Research work must be continued and intensified, on the basis of which we can complete the information on the faunal composition of this marvellous region. River Tisa and the River Tisa meadows deserve a better sustained protection which could be achieved by means of international cooperation.

Social and cultural values: The culture and civilisation of this area root deeply in the past. Manastirea la Peri, a site on the right bank of River Tisa, and Sarasau have been religious centres as much as centres for spreading the Romanian alphabet in the area.

Human activities here began with animal keeping, agriculture and forest work, "în butini", wood processing and domestic handicrafts. The followings are traditional products and activities characteristic of this region: gates carved with Maramuresh motifs and symbols (rope, sun, arbor vitae), wooden houses, churches with specific architecture (with entrance hall), home objects with artistic patterns (spindle, cradle, weaving loom, woollen rugs, bags, carpets dyed in vivid colours), etc. The traditional peasant wear in the Maramuresh County is characterized by its temperance, chromatic sense and well-chosen motifs: anthropic, zoomorphic and floral.

The pastoral, agricultural life of the people living here has multiple spiritual values, being tightly related to a large number of customs and archaic rituals such as "Sâmbra oilor", "Ruptul sterpelor", "St. John's Day", "Tânjaua" (the celebration of the beginning of spring farming activities), etc.

During the winter holidays (Christmas, New Year's Eve, Epiphany) carol singers go from house to house wishing the hosts happiness, rich crops for the coming New Year.

Lasting until the end of December there is a Winter Traditional Festival at Sighetu Marmației for which thousands of people come from Romania and abroad.

Land tenure/ownership:

The Upper Tisa basin in Maramuresh county has an area of 334000 hectares, with the following distribution:
-farming lands 150000 ha 44,99%
- lands with forestry vegetation 162000 ha 48, 50%
-other lands 22000 ha 6,51%

Out of this area National Parks extend over 4403 ha, with a perspective of further extension, as declared and approved by decision No. 37/1994 of the Maramuresh County Council. Among National Parks we can mention "Pietrosul Rodnei" (3300 ha), "Cornu Nedeii - Ciungii Bălăsinii" (800 ha), and others.
Seventy percent of the farming lands in this region are private, and the remaining 30% are lands belonging to state possession (mainly public estates): primarily grazing fields and pastures under the administration of the mayoralty and Agricultural Commercial Enterprises with state capital (SC Agricole SA). Out of the lands covered with forestry vegetation over 95% are state properties (public estates) administered by the Regia Autonoma ROMSILVA and the Forest Enterprises both of which put into practice the policy of forest protection legislated by the Legea Codului Silvic (The Forest Code Law) No. 26/1996.
After putting the Land Property Law (No. 18/1991) into operation, each forest land owner was given a hectare of forest to be managed under forest policy.
The protected lands, proposed in Article 9 to be administrative centres and extending over an area of about 666 hectares, are state properties (public estate), administered by the mayoralty and R.A. ROMSILVA S.A., but there are also areas on which ownership has not been specified yet, especially those next to the former border strip.
Adjacent areas that are neither cultivated nor grazed are used for domestic activities.

Current land use: Areas adjacent to River Tisa make up a total of 54370 hectares. Land use structure is as follows (data also comprise the neighbouring zones that administratively belong to these places) :
-farming lands 7380 ha = 13.57%
-orchards 1309 ha = 4.25%
-hayfields and grazing lands17761 ha = 32.67%
-forestry vegetation23078 ha = 42.45%
-other uses 3842 ha = 7.06%

The high share of farming lands is represented by pastures and hayfields. This imposes on the local population a certain activity, namely animal breeding. The main activity of the rural population is plant cultivation and animal breeding and the processing of these primary argicultural products. The main activities include

the breeding of sheep, cattle, horse and poultry, together with bee-keeping, which all ensure the people an important income, mainly through homemade goods and wool manufacturing. The most famous wool manufacturers are to be found in Săpânța.

The vast areas covered with forests provide the inhabitants with other important sources of income: workplaces in forestry enterprises and in timber and wool processing factories in Sighetu Marmației and Câmpulung la Tisa.

The presence of wood is also reflected in the physical appearance of dwellings and home dependencies that consist of a great amount of wood processed by famous craftsmen.

Farmlands, most of them being private properties, are cultivated by individual land owners whose products are consumed in their own farms.

Fruit growing extends over a comparatively small area of about 4,25% of the total, in the form of intensivly cultivated orchards possessed by the Agricultural Enterprises - S.C. Agricole S.A. (with a perspective to being turned into private properties), and private traditional orchards, too (that partly extend over the territory under). Fruits grown here are: apple, plum, pear, etc.

Hunting in the frontier region of the River Tisa basin is forbidden, while fishing is practised by organized amateurs with licences or permits released by the qualified authorities.

On a local scale different kinds of stone are still being exploited in the quarries, and the ballast-pit products in the Upper Tisa bed are also being turned to account. Sediments are sorted in the sorting stations at Sighetu Marmației.

Material removal from the ballast-pit resources is achieved occasionally by direct excavation from the floodplain and the product is used mainly for civil and industrial building.

The water of River Tisa is, in general, not used as industrial water supply for enterprises (except for the Câmpulung la Tisa Timber Factory), and it is not used for irrigation either.

There are no organized dumpsites along the Upper Tisa bed. In an unorganized way, though, people still deposit domestic waste in the proximity of almost every settlement along the main flood plain.

Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land use and development projects: From Miceu-Piatra up to Valea Vişeului large areas along River Tisa, covered by poplars (*Populus* sp.) and willows (*Salix* sp.), were cleared between 1980-1993. Most of these lands have been turned into farmlands; habitats of various living organisms have been diminished.

In the River Tisa meadow (the first terrace) draining operations took place until 1989: some swamps and ponds were subjected to agricultural management.

Due to clearing and uprooting, the banks of River Tisa became exposed to erosion during high floods. Although paving and consolidating has been done along the course of River Tisa, the water course did alter.

Works of consolidation were no longer maintained after the high floods, which fact determined the fate of many deserted channels, ponds and swamps: they became clogged and no longer provided shelter for waterfowl.

The last Grey Heron (*Ardea cinerea*) colony in the River Tisa meadow (village Tisa) was destroyed due to the wrong conception of the 1950s. It was feared that the birds might transfer ichthyophagous pests, and even the trees good for nesting were all cut down.
In the meadow exotic species or ones found in adjacent areas were planted, such as: Common Spruce (*Picea abies*), White Fir (*Abies alba*), Duglas Fir (*Pseudotsuga toxifolia*), American Bird Cherry (*Padus serotina*), Green Maple (*Acer negundo*), Catalpa (*Catalpa bignonioides*) and others.
The risk of damaging water quality is conveyed by some enterprises, such as the Borsa Mining Enterprise, the Sighet Mechanic Commercial S.A., the Vişeu Therapy S.A., the Hospitals in Borsa, Vişeu and Sighetu Marmaţiei, in case their filter stations do not work. After heavy rains pollution can also occur from the dump heaps related to the graphite schist prospects at Repedea. In such cases these heaps are washed away by torrents the way it happened in 1973, when after a downpour the polluting alluvial deposits of the graphite schists caused great damage to the ichthyofauna down to the River Vişeu - River Tisa confluence.
High floods provoked by downpours and lasting rains threaten Sighetu Marmaţiei and keep on flooding Remeţi and Teceu Mic.
The degradation of these wet habitats had a direct influence on the diminution of the variety and numbers of vertebrates characteristic of this area. For example, pollution to River Tisa had a negative impact on the huchen and other salmonid species as well as other fishes preferring oxygenated clear water.
Pond clogging and draining had negative impacts not only on certain fishes, but also on other vertebrates such as the European Pond Terrapin (*Emys orbicularis*), waterfowls nesting in these habitats such as the Little Grebe (*Podiceps ruficollis*), the Little Bittern (*Ixobrychus minutus*), the Mallard (*Anas platyrhynchos*), the Gallinule (*Gallinula chloropus*), etc., and especially on mirgatory birds that make a halt in large numbers near these ponds. Among these there are even very rare species such as the Arctic Loon (*Gavia arctica*), the Red-throated Diver (*Gavia stellata*) and other duck species.
The habitat of numerous mammal species living here e.g. the Muskrat (*Ondatra zibethica*), have been disturbed.
Massive clearing activities in the meadows have been felt even in the diminution of the nesting species in this very favourable habitat, such as the Lesser Spotted Eagle (*Aquila pomarina*), other birds of prey, and other bird species, too.
Environmental damaging through the whole Upper Tisa Basin by massive clearing, by polluting rivers with different substances and overflown wastes, etc. induce direct as well as indirect damages to the water quality of River Tisa and to the habitat of different living organisms in the wetlands of the region and in the flood plain.
The problem of Huchen (*Hucho hucho*) protection is not adequately resolved. The lack of piscicultural guarding by well-trained staff is being felt. There are no

patrols; some areas should be closed, and fishing should be forbidden in places that are known as spawning and breeding sites of huchens.
There are some hydroelectric power projects for River Tisa, including mine hydropower stations. In the first stage the Teceu and Săpânța hydropower stations will be built. The Teceu dam is meant to be built across the river, as part of an international route, allowing the passage of vessels. The following enterprises seem to be interested in these projects: the Ministry of Waters, Forests and Environmental Protection, the Autonomous Administration of Romanian Waters, the Ministry of Industry (Electric Power Department), and others.

Conservastion measures taken: The Upper Tisa Wetland under study is situated along the Romanian-Ukrainian border where public access is restricted, which is a measure favouring the partial protection of the area.
-Hunting is forbidden in the frontier area and fishing can be practised only with a permit;
-Fishing can be practiced by the members of the Associatiation of Hunters and Fishermen of Romania, with an exception for the **Huchen** (*Hucho hucho*) which is considered by law to be a natural monument (Law on Environment Protection No. 137/1995, County Council Decision No. 37/1994 providing precautionary and preserving measures for National Parks and natural monuments to be found in the Maramuresh County area).
-Decision No. 37/1994, among other things, stipulated in its annexes the protection of the "timoave", by declaring them to be National Parks. Such are "Mlastina Poiana Brazilor" (Fir Clearing Swamp), "Tăul Mororenilor", "Mlastina Oligotrofă Vlăsinescu" (Vlăsinescu Oligotrophic Swamp), "Mlastina Iezerul Mare" (Great Pond Swamp), "Mlastina Oligotrofă Tăul lui Dumitru" (Dumitru's Pool Oligotrophic Swamp), "Poiana Săpânței" and „Vrăticel".
-The Maramuresh Ecological Society, with its headquarters in Baia Mare, and The Sighetu Marmației Ecological Society contributed to drawing up Decision No. 37/1994 and to designating new protected areas that are to be declared National Parks.
-Trees in the "Livada" (Orchard), Săpânța commune, are protected, for they belong to the Dendrological Park area which is to be declared forestry park.
-Lands covered with forestry are administered by Regia Autonoma Romsilva, in accordance with Law No. 26/1996. By applying forestry management the protected areas fit within the forests belonging to 1st rank protection.

Conservation measures proposed but not yet implemented:: Conservation measures of such nature have not been taken officially in the Upper Tisa Wetland. The exception is the declaration of the **Huchen** (*Hucho hucho*) a natural monument, although in the frontier area it is being fished.
Generally speaking, all National Parks and Natural monuments included in the annexes to the Maramuresh County Council Decision No. 37/1994 are ordered to the administration of the Regia Autonoma Romsilva and to the local councils that possess the lands on which these natural values are situated.

- Scientists (researchers, museum specialists) have had permanent preoccupations regarding the protection of the flora and the fauna of the area. In their scientific papers published in different specialized reviews, and in those presented on the occasion of scientific sessions organized for example by the Cluj Napoca Department of the Romanian Academy, they presented the problems of the protection of the Upper Tisa area and of the living organisms of the place (**Huchen**, migratory birds, local nesting birds, exotic species, etc.).
"Observations and proposals regarding the ancient trees in the natural ecosystems and dendrological parks of the Maramuresh Depression". Scientific Session of the Romanian Academy, Department of Cluj-Napoca, 22-23 April, 1982.
"Contributions to the knowledge about the avifauna of the Upper Tisa (on Romanian territory)". Scientific Session of the Hungarian Ornitological Society, Nyíregyháza, 20-22 October, 1995,
and others.

Current scientific research and facilities: Due to its geomorphological features, to its flora, fauna, social, cultural and ethno-geographical values, the Upper Tisa Land is under permanent research work conducted by Romanian and foreign specialists.
Research is made in the fields of microbiology, zoology (aquifauna, ichthyofauna), forest and spontaneous flora, by specialists from the Maramuresh Museum from Sighetu Marmației, the Maramuresh County Museum, the Bucharest Forest Research Institute, the Cluj-Napoca Department of the National Institute for Hydrological Measurements, the Cluj-Napoca Department of the Romanian Academy, etc.
There are proposals for the future to supplement the research with new data concerning mainly the fauna and the flora that develops in time. In the River Tisa Wetland it is necessary to parcel out the areas subjected to protection. This must be done so as to obtain lots and sublots of a wetland area in each place and entrust these to the owners for managing and for careful administration, in accordance with the Ramsar Convention.

Current conservation education: In Sighetu Marmației there is the Maramuresh Museum. The staff of the museum, together with teachers from the primary and secondary schools, popularize towards the visitors the importance of environmental protection. The establishment of the Ecological Societies in Baia Mare and Sighetu Marmației has had an important impact on people's education, via publishing several articles dealing with the protection of the local flora and fauna, in the local and specialized media. Also, through thematic conferences followed by slide shows or video projecting, the sense of taking part in the maintenance and restoration of the order of our living environment is cultivated.
The two above mentioned societies contribute to carrying out ecological education, by means of camps organised for groups of young people.
In the proposed wetland sustained propaganda will be necessary, probably by pronouncing ecological basic rules and releasing posters with the species of fauna and flora to be protected.

Current recreation recreation and tourism: The protected areas, the buffer zones and bordering lands of the the Upper Tisa Basin offer possibility for extensive recreative tourism.

In the protected areas and along the rivers Săpânța, Iza and Vişeu, sport fishing is being practised. The Teplițe recreation area at Tisa, eastward of Sighetu Marmației is used for practising aquatic sports and as an area of recreation for the inhabitants of nearby settlements.

The Livada dendrological park in Săpânța, the Grădina Morii (Mill Garden) in Sighetu Marmației, the exotic trees in Tisa and some others, are excellent places for recreative tourism and for enriching the visitors' ecological knowledge.

Anthropological sights of international touristic importance in areas bordering the analysed region are:

- Săpânța lying on the left bank of River Tisa, on the National Road No. 19 connecting Maramuresh County with Oas County. The most important sights are: "Cimitirul vesel" (Merry Cemetery), a unique place in the world, made by folk artist Stan Ion Pătras, with its painted, engraved and carved crosses, together with epitaphs containing pieces of folk poems in connection with the former activity of the deceased.

The Trout Station where visitors can fish a trout, together with a mineral water spring, can be considered interesting sights. In the commune home handicraft industry has developed: processing wool and manufacturing rugs, coloured carpets, knapsacks, wallets, etc.

- Sighetu Marmației lies upstream from the junction between the rivers Iza and Tisa. Based on a document dating back to 1329, it is considered an old cultural centre. The "Diplomele Maramureshene" (Maramuresh Diplomas) were printed here by Dr. Ioan Mihaly de Apsa. The most important sights to be visited in Sighetu Marmației are:

-The Maramuresh Museum with its departments of ethnography, natural sciences, history, and art gallery.

-The Open Air Museum of the Maramuresh Village, on the Dobăies Hill;

-The Sighet Prison, where great Romanian politicians such as Iuliu Maniu, I. C. Brătianu, Cardinal Iuliu Hossu and others, were exterminated.

-The Orthodox, Catholic and Protestant churches

-The "Grădina Morii" Park, a recreative area with many ancient and exotic trees having been declared to be natural monuments.

-The Solovan Hill, from where you have a gorgeous view of the Maramuresh Depression and the course of River Tisa.

In places along the Vişeu, Iza and Mara Valleys tourists can admire the wooden churches with their high steeples rising up above towards the sky, together with the Maramuresh wooden gates which are real masterpieces of carved wood.

Jurisdiction: The studied area proposed as a protected land is meant to enter under the Ramsar Convention, with an area of 666 hectares. As mentioned in article 9, the communes will have to exercise the authority right.

-the mayoralties of Remeți, Săpânța, Câmpulung la Tisa, Sarasău, Bocicoiu Mare, Rona de Sus, Bistra and Sighetu Marmației will look after this area according to corresponding regulations;
-the Maramuresh County Council is involved on the level of regional legislation (e.g. decision "The Protected Areas");
- the Cluj-Napoca Department of the Romanian Academy will have to decide upon scientific research in the wetland;
-the Ministry of Waters, Forests and Environmental Protection requested and decided the enlisting of the Upper Tisa as a habitat for waterfowls (Law No. 5, 25 January, 1991);
-the Baia Mare University, the Sighetu Marmației Museum, the Ecological Societies of Baia Mare and Sighetu Marmației will be executors of research and studies regarding the regional fauna and flora.

Management authority: The responsibility for the Wetland will be established after it is registered on the wetland list.

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Appendix

List of Vertebrates Confirmed Along River Tisa and the meadows

Chart 1.

Fishes (Pisciformes)

Lampetra danfordi Regan 1911 - **Danube Lamprey**
Salmo trutta fario (L.) 1759 - **Common River Trout**
Salmo gaidneri irideus Gibb. 1855 - **Rainbow Trout**
Hucho hucho (L.) 1758 - **Huchen**
Thymallus tymallus (L.) 1758 - **Grayling**
Esox lucius (L.) 1758 - **Pike**
Rutilus rutilus carpathorossicus (Vladycov) 1930 - **Carpathian Roach**
Leuciscus soufia agassizi (Valenciennes) 1844 - **Strömer**
Leuciscus leuciscus leuciscus (L.) 1758 - **Dace**
Leuciscus cephalus cephalus (L.) 1758 - **Chub**
Phoxinus phoxinus:phoxinus (L.) 1758 - **Minnow**
Aspius aspius aspius (L.) 1758 - **Asp**
Alburnus alburnus alburnus (L.) 1758 - **Bleak**
Alburnus bipunctatus bipunctatus (Bloch) 1782 - **Rifle Minnow**
Vimba vimba carinata (Palas) 1811 - **Azov Vimba**
Chondrostoma nasus nasus (L.) 1758 - **Undermouth**
Gobio gobio carpathicus (Vladycov) 1930 - **Gudgeon**
Gobio uranoscopus frici (Vladycov) 1925 - **Long-whiskered Gudgeon**
Barbus barbus barbus (L.) 1758) - **Barbel**
Barbus meridionalis:petenyi Heckel 1847 - **Petényi's Barbel**
Cyprinus carpio carpio (L.) 1758 - **Carp**
Noemachilus barbatulus barbatulus (L.) 1758 - **Stone Loach**
Cobitis aurata balcanica Krraman 1822 - **Balcan Loach**
Silurus glanis (L.) 1758) - **Sheatfish**
Lota lota (L.) 1758) - **Burbot**
Perca fluviatis fluviatilis (L.) 1758 - **Perch**
Aspro streber Siebild 1863) - **Streber**
Aspro zingel zingel (L.) 1758) - **Zingel**
Stizostedion lucioperca (L.) 1758 - **Pike-perch**
Cottus gobio gobio (L.) 1758 - **Bullhead**
Cottus poecilopus poecilopus Heck. 1836 - **Alpine Bullhead**
Acerina schaester (L.) 1758 - **Acerine**
Acipenser ruthenus (L.) 1758 - **Sterlet**

Chart 2.

Amphibians (Amphibia)

Triturus montandoni (Boulenger) 1881 - **Carpathian Newt**
Triturus cristatus (Laur) 1768 - **Crested Newt**
Triturus vulgaris (L.) 1758 - **Smooth Newt**
Bombina variegata (L.) 1758 - **Yellow-bellied Toad**
Bufo bufo (L.) 1758 - **Common Toad**
Bufo viridis Laur. 1768 - **Green Toad**
Hyla arborea (L.) 1758 - **Common Tree Frog**

Rana ridibunda Pall. 1771 - **Marsh Frog**
Rana esculenta (L.) 1758 - **Green Frog**
Rana dalmatina Bonaparte 1839 - **Agile Frog**
Rana temporaria (L.) 1758 - **Common Frog**

Chart 3.
Reptiles (Reptilia)
Emys orbicularis (L.) 1758 - **European Pond Terrapin**
Lacerta agilis (L.) 1758 - **Sand Lizard**
Natrix natrix (L.) 1758 - **Grass Snake**

Chart 4.
Nesting Birds
Podiceps ruficollis (Pall.) 1764 - **Little Grebe**
Ixobrychus minutus minutus (L.) 1758 - **Little Bittern**
Ciconia ciconia ciconia (L.) 1758 - **White Stork**
Anas platyrhynchos platyrhynchos (L.) 1758 - **Mallard**
Rallus aquaticus aquaticus (L.) 1758 - **Water Rail**
Anas querquedula (L.) 1758 - **Garganey**
Porzana porzana (L.) 1758 - **Spotted Crake**
Porzana parva (Scop.) 1769 - **Little Crake**
Crex crex (L.) 1758 - **Corncrake**
Gallinula chloropus (L.) 1758 - **Moorhen**
Charadrius dubius curonicus Gml. 1789 - **Little Ringed Plover**
Vanellus vanellus (L.) 1758 - **Lapwing**
Tringa hypoleucos (L.) 1758 - **Common Sandpiper**
Sterna hirundo hirundo (L.) 1758 - **Common Tern**
Alcedo atthis ispida (L.) 1758 - **Kingfisher**
Riparia riparia riparia (L.) 1758 - **Sand Martin**
Cinclus cinclus aquaticus (Bechst.) 1789 - **Dipper**
Acrocephalus schoenobaenus (L.) 1758 - **Sedge Warbler**
Acrocephalus palustris (Bechst.) 1789 - **Marsh Warbler**
Acrocephalus scirpaceus scirpaceus (Herm.) 1804 - **Reed Warbler**
Acrocephalus arundinaceus arundinaceus (L.) 1758 - **Great Reed Warbler**
Motacilla cinerea cinerea Tunst. 1771 - **Grey Wagtail**
Motacilla alba alba (L.) 1758 - **White Wagtail**

Chart 5.
Nesting Birds in the meadow areas of River Tisa
Accipiter gentilis gentilis (L.) 1758 - **Goshawk**
Aquila pomarina pomarina (C. L. BREHM) 1831 - **Lesser Spotted Eagle**
Falco subbuteo subbuteo (L.) 1758) - **Hobby**
Falco tinnunculus tinnunculus (L.) 1758 - **Kestrel**
Perdix perdix perdix (L.) 1758 - **Grey Partridge**
Coturnix coturnix coturnix (L.) 1758 - **Quail**
Phasianus colchicus (L.) 1758 - **Ring-necked Pheasant**
Columba oenas (L.) 1758 - **Stock Dove**

Columba palumbus palumbus (L.) 1758 - **Wood Pigeon**
Streptopelia decaocto decaocto (L.) 1758 - **Collared Turtle Dove**
Streptopelia turtur (L.) 1758 - **Turtle dove**
Cuculus canorus canorus (L.) 1758 - **Cuckoo**
Asio otus otus (L.) 1758 - **Long-eared Owl**
Athene noctua noctua (Scop.) 1769 - **Little Owl**
Strix aluco aluco (L.) 1758 - **Tawny Owl**
Upopa epops epops (L.) 1758 - **Hoopoe**
Jynx torquilla torquilla (L.) 1758 - **Wryneck**
Picus viridis viridis (L.) 1758 - **Green Woodpecker**
Dendrocopos major pinetorum (L. Brehm.) 1831 - **Great Spotted Woodpecker**
Dendrocopos syriacus (Hempr. Et Ehrenb) 1833 - **Syrian Woodpecker**
Dendrocopos medius medius (L.) 1758 - **Middle Spotted Woodpecker**
Galerida cristata cristata (L.) 1758 - **Crested Lark**
Alauda arvensis arvensis (L.) 1758 - **Skylark**
Garrulus glandarius glandarius (L.) 1758 - **Jay**
Oriolus oriolus oriolus (L.) 1758 - **Golden Oriole**
Pica pica pica (L.) 1758 - **Magpie**
Corvus monedula soemmerringii (Fisch.) 1811 - **Jackdaw**
Corvus frugilegus frugilegus (L.) 1758 - **Rook**
Corvus corone cornix (L.) 1758 - **Carrion Crow**
Corvus corax corax (L.) 1758) - **Raven**
Parus palustris palustris (L.) 1758 - **Marsh Tit**
Parus caeruleus caeruleus (L.) 1758 - **Blue tit**
Parus major major (L.) 1758 - **Great Tit**
Aegithalos caudatus caudatus (L.) 1758 - **Long-tailed Tit**
Sitta europaea caesia Wolf. 1810 - **Nuthatch**
Certhia familiaris familiaris (L.) 1758 - **Tree Creeper**
Troglodytes troglodytes troglodytes (L.) 1758 - **Wren**
Saxicola rubetra (L.) 1758 - **Whinchat**
Saxicola torquata (L.) 1766 - **Stonechat**
Oenanthe oenanthe oenanthe (L.) 1758 - **Wheatear**
Phoenicurus ochruros gibraltariensis (Gml.) 1789 - **Black Redstart**
Phoenicurus phoenicurus phoenicurus (L.) 1758 - **Redstart**
Erithacus rubecula rubecula (L.) 1758 - **Robin**
Luscinia luscinia (L.) 1758 - **Thrush Nightingale**
Turdus pilaris (L.) 1758 - **Fieldfare**
Turdus merula merula (L.) 1758 - **Blackbird**
Turdus philomelos philomelos C. L. Brehm.)1831 - **Song Thrush**
Hippolais icterina (Vieill) 1817 - **Icterine Warbler**
Sylvia borin borin (Bodd.) 1783 - **Garden Warbler**
Sylvia atricapilla aticapilla (L.) 1758 - **Blackcap**
Sylvia curruca curruca (L.) 1758 - **Lesser Whitethroat**
Phylloscopus collybita collybita (Vieill.)1817 - **Chiffchaff**
Phylloscopus trochilus fitis Bechst. 1793 - **Willow Warbler**
Muscicapa striata striata (Pall.) 1764 - **Spotted Flycatcher**
Prunella modularis modularis (L.) 1758 - **Hedge Sparrow**
Lanius collurio collurio (L.) 1758 - **Red-backed Shrike**

Lanius minor minor Gml. 1788 - **Lesser Shrike**
Lanius excubitor excubitor (L.) 1758 - **Great Grey Shrike**
Sturnus vulgaris vulgaris (L.) 1758 - **Starling**
Passer montanus montanus (L.) 1758 - **Tree Sparrow**
Passer domesticus domesticus (L.) 1758 - **House Sparrow**
Carduelis chloris chloris (L.) 1758 - **Greenfinch**
Carduelis carduelis carduelis (L.) 1758 - **European Goldfinch**
Fringilla coelebs coelebs (L.) 1758 - **Chaffinch**
Serinus serinus (L.) 1758 - **Serin**
Acanthis cannabina cannabina (L.) 1758 - **Linnet**
Emberiza citrinella citrinella (L.) 1758 - **Yellowhammer**

Chart 6.
Winter Guest Migratory Birds
Gavia stellata (Pont) 1763 - **Red-throated Diver**
Gavia arctica arctica (L.) 1758 - **Black-throated Diver**
Podiceps auritus auritus (L.) 1758 - **Slavonian Grebe**
Podiceps griseigena griseigena (Bodd.) 1733 - **Red-necked Grebe**
Podiceps cristatus cristatus (L.) 1758 - **Great Crested Grebe**
Botaurus stellaris stellaris (L.) 1758 - **Bittern**
Nycticorax nycticorax nycticorax (L.) 1758 - **Night Heron**
Ardea cinerea cinerea (L.) 1758 - **Grey Heron**
Ardeola ralloides (Scop.) 1769 - **Squacco Heron**
Ardea purpurea purpurea (L.) 1758 - **Purple Heron**
Ciconia nigra nigra (L.) 1758 - **Black stork**
Anser anser (L.) 1758 - **Greylag Goose**
Anser albifrons albifrons (Scop.) 1769 - **White-fronted Goose**
Anser fabalis brachyrhynchus Baillon 1811 - **Bean Goose**
Cygnus olor (Gm.) 1789 - **Mute Swan**
Anas crecca crecca (L.) 1758 - **Green-winged Teal**
Anas penelope (L.) 1758 - **European Widgeon**
Anas acuta acuta (L.) 1758 - **Pintail**
Anas clypeata (L.) 1758 - **Shoveler**
Netta rufina (Pall.) 1773 - **Red-crested Pochard**
Aythya ferina (L.) 1758 - **Pochard**
Aythya nyroca (Guldenst.) 1770 - **Ferruginous Duck**
Aythya fuligula (L.) 1758 - **Tufted Duck**
Aythya marila (L.) 1758 - **Greater Scaup**
Bucephala clangula clangula (L.) 1758 - **Goldeneye**
Mergus serrator (L.) 1758 - **Red-Breasted Merganser**
Mergus merganser merganser (L.) 1758 - **Goosander**
Haliaetus albicilla (L.) 1758 - **White-tailed Eagle**
Circus pygargus (L.) 1758 - **Montagu's Harrier**
Circus cyaneus cyeneus (L.) 1758 - **Hen Harrier**
Pandion haliaetus haliaetus (L.) 1758 - **Osprey**
Grus grus grus (L.) 1758 - **Crane**
Fulica atra atra (L.) 1758 - **Coot**
Pluvialis apricaria altifrons (C. L. Brehm.) 1831 - **Golden plover**

Calidris minuta (Leisl.) 1812 - **Little Stint**
Philomachus pugnax (L.) 1758 - **Ruff**
Tringa totanus totanus (L.) 1758 - **Redshank**
Tringa nebularia (Gunn.) 1767 - **Greenshank**
Tringa ochropus (L.) 1758 - **Green Sandpiper**
Tringa glareola (L.) 1758 - **Wood Sandpiper**
Gallinago gallinago gallinago (L.) 1758 - **Common Snipe**
Larus ridibundus (L.) 1758 - **Black-headed Gull**
Larus argentatus (L.) 1758 - **Herring Gull**
Chlidonias niger niger (L.) 1758 - **Black Tern**
Hydroprogne tschegrava (Lepechin) 1770 - **Caspian Tern**
Asio flammeus flammeus (Pontopp.) 1763 - **Short-eared Owl**
Motacilla flava flava (L.) 1758 - **Yellow Wagtail**
Emberiza schoeniculus schoeniculus (L.) 1758 - **Reed Bunting**

Chart 7.
Herbaceous Plants from the Upper Tisa Land
Equisetum arvense - **Field Horsetail**
Humulus lupulus - **Wild Hop**
Urtica dioica- **Common Nettle**
Polygonum aviculare - **Knotgrass**
Polygonum amphibium - **Amphibious Bistort**
Polygonum multiflorum
Stellaria nemorum - **Wood Stitchwort**
Silene vulgaris - **Bladder Campion**
Saponaria officinalis - **Soapwort**
Mercurialis perennis -**Dog's Mercury**
Trollius europaeus - **Globe Flower**
Hepatica transsylvanica - **Transsylvanian Hepatica**
Dentaria bulbifera - **Toothwort**
Ranunculus platanifolius - **Large Whie Buttercup**
Asarum europaeum - **European Ginger**
Corydalis solida - **Bulbous Corydalis**
Viola alba - **White Violet**
Viola tricolor - **Wild Pansy**
Hypericum perforatum - **Perforate St John's Wort**
Fragaria vesca - **Wild Strawberry**
Medicago falcata - **Yellow Lucerne**
Capsella bursa-pastoris - **Sheperd's Purse**
Trifolium pratense - **Red Clover**
Lotus corniculatus - **Birdsfoot Trefoil**
Malva sylvestris -**Common Mallow**
Oxalis acetosella - **Wood-sorrel**
Geranium phaeum - **Dusky Cranesbill**
Geranium robertianum - **Herb Robert**
Angelica silvestris - **Angelica**
Primula officinalis - **Primrose**
Pulmonaria officinalis - **Lungwort**

Convolvulus arvensis - **Field Bindweed**
Symphytum cordatum - **Comfrey**
Verbascum phlomoides - **Orange Mullein**
Prunella vulgaris - **Self-heal**
Laminum maculatum - **Spotted Dead-nettle**
Thymus serpyllum - **Wild Thyme**
Inula helenium - **Elecampane**
Achillea millefolium - **Yarrow**
Platango lanceolata - **Ribwort Plantain**
Menyanthes trifoliata - **Bogbean**
Campanula patula -**Spreading Bellflower**
Chrysanthemum corymbosum -**Crown Daisy**
Tussilago farfara - **Coltsfoot**
Taraxacum officinale - **Dandelion**
Arctium lappa - **Greater Burdock**
Centaurea cyanus - **Cornflower**
Typha angustifolia -**Lesser Bulrush**
Phragmites communis - **Common Reed**
Colchicum autumnale - **Meadow Saffron**
Leucojum vernum - **Spring Snowflake**
Schoenoplectus lacustris
Carex canescens
Carex sylvatica - **Wood Sedge**
Festuca gigantea -**Giant Fescue**
Festuca rubra - **Red Fescue**
Festuca heterophyla - **Various-leaved Fescue**
Poa pratensis - **Smooth Meadow-Grass**
Agropyrum repens - **Common Couch**
Dryopteris thelypteris - **Fern sp.**
Caltha lactia - **Marigold sp.**
Myosotis palustris - **Marsh Forget-me-not**
Iris pseudacorus - **Yellow Iris**
Mentha aquatica - **Water Mint**
Lemna minor - **Common Duckweed**
Potamogeton matans - **Broad-leaved Pondweed**
Alisma plantago-aquatica - **Common Water Plantain**
Juncus effuscus - **Soft Rush**
Scirpus lanstris - **Common Bulrush**
Butamus beltamus - **Rush sp.**
Clematis vitalba - **Traveller's Joy**
Vitis silvestris - **Woodland Grape**
Sicyos angulatus - **Bur Cucumber**
Calystegia arvensis - **Bindweed sp.**
Helianthus tuberosus - **Jerusalem Artichoke**
Filipendula ulmaria - **Meadowsweet**
Filipendula hexapetala - **Dropwort**
Prunella vulgaris - **Self-heal**
Gallium verum - **Lady's Bedstraw**

Chart 8.
Ligneous Plants from the Upper Tisa Land (Trees, Shrubs, Bushes)
Abies alba - **White Fir**
Pseudotsuga toxifolia -
Picea excelsa - **Common Spruce**
Larix decidua - **Larch**
Pinus silvestris - **Common Pine**
Pinus nigra - **Black Pine**
Thuja orientalis
Thuja occidentalis
Populus alba - **White Poplar**
Plopulus tremula - **Trembling Poplar**
Populus nigra - **Black Poplar**
Salix alba - **White Willow**
Salix caprea - **Goat Willow**
Salix viminalis - **Osier Willow**
Salix incana - **Hoary Willow**
Salix purpurea - **Red Willow**
Juglans regia - **Walnut**
Betula verrucosa - **Silver Birch**
Alnus glutinosa - **Common Alder**
Alnus incana - **White Alder**
Carpinus betulus - **Hornbeam**
Corylus avellana - **Hazel**
Fagus sylvatica - **Beech**
Quercus sessiliflora - **Sessile Oak**
Quercus robur - **Common Oak**
Ulmus campestris - **Elm**
Ulmus montana - **Mountain Elm**
Morus alba - **Mulberry**
Viscum album - **Mistletoe**
Loranthus europaeus - **Yellow-berried Mistletoe**
Magnolia acuminta - **Magnolia**
Ribes grossularia - **Gooseberry**
Ribes nigrum - **Black Currant**
Platanus occidentalis - **Plane**
Crataegus monogyna - **Hawthorn**
Sorbus aucuparia - **Mountain Ash**
Malus silvestris - **Wild Crab**
Rubus idaeus - **Raspberry**
Rubus caesius - **Dewberry**
Rubus hirtus - **Blackberry**
Rosa canina - **Dog Rose**
Prunus spinosa - **Blackthorn**
Prunus avium (Cerasus avium) - **Wild Cherry**
Prunus padus - **Bird Cherry**
Padus serotina - **American Bird Cherry**

Gleditschia triacanthos -
Sarothamnus scoparius - **Scotch Broom**
Robinia pseudacacia - **Locust Tree**
Acer platanoides - **Norway Maple**
Acer campestre - **Common Maple**
Acer pseudoplatanus - **Sycamore Maple**
Acer negundo - **American Maple**
Aesculus hippocastanum - **Horse Chestnut**
Vitis silvestris - **Woodland Grape**
Tilia cordata (parvifolia) - **Small-leaved Lime**
Tilia platyphyllos - **Large-leaved Lime**
Elaeagnus angustifolia - **Oleaster**
Hedera helix - **Ivy**
Cornus mascula
Cornus mas - **Cornel**
Vaccinium myrtillus - **Bilberry**
Vaccinium vitis-idaea - **Cowberry**
Fraxinus excelsior - **Common Ash**
Syringa vulgaris - **Common Lilac**
Ligustrum vulgare - **Privet**
Catalpa bignonioides - **Catalpa**
Sambucus nigra - **Common Elder**
Sambucus racemosa - **Red-berried Elder**
Viburnum opulus - **Guelder Rose**
Chart 9.
Herbaceous and Ligneous Plants Under Protection
Herbaceous Plants
Scopolia carniolica
Melittis melissophyllene - **Bastard Balm**
Cypripedium calceolus - **Lady's Slipper**
Narcissus angustifolius - **Wild Daffodil**
Vaccinium oxycoccos - **Cranberry**

Ligneous Plants
Taxus baccata - **Yew** (Sighetu Marmației)
Quercus sessiliflora - **Sessile Oak** (Sighetu Marmației)
Tsuga canadensis (Tisa-Bocicoiu Mare)
Populus nigra - **Black Poplar** (Sighetu Marmației)
Platanus occidentalis - **Plane** (Sighetu Marmației)
Liriodendron tulipifera **Tulip Tree** (Sighetu Marmației)
Juglans nigra - **Black Walnut** (Tisa-Bocicoiu Mare)
Magnolia acumita - **Magnolia** (Tisa-Bocicoiu Mare)