Information Sheet on Ramsar Wetlands (RIS) – 2006-2008 version

Available for download from http://www.ramsar.org/ris/key_ris_index.htm.

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes 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. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.

3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

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

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DD MM YY

Designation date | Site Reference Number

Institute for Nature Conservation of Serbia:

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2. Date this sheet was completed/updated:
20.11.2007

3. Country:
Serbia

4. Name of the Ramsar site:
The precise name of the designated site in one of the three official languages (English, French or Spanish) of the Convention. Alternative names, including in local language(s), should be given in parentheses after the precise name.
Vlasina

5. Designation of new Ramsar site or update of existing site:

This RIS is for (tick one box only)**:**
a) Designation of a new Ramsar site ☑; or
b) Updated information on an existing Ramsar site ❑

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area

The Ramsar site boundary and site area are unchanged: ❑

or
If the site boundary has changed:
i) the boundary has been delineated more accurately ❑; or
ii) the boundary has been extended ❑; or
iii) the boundary has been restricted** ❑

and/or

If the site area has changed:
i) the area has been measured more accurately ❑; or
ii) the area has been extended ❑; or
iii) the area has been reduced** ❑

** **Important note**: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site:
Refer to Annex III of the *Explanatory Note and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:
i**) a hard copy** (required for inclusion of site in the Ramsar List): ☑;

ii**) an electronic format** (e.g. a JPEG or ArcView image☑;

iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** ❑.

b) Describe briefly the type of boundary delineation applied:
e.g. the boundary is the same as an existing protected area (nature reserve, national park, etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

8. Geographical coordinates (latitude/longitude, in degrees and minutes):
Provide the coordinates of the approximate centre of the site and/or the limits of the site. If the site is composed of more than one separate area, provide coordinates for each of these areas.

Central	42° 42' 10" N 22° 21' 16" E
West	22° 19' 02" E
South	42° 39' 49" N
East	22° 23' 02" E
North	42° 46' 20" N

9. General location:
Include in which part of the country and which large administrative region(s) the site lies and the location of the nearest large town.
The proposed Ramsar site "Vlasina" is positioned in southeastern Serbia, near the border with Bulgaria, on the territory of the Municipality of Surdulica.

10. Elevation: (in metres: average and/or maximum & minimum)

1174 – 1300 meters

11. Area: (in hectares)
3,209 hectares

12. General overview of the site:
Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

From the landscape aspect, Lake Vlasinsko and its immediate surroundings have specific and attractive landscape characteristics. The great water surface, surrounded by gently rolling hills, jagged shore, wet meadows, peat bogs, and the valley of the River Vlasina, along with two islands and several narrow and elongated peninsulas with many meadows and birch thickets, give this area a characteristic and unique appearance. Lake Vlasinsko, an important hydrographic object, was formed following the wide-ranging hydrotechnical interventions. The natural borders of the watershed were changed, due to which this reservoir belongs only to the Black Sea drainage area. The diversity and specific features of the habitats of this area are the reasons for the high diversity of the flora, vegetation, fauna, and ecosystems, which have distinct representative, autochthonous, and authentic natural characteristics. The area represents the habitat of a large number of natural rarities, as well as natural-historical phenomena, such as peat islands with highly specialised communities. During the time of its existence, this peat bog was the largest in Serbia, and for a series of characteristic features of the hydrographic regime and floristic and faunistic richness, it was unique in the Balkans. The flora of the Vlasina peat bog is made of 219 species (without *Bryophyta*). In accordance with the high diversity of flora, vegetation, and habitats, the area of Vlasina is characterised with the presence of endemic taxa. The flora of the Vlasina peat bog includes characteristic peat bog plants, such as marsh cinquefoil (*Potentilla palustris*), downy birch *(Betula pubescens*), round-leaved sundew (*Drosera rotundifolia*), mud sedge (*Carex limosa*), bogbean (*Menyanthes trifoliata*), and other species. The fauna of the area of Vlasina, in spite of changes provoked by several centuries long anthropogenic influences, have important elements of rare and threatened species. In the fauna of amphibians and reptiles in the area of Vlasina, particularly specific is *Triturus cristatus*. The ornithofauna of this area, as one of the fundamental phenomena, represents a particularly important and threatened category, and its richness is visible through the presence of 125 recorded species. According to the internationally approved principles, more than 60 species are protected, and according to the national legislature, 50 species are permanently protected. The presence of globally threatened bird species, such as the corncrake *Crex crex*, is particularly significant. Of rare and threatened species of the mammal fauna, specific are the European souslik *Spermophilus citellus*, which is on the Global Red List, the northern water vole *Arvicola terrestris* and the otter *Lutra lutra*, threatened at the national level. Partly preserved important primordial biogeocoenoses (first of all peat, swamp, humid, and forest, meadow and pasture as well), clearly show that this natural asset is important and that it represents a significant part of the characteristic floristic-vegetational and faunistic diversity.

The Government of the Republic of Serbia issued the Decree on Protection of the Landscape of Outstanding Features "Vlasina" over the area of 12,740 hectares, which comprises the entire Ramsar site. Along with the Ramsar site this Landscape of Outstanding Features includes the surrounding hilly-mountain areas. In 2000, the area of Vlasina is included into the registry of areas of international importance for birds, according to the IBA project, over the area of 22,000 hectares.

13. Ramsar Criteria:

Tick the box under each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11). All Criteria which apply should be ticked.

1	2	3	4	5	6	7	8	9
☑	☑	☑	☑	☐	☐	☐	☐	☐

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Criterion 1: "Vlasina" is an exceptional example of a specific wetland, with humid meadows and peat bogs unique in the Balkan Peninsula, very rare and threatened in the relevant biogeographical region.

Criterion 2: "Vlasina" provides the survival for a significant number of vulnerable, endangered, and critically endangered species and endangered ecosystems.

IUCN Red List (2004): a globally important representative of the bird fauna is the corncrake *Crex crex* (Threatened: Vulnerable). Specific significance for the protection of Vlasina has the presence of the European souslik *Spermophilus citellus* (Threatened: Vulnerable), which lives in the area immediately near the shore of Lake Vlasinsko, close to the place where the River Lisinska empties into the lake.

The globally threatened plant species are:

Silene asterias, Coeloglosum viride, Corallorhiza trifida, Dactylorhiza cordigera, Dactylorhiza incarnata, Dactylorhiza maculata, Dactylorhiza saccifera, Dactylorhiza majalis, Epipactis helleborine, Gymnadenia conpsea, Leucorchis frivaldii, Orchis laxiflora, Orchis morio, Platanthera bifolia, Rumex balcanicus, Pedicularis heterodonta.

The first volume of the Red Book of the Flora of Serbia gives the confirmation on the significance and the level of threat of the flora of Vlasina. In this volume, which treats extinct and critically endangered taxa, as much as eleven species of the flora of Vlasina are considered – *Betula pubescens, Caldesia parnassifolia, Carex limosa, Cirsium helenioides, Dracocephalum rayschiana, Elatine triandra, Juncus capitatus, Polemonium caeruleum, Ranunculus lingua, Sparganium natans* (*Sparganium minimum*), and *Utricularia minor.*

A large number of threatened species of plants and animals were recorded in Vlasina, protected at the national level by the "Decree on Protection of Natural Rarities" (Official Gazette of the Republic of Serbia, No. 53/93 and 93/93).

Criterion 3: Vlasina provides survival of valuable populations of plants and animals, significant for the conservation of the biological diversity in the relevant biogeographical region, such as*:* round-leaved sundew (*Drosera rotundifolia*), sedge (*Carex firosa*), melancholy thistle (*Cirsium helenioides*), sand martin *(Riparia riparia)*, redshank *(Tringa totanus)*, tufted duck *(Aythtya fuligula)*, northern water vole *(Arvicola terrestris*), and otter *(Lutra lutra).*

A colony of sand martins *(Riparia riparia*) with around 300 active nests, unique in this biogeographical region, can be found on the slope near the confluence of the River Milovanska Reka into Lake Vlasinsko.

The peat island and peat bogs of this area represent one of the most important refuge of the boreal flora in southern Europe in general.

This unique complex of aquatic, swamp, peat bog, and forest habitats, in the vicinity of the River Vlasina and the reservoir, represents a centre of ecosystem, species, and genetic diversity.

Criterion 4: Swamps and wet meadows around Lake Vlasinsko and the River Vlasina enable survival of the corncrake *(Crex crex*) during unfavourable periods of its life cycle, which nests both in the area of the Ramsar site and on meadows on slopes of the surrounding mountains. During dry years, most of the meadows in this area become unfavourable for nesting of the corncrake, with the exception of the most humid peat bog meadows. The survival of this species in the wider region during dry periods depends on this area.

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15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):
Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:
Pannonian Biogeographic region. According to the EEA regionalization scheme
Vlasina belongs to the central-south-European mountain biogeographical region, the central-European mountain subregion, and within this subregion, to the Balkan province.

b) biogeographic regionalisation scheme (include reference citation):

Stevanović, V. (1995): Biogeografska podela Jugoslavije (*Biogeographic regionalisation of Yugoslavia*) - In: Stevanović, V., Vasić, V. (eds): Biodiverzitet Jugoslavije sa pregledom vrsta od međunarodnog značaja (*Biodiversity of Yugoslavia with a review of internationally significant species*) – Faculty of Biology, Belgrade, and Ecolibri, Belgrade.

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16. Physical features of the site:
Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.
Relief

The reservoir Vlasinsko is located on the rolling fluvial area at around 1200 m ASL in the former wide and shallow river valley, on the poorly water-permeable substratum made of crystal shale. This is a highly flattened watershed between the rivers Vrla, Božica, Jerma, and Vlasina. The area of the Vlasina complex belongs to the large tectonic unit designated as the Serbian crystal core or the Serbian-Macedonic mass, and it consists of five larger elements of the regional structure, of which only the Vlasina syncline and the Čemernik syncline are in the immediate vicinity of lake Vlasinsko. The supposition of Cvijić (1886, 1903) that during his research Vlasina was the final stadium of the former Lake Vlasinsko ("Vlasinsko Blato", blato=mud), which was covered by lake overgrowing processes, was accepted by many authors. The old lake was formed during the Pleistocene in the so-called Vlasinska depression, which belongs to depressions of the Rhodopian type, by the lake formation processes in the already formed river valley of the Vlasina, at the altitude of 1200 meters, and by the partitioning of this valley by large quantities of the rock-clay material. The area of the former peat bog was 10.5 km².

Hydrological characteristics

The reservoir Vlasinsko was formed after the construction of the dam in 1949 on the place of the existing peat bog. Today, the area of the Vlasina peat bog that is not flooded covers 30 hectares. Another 2/3 remaines under the water of the lake. According to its altitude (1210.8 – 1213.8 m), Lake Vlasinsko is one of the highest reservoirs of the Balkan Peninsula.

Lake Vlasinsko is 9 km long and stretches in the meridian direction. It is 1.77 km wide on average, and it is widest in its southern part – 3.5 km. The average depth of the lake is 12 m. The slope of the bottom is the steepest in the immediate vicinity of the dam, in the northern part of the lake, where it is 25 m deep. The water surface covers around 14 km². The shoreline is not stable and its length is approximately 132.5 km. The total volume of the lake water is 165 millions m³, while the average annual water inflow is around 4 m³/s.

The highest mean monthly water temperatures are recorded in August (18-19°C), and the lowest in winter months: January, February, and March (1-2°C).

The natural tributaries of Lake Vlasinsko are: Babina, Murina Reka, and Pojište (from the eastern side of the lake), Simeonova Reka and Jarčev Potok (from the southern side), Milovanska Reka (from the southeastern side), Šaovica, Jančin and Stevanovski Potok, Manojlovića and Cvetkova Reka (from the western side).

The maximum water flow in the rivers of this area occurs in the period April – June. This is the period of snow thawing, and the beginning of heavy rains. The summer and the winter water flow maximums are separated by the rainy autumn season, when the mild increase of the water flow is noticed, just before the snows.

The study results indicate that the lake water is neutral to mildly alkaline. The waters of Vlasina have a low mineral content, they are soft, and rich in dissolved oxygen.

Geomorphological processes

The shore of Lake Vlasinsko is very jagged (2.16), and its shore constantly changes. The shape of the shoreline is influenced by the geological composition, primordial relief related to the inclination and height of the lake sides, form, size and depth of particular parts of the lake, oscillation of the lake water level, crashing, and climate-meteorological elements and factors (e.g. the wind that influences the formation of waves). The domination of the fluvial forms of the relief is one of the main geomorphological characteristics of Lake Vlasinsko. A significant role in formation of the various relief forms has the fluvial erosion (surface, vertical, riverbed deepening, formation of trenches, furrows, and rifts). The abrasion processes have the greatest effect on the formation of the shoreline forms of the relief. Such strong influence of waves is of crucial importance for the formation of headlands, cliffs, bays, and shore terraces.

Two largest islands of Lake Vlasinsko are Stratorija and Dugi Del. Stratorija is positioned at the altitude of 1210 meters, it is 250 m long, and 115 m wide. The length of the Dugi Del is 450 meters, and the width is 150 meters. The relative height of both islands is 11 meters. Four largest peninsulas in the lake are Pejčinov Klad, Bratanov Del, Zanoga, and Jovkin Hrid. The process of changing of Vlasinsko Blato into the reservoir is the reason for the presence of floating peat islands. While the reservoir was filling with water, the peat layers from the bottom of the lake detached and floated to the surface of the lake. Today, the total surface of the peat islands on Lake Vlasinsko is 8-10 hectares.

Geological characteristics

From the geotectonic aspect, the area of Vlasina belongs to the Serbian-Macedonian mass, and according to its lithological composition it is distinguished in the literature as the Vlasina complex. The metamorphic complex of shale – the Vlasinski complex, is built from regionally and progressively metamorphosed shale of the Riphey – Cambrian age. General characteristics of this complex, which represents a sediment-volcanogenic formation metamorphosed in conditions of the green shale facies, are: the changeability of the rocks both vertically and horizontally, which is influenced by alternation of the primary clayey, sandy, marl, and other sediments and basic magmatic rocks; the intensive development of minerals that are stable in conditions of the green shale facies; the presence of albite originating from the primary rocks. The Quaternary sediments in the studied area are genetically linked to the formation of the relief, namely to the process of the fluvial erosion. The representatives of these

sediments are: the terrace sediments, alluvial deposits, deluvial-proluvial and coluvial layers. They are distributed along the watercourse of the Vlasina and around the lake.

Hydrogeological characteristics

The studied area is built from rocks with diverse geological structure, the level of disintegration, porosity, and other features that have caused hydrogeological characteristics of particular lithological components. According to the structure of porosity in the present lithological environs in the area of Vlasina, the following is developed: intergranular type aquifers within the alluvial sediments and eluvial, deluvial-proluvial and coluvial layers; fractured type aquifers within crystal shale and their varieties and magmatic rocks.

Pedological characteristics

The pedological cover in the surroundings of Lake Vlasinsko is very homogeneous. Namely, besides the peat, there are pebble-alluvial and deluvial soils in the levelled shore area, but only fragmentary and in smaller areas, mainly along watercourses. Much wider areas are covered with district rankers on shale and sand and acid brown soils.

Climate characteristics

The continental features of the climate in the area of Vlasina are distinguished with temperate cold and humid climate of the submontane type, with very cold winters, and with moderately warm summers. Autumn is warmer and more arid than spring, and the mean monthly amplitudes of the air temperature are very distinct.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, and climate (including climate type).

The Gramada Mt. (1721 m ASL) rises from the northern part of the plateau, the mountain range of Čemernik (1638 m ASL) and Vardenik (Veliki Strešer 1876 m ASL) from the west, Milevske Mts. (1733 m ASL) from the south, and towards the watershed of the River Jerma in the east there is a relatively low area at around 1400 m ASL.

The area of the Vlasina complex belongs to the tectonic unit that is designated as the Serbian crystal core or the Serbian-Macedonian mass, and it consists of five larger elements of the regional structure, of which only the Vlasina syncline and the Čemernik anticline are in the immediate vicinity of Lake Vlasinsko. The mountains that surround the lake are block mountains. They were made by breaking of the inland mass of the crystal shale in the period from the Palaeozoic to the Neogene. The strong fluvial-denudation process changed the appearance of the mountain mass after the tectonic movements were relatively subsided.

The area of Vlasina belongs to the watersheds of the Vlasina (Južna Morava), Jerma (Nišava), and Dragovištica (Struma). The main watercourses are the Božička Reka with its headwater branches Dejanova, Kolunička, and Pusta Reka, the Lisinska Reka – the right tributary of the Božica, and Vučja Reka – a headwater branch of the Jerma. The direction of the river valleys and watercourses of the Vlasina complex follows the rift and the tectonic zones. It is supposed that the watershed of the Jerma (Vučja Reka) and the Vlasina were once coalesced. The valleys of larger watercourses are of the ravine type. The hydrographic network is divided to temporary and permanent watercourses. It mainly consists of mountain rivulets and creeks, the headwaters of which are difficult to determine, since they are divided into the large number of small springs. The acidic brown soils are widely distributed in the hilly-mountain region of Serbia.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

After the Vlasina peat bog was flooded and the lake was formed, certain specific climate-meteorological changes were observed. They are primarily manifested as a mild decrease of the mean annual air temperature in the period after the peat bog was flooded. The total quantity of the precipitation is only slightly greater, but instead of two annual maximums before the flooding of the peat bog, there is only one distinct spring maximum. The formation of the reservoir caused the decrease of the temperature extremes. The wet meadows in the valley of the River Vlasina participate in the processes of water purification.

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19. Wetland Types

a) presence:

Circle or underline the applicable codes for the wetland types of the Ramsar "Classification System for Wetland Type" present in the Ramsar site. Descriptions of each wetland type code are provided in Annex I of the *Explanatory Notes & Guidelines*.

Marine/coastal: A • B • C • D • E • F • G • H • I • J • K • Zk(a)

Inland: L • M • N • O • P • Q • R • Sp • Ss • Tp Ts • U • Va •
Vt • W • Xf • Xp • Y • Zg • Zk(b)

Human-made: 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • Zk(c)

b) dominance:

List the wetland types identified in a) above in order of their dominance (by area) in the Ramsar site, starting with the wetland type with the largest area.

6, U, Ts, Tp, Xp, M, W, 9

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20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

The vegetation of the area of Vlasina is very diverse and it is represented with a large number of communities, which is in accordance with the great diversity of the habitats and the complex influence of ecological factors in this area.

From the aspect of the potential vegetation, the wider area of Vlasina is of the forest type. The area around Lake Vlasinsko is within the belt of the climazonal forest *Fagetum moesiacum montanum*. The belt of the mesophilous deciduous forests *(Fagetum montanum)* is the best developed between 800 and 1300 m.

It is assumed that impressive coniferous forests were developed several times in the postglacial period (pine, Norway spruce, and mixed deciduous-coniferous). Old fossilised remains are the testimony of the presence of conifers in Vlasina in the immediate past, as well as the large quantity of the pollen preserved in the peat.

The birch forests *Populo-Betuletum* (*Populo–Betuletum pendulae* (Košanin 1910) prov., *Betuletum pendulae* (Ranđelović, V. 1994) prov.) are best developed below the Predstojčeva and Dojčinova Mahala towards the River Vlasina, but they also occur in other parts of Vlasina.

In the valleys of rivers and creeks that flow from the plateau, the potential vegetation of willow groves is developed. Willow groves of the *Salicetum albae-fragilis* type are developed around large watercourses, as well as of the *Salicetum purpureae* type, which is developed around creeks too. Wet and peaty areas around lakes and rivers are distinguished with the interesting vegetation that consists of several species of willows*: Salix pentandra, S. aurita, S. cinerea*, and *S. purpurea.*

However, the vegetation of Vlasina is characterised with various types of herbaceous meadow and pasture vegetation as well. These are often secondarily developed derivatives of the meadow-pasture or turf vegetation developed on account of the cleared forest communities, namely associations of the type *Festuco-Nardetum strictae*, *Danthonio-Trifolietum velenovskyi*, and more rarely *Diantho-Armerietum rumelicae*.

On swampy habitats near mountain creeks of Vlasina, a specific community of the *Hygronardetum strictae* type is developed, though more locally present than the previously mentioned communities of the *Nardetum* type. In some cases, the *Hygronardetum* communities are developed along the edge of the peat bog, therefore containing elements of the peat bog vegetation.

The communities *Rhinantho-Cynosuretum* and *Trifolio-Cynosuretum cristati* represent hygro-mesophilous meadows developed in fragments on a deep to moderately deep wet soils of Vlasina in the zone of hilly beech forests. The meadow vegetation built of *Deschampsia caespitosa* is particularly interesting. Such communities occur in several places around Lake Vlasinsko, on swampy habitats around creeks, peat bogs, etc., forming characteristic bumpy areas made from large clusters of this grass.

The potential vegetation of valley and swampy meadows is developed in wet habitats around larger creeks and rivers. The valley meadows are represented with communities *Deschampsietum caespitosae*, *Equiseto - Scirpetum silvaticae*, and *Filipenduletum ulmariae*. The *Deschampsietum caespitosae* is the community of wet valley and mountain meadows that has intrazonal and patchy distribution in the mountain areas of Vlasina in the zone of the beech forest (*Fagetum montanum*), near the creeks that empty into lake Vlasinsko, and around the lake itself.

Swampy communities include the alliances *Magnocaricion*, *Caricetum rostrato-vesicariae*, *Caricetum gracilis* and in fragments the alliances *Phragmition, Phragmitetum australis, Sparganio - Glycerietum fluitantis*, and *Glycerietum maximae*. The *Phragmitetum australis* is a swampy community that is developed around mountain creeks that empty into the lake, in the form of smaller fragments. The localities around Lake Vlasinsko are among the last existing habitats in Serbia for the species *Pedicularis palustris* (marsh lousewort). The specific vegetation with the community of *Elatino triandrae-Eleocharetum acicularis* is developed in occasionally flooded areas around the lake.

The peat bog vegetation of Vlasina is represented with the mosaic complex of various associations and is very intricate. Ranđelović (1994) placed the plant cover of the Vlasina peat bog into the class *Scheuchzerio - Caricetea fuscae*, which includes association of the flat peat bogs and transitory peat bogs. The same author distinguishes two orders - *Caricetalia fuscae* for the plant communities of low sedges, and the order *Scheuchzerietalia palustris* – the vegetation of the pure and mixed "sphagnetums". The peat bog vegetation in Vlasina is intrazonal vegetation, which means that it is developed inside the forest belt. The largest areas covered with such vegetation are developed on floating peat islands and around the lake, representing the fragments of the former Vlasina peat bog. The vegetational order *Caricetalia fuscae* is represented with the vegetation of the alliance *Caricion canescentis-nigrae* on peat deposits in valleys of larger creeks, around creeks on mountain tops that surround the lake, and on peat islands.

The association *Eriopohoro - Caricetum flavae* is developed on a shallow layer of peat on a gently inclined terrain near the creeks. It is significant that the number of the sphagnum mosses in this community is very small, although they are present in 70% of the stands. The order *Scheuchzerietalia palustris* is represented with two alliances, *Rhynchosporion albae* and *Salici - betulion pubescentis*. From the alliance *Rhynchosporion albae*, three associations that are elements of the transitory peat bog vegetation are developed in Vlasina. Such vegetation represents the fragments of the vegetational peat bog formations of central, western, and northern Europe. In the Balkan Peninsula, it has a disjunctive distribution, and it has a tremendous significance for the survival of the boreal flora and biodiversity conservation. The association *Sphagno-Equisethum fluviatilis* represents a community of pioneer plants of the sphagnum peat bogs, and it is developed on muddy and peat soil with an adequate amount of water in the ground. This association is described precisely from the area of the Vlasina plateau where it mainly inhabits sphagnum islands. The community *Drosero - Caricetum stellulatae*, also from the alliance *Rhynchosporion albae*, is developed on a very acid terrain, on peat islands, and near Bratašnica, in the valley of the River Murina

Reka, and in other places as well. The association *Caricetum limosae* is best developed in peat bogs around creeks that empty into the Lake Vlasinsko. The community is very rare in the Balkan Peninsula. The presence of the species *Carex limosa* is a significant feature of this community, as well as of a number of mostly sphagnum mosses.

The vegetation of peat sibljak is developed on peat islands of Lake Vlasinsko, along with other peat communities. This is the formation physiognomically characterised with short trees of the downy birch (*Betula pubescens*) and with the shrubs of the rosemary-leaved willow (*Salix rosmarinifolia*). This community represents a true rarity not only for Serbia, but for the Balkan Peninsula as well. The communities of the peat bog sibljaks with other peat bog communities are rich in species of northern distribution. Therefore, the peat islands and peat bogs of Vlasina generally represent one of the most important refugia of the boreal flora and vegetation in the southern part of Europe.

The formation of the reservoir in place of the former Vlasinsko Blato created the more favourable conditions for the development of the hydrophyte vegetation. The characteristics and the distribution of such vegetation is strongly influenced by the water regime. The vegetation of occasionally flooded areas is developed throughout the surroundings of Lake Vlasinsko. The decrease of the water level in the lake causes the progression of the vegetation of the cited alliance that is mixed with the elements of the flotant vegetation adapted to terrestrial way of life. The zone of the emerse vegetation is not very distinct, and the belt of the flotant vegetation has an "amphibian" character.

The lake is generally not much overgrown with aquatic vegetation. Such condition is the consequence of the low concentration of mineral substances, high level of the humic acids, and low water temperature. The macrophyte vegetation is best developed in coves and bays. The bottom of the west shore is overgrown with the vegetation in the form of a narrow belt, while the bottom of the eastern shore is mostly without the vegetation. The macrophyte vegetation of Lake Vlasinsko can be divided into three vertical zones: the zone of submerse vegetation, the zone of the flotant vegetation, and the zone of the vegetation of occasionally flooded areas.

Along with the common bladderwort (*Utricularia vulgaris*), the very rare and relic lesser bladderwort *(Utricularia minor)* can also be found in the vegetation of the peat areas.

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21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14, Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

The diversity and specific habitats of Vlasina caused the high diversity of the flora. Vlasinsko Blato, i.e. the Vlasina peat bog was the largest peat bog habitat in the Balkans, and one of the largest peat bogs in Europe before it was flooded. As such, it represented a true floristic and ecological rarity, and it always attracted many researchers. Mountain peat bogs of the Balkan Peninsula are distinguished as potential centres of floristic diversity. There are precise data on the flora of the Vlasina peat bog that consists of 219 species (without *Bryophyta*). The presence of characteristic peat habitats enabled the survival of the elements of the boreal flora and vegetation. Boreal relic species are the remains of the flora of coniferous forests and peat bogs that spread over vast areas in the Balkan Peninsula during glaciations and interglaciations. Košanin (1910) called Vlasinsko Blato the largest peat bog both in Serbia and on the Balkan Peninsula. The largest part of the former mud was destroyed due to the construction of the reservoir, as was already stressed, however, large areas covered by peat remained around springs and creeks that empty into the lake. Furthermore, a part of the peat detached from the bottom after the flooding of the mud and, since the peat is full of air, it floats on the surface of the water in the form of islets representing a particular attraction. The flora of the Vlasina peat bog is characterised with the presence of specific peat bog plants such as marsh cinquefoil (*Potentilla palustris*), downy birch *(Betula pubescens*), and bogbean (*Menyanthes trifoliata*). Of significant species that live in Vlasina, we will mention some others that represent true floristic rarities: long-stem waterwort (*Elatine triandra*), and water horsetail

(*Equisetum fluviatile*). Some species completely disappeared from the territory of Vlasina. The species Jacob's ladder (*Polemonium caeruleum*), leafybract dwarf rush (*Juncus capitatus*), and northern dragonhead (*Dracocephalum ruyschiana*) disappeared from the flora of Vlasina and by this from the flora of Serbia as well. The presence of endemic and subendemic plant taxa in the wider surroundings of the lake is estimated to 10%. The most distinct are the Balkan and sub-Balkan endemics. The distribution of the Balkan endemics is restricted to the Balkan Peninsula. These are: *Dianthus cruenthus, Silene flavescens, Silene roemeri, Silene waldsteinii, Cynoglossum montanum, Knautia magnifica, Crocus veluchensis, Centaurea kotschyana, Genista depressa, Pinguicula balcanica, Roripa prolifera, Cirsium candlabrum, Aconitum pentheri*, and other species. From the chorological aspect, Balkan endemics belong to different floristic elements, of which the most important are the Moesian endemics. Moesian endemics are *Bruckenthalia spiculifolia, Gentianella bulgarica, Tragopogon balcanicus, Pastinaca hirsuta*, and *Trifolium velenovskyi*. In addition, the presence of endemics that are characteristic for the western parts of the Moeasian province, which are even more important, is also important. Among these extremely rare species are *Centaurea velenovskyi, Peucedanum aequiradium, Verbascum adamovicii, Hieracium macedonicum, Oenanthe stenoloba, Centaurea rhenana* subsp. *tartarea*, and *Allium melanantherum*.

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22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Ichthyofauna

The first studies cite only three species as autochthonous for Lake Vlasinsko: trout (*Salmo trutta*), minnow (*Phoxinus phoxinus*), and Mediterranean barbel (*Barbus meridionalis*). In comparison to that, during more recent studies (1992, 1994, 1995) as much as 11 species were recorded, of which only one, the Mediterranean barbel, as the autochthonous. These are *Salmo trutta* trout; *Oncorhynchus mykiss* rainbow trout; *Cyprinus carpio* carp; *Carassius carassius* crucian carp; *Carassius auratus* goldfish; *Ctenopharyngodon idella* grass carp; *Leuciscus cephalus* chub; *Barbus peloponnesius* Mediterranean barbel; *Rutilus macedonicus* Macedonian roach; *Rutilus basak; Tinca tinca* tench; *Alburnus albidus* white bleak; *Scardinius graecus* Greek rudd; *Ictalurus rebulosus* brown bullhead; *Lepomis gibbosus* pumpkinseed, and *Perca fluviatilis* perch.

The first introduction of allochthonous representatives of the ichthyofauna into the waters of Lake Vlasinsko was done during the middle of 1950's, when Ohrid trout was introduced from Lake Ohrid. At the end of 1970's and the beginning of 1980's the grass carp was introduced into the lake with the purpose to slow down the overgrowing process of the lake, since this is a distinct herbivorous species. The tench, carp, crucian carp, and goldfish were also introduced, as well as, probably accidentally, perch, pumpkinseed, and brown bullhead. Furthermore, the white bleak, and with it probably *Rutilus basak*, Macedonian roach, and chub were also introduced. During the past period, introduction of allochthonous salmonid species was also done, primarily of the rainbow trout and brook trout. There were even attempts to introduce grayling and eel into the lake. One of the alarming facts in the ichthyofauna of Lake Vlasinsko is the disappearance of the minnow. In this way, Lake Vlasinsko, in spite of its extremely good water quality that is suitable for salmonid species, turned into a reservoir with dominant cyprinid species characteristic for lowland waters and reservoirs, where the unplanned stocking played an important role.

Herpetofauna

The formation of the reservoir in the middle of the 20th century by changing the former pond and swamp ecosystems, by regulating and channelling of the river courses that bring water into the lake, and by changing the climate conditions, caused the alteration and structure of the population attributes of the present amphibian and reptile species. The presence of 12 species of amphibians (4 species from the

order Caudata and 8 species from the order Anura), as well as 12 species of reptiles was recorded in the area of Vlasina.

Among the amphibian and reptile fauna in Vlasina, specific significance has the species *Triturus cristatus*.

Ornithofauna

Lake Vlasinsko was formed in the place of the once well-known Vlasina peat bog – the largest peat bog area in Serbia, by many features unique for its significance for the ornithofauna. Particularly valuable is the ornithofauna of the peat bog, swamps, and wet meadows, as well as the numerous migratory bird species that use the large water surface of the lake to rest and feed during the spring, autumn, and winter months. Around 125 species of birds were recorded on Lake Vlasinsko.

The grey heron (*Ardea cinerea*) and cormorant *(Phalacrocorax carbo*) nest in Vlasina, and this is the highest altitude in Serbia where these two species have a nesting colony.

The ornithofauna of the peat bog, swamps, and wet meadows once inhabited the sphagnum peat bog – Vlasinsko Blato. It was distinct for the autochthonous, as well as boreal elements. After the peat bog was flooded at the beginning of 1950's in order to form Lake Vlasinsko, this type of the fauna was destroyed. In the formation of the present fauna observed and recorded in 1990-2000, certainly the greatest (negative) role had the transformation of Vlasinsko Blato into the reservoir. The nesting was hindered for many species, while other simply disappeared from the area. This is the case with the last colony of the crane – *Grus grus* in the Balkan Peninsula. Some species started to come and nest in Vlasina only after the lake was formed. In 1977 and 1978, the tufted duck – *Aythya fuligula*, and the little ringed plover – *Charadrius dubius*, which appeared on small sandbanks, were observed to nest for the first time. Wet meadows are the habitat for a stable nesting population of the whinchat *(Saxicola rubetra)* and yellow wagtail *(Motacilla flava)*.

Theriofauna

The area of Vlasina represents a mosaic complex of ecosystems that provides favourable living conditions for a large number of mammal species. From the family of shrews, the water shrew and the Miller's water shrew (*Neomys foediens, N. anomalus*) are present. The brown hare (*Lepus europaeus*), red fox (*Vulpes vulpes*), pine marten and beech marten (*Martes martes*, *M. foina*), polecat (*Mustela putorius*), and badger (*Meles meles*) are also present.

23. Social and cultural values:

a) Describe if the site has any general social and/or cultural values e.g., fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values:

The natural values, the source of water supply, tourism, and other compatible activities represent and will represent the basis for development of this area. There are three settlements in the surroundings of the lake: Vlasina Rid, Vlasina Stojkovićeva, and Vlasina Okruglica. The settlements in this area bear a sign of insufficient development, characteristic for most of the rural mountain areas in Serbia. In the age structure of the inhabitants within the area, the inhabitants aged 50-69 years prevail, and the least percent in all settlements goes to the youngest members (up to 9 years of age). The rapid decrease of the number of inhabitants is present in the settlements around Lake Vlasinsko, and if this trend would continue with the same pace, some settlements would become uninhabited. This unfavourable age structure contribute to the unpleasant picture on development potentials of this area when human resources are concerned – as principal prerequisites of the development. There are 1400 farmer households in the area of Vlasina, where sheep, cattle, and horses are bred.

The studies in this area revealed that before the Slavs came to the plateau of Vlasinsko Blato, Roman,

Byzantine, and before them Wallachian settlements existed there. In the second half of the 12th century, the rest of these peoples blended with the Slavs. Only some monuments were preserved, turned into various and unusual figures during time, which can be seen in several abandoned village cemeteries. In the area of the natural asset, the following architectural heritage was recorded:

The spatial cultural-historical unit Mahala Rid is positioned on the western side of the lake, on a hill that dominates the surroundings. The unit probably existed already in the Turkish period, but there are no material traces left except the data that 160 years ago a church was built on older foundations. The objects that make this unique spatial and cultural-historical monumental entity originate from the end of the 19th and in the first half of the 20th century.

Mandžina Mahala represents one of the smaller entities. Two groups of four households with residential and supplementary objects were registered. In opposition to Rid, where elements of the town architecture dominate, the rural architectural elements prevail in this settlement, with the evident effort to make them similar to the urban ambient through vividly coloured facades.

Dojčinova Mahala is positioned to the northwest from the lake. As an ambient unity it deserves a full attention primarily for the compactedness of its rural ensemble, and particularly for the values of some of the objects, from older types of the village house through modifications influenced by the urban architecture, to forms with developed facade plasticity. There is a holy tree ("Zapis") on the eastern access road, a large, centuries old beech with an incised cross, fenced with a short stone wall, and which has a significance of a cult object.

Groups and individual objects in Dojčinova Mahala have an exceptional documentary value, and as a unity they have an ambient value as well. In Gadžina Mahala there is also a holy tree ("Zapis") with a stone cross.

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning?

If Yes, tick the box ☑and describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

There are several legends on Vlasinsko Blato and dangers that it hides. One of them tells on the destruction of a "great army". Another is the myth of a *great water bull*, which came out from the swamp at nights, and on the pastures on the shore attacked village cattle. In order to prevent him, the village blacksmith covered the horns of his bull with iron. In this way, the blacksmith's bull overpowered the water bull who never again went into dangerous ventures. His roar was occasionally heard from the swamp, which made the hills shake and triggered giant bubbles on the water surface. This legend amalgamates the motives of traditional cattle breeding and ecological features of the aquatic habitat.

iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:
a) within the Ramsar site:

A large part of the area is covered by Lake Vlasinsko (44%), which is state-owned. Other areas around the lake are more or less equally state-owned or represent private properties.

b) in the surrounding area:

According to the ownership structure of the cadastre municipalities, around 55% of the land is privately owned and around 45% is state-owned or under other forms of ownership.

25. Current land (including water) use:
a) within the Ramsar site:

The basic purpose for which the reservoir Vlasinsko was formed is the production of electric energy. The entire area, according to the water usage plan and water economy infrastructure, was defined and reserved as the source of surface water with built reservoirs. The reservoirs are multipurpose (water supply, energetics, fishery, and tourism) and represent a part of the regional upper Južna Morava system. The purpose and the significance of the reservoir imposes an obligation to protect the entire area and the watershed. Besides, waters are also used for water supply, tourism, and recreation. One of the bearers of cattle breeding, along with the small family cattle farms, is the SIMPO farm, with the capacity of around 10,000 heads. There are around 1400 farming households in the area of Vlasina, where sheep, cattle, and horses are bred. One of the traditional activities of the inhabitants of Vlasina is the trade of medicinal herbs and forest fruits, which are also an important natural resource of the area. Sport fishing is important and is one of the widely practised types of usage of Lake Vlasinsko.

b) in the surrounding area:

Several vegetable cultures are traditionally grown in this area, of which potato, grown primarily on small private farms, is most widely spread. The first bigger farm for production of potato started to operate during 2000. The greatest representative of the economic development is the enterprise for water bottling "Vlasinska Rosa". The factory was established in 1998, with modern work facilities. There are also several fishponds in the surroundings, where rainbow trout is reared. The forests in the surrounding area comprise state-owned forest, private owned forests, and forests under other types of ownership. The forests are managed in keeping with the protection regimes for the Landscape of Outstanding Features "Vlasina". The significant place among economic objects have the sawmills, of which two are particularly important, one at the locality Crna Trava and the other in Božica. The area of southeastern Serbia is the habitat of roe deer, brown hare, and wild boar, and it is planned to organise a wildlife park and new locations for wildlife – first of all for red deer.

26. 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 area of Vlasina is one of the areas with the most intensive depopulation processes in Serbia, with the stagnation of economic growth. The production is decreasing even within traditional trades. On the other side, the expansion of the tourist-recreational pressure causes the sudden and hardly stoppable process of degradation of the natural values of the area. Such actions include sudden and unplanned urbanization, considerable hydro-ameliorative activities, spreading of agricultural complexes, construction of roads, waste depots, etc.

Wet habitats were drained in order to create arable land and meadows, and the aquifers are used for water supply.

The most significant changes, the effects of which are felt even today, occurred after April 9, 1949, when the filling of the lake started. The reservoir was formed after the construction of the dam on the place where the River Vlasina flowed out of the peat bog, among people known as "Vlasinsko Blato", so that 2/3 of the former peat bog was covered with water.

Other various factors that act permanently or occur sporadically in the area of Vlasina are the following: fires unintentionally caused by human factor, intentional fires for the needs of cattle breeding, burning of shore vegetation for fishing, extinguishing, mowing, accumulating waste, collecting of particular species for collections, etc.

The peat is also exploited at this location by the factory for peat processing that operates in scope of the furniture factory "Simpo" from Vranje.

One of the important processes that influence the changes of the configuration of the terrain is the alteration of the lake shore belt under the influence of waves and sedimentation, as well as drastic water level changes in the lake. Besides the changes they cause from the geomorphological aspect, these processes lead to a significant stability disturbance of ecological processes in and around the lake.

The ichthyofauna of Lake Vlasinsko is significantly changed in relation to the natural potentials of these waters, due to the introduction of many species that do not belong to this type of lake. Hydrotechnical interventions (formation of the inflow channels, coalescing of creeks and rivulets) by which some rivers were shifted from one watershed to another, which changed the natural boundaries of the watersheds, prevented the natural migratory movements during spawning and the spawning itself. In this way, Lake Vlasinsko, in spite of the water quality that is appropriate for salmonid species, turned into the reservoir in which cyprinid species, characteristic for lowland waters and reservoirs, prevail.

By flooding of the peat bog for the purpose of Lake Vlasinsko formation, the ornithofauna was disturbed and reduced to adaptable species that live in the immediate vicinity of the lake, on floating peat islands, and around some tributaries of the lake. The nesting of many species was prevented, while some simply disappeared. This was the case with one of the last nesting places of the crane – *Grus grus*. In recent times, sport fishing represents one of the most important factors that are threatening the ornithofauna. The fishermen on the shores of the lake are most numerous exactly in June and July, and these period corresponds to the bird nesting season. Frequent movements along the shore and on water, boating, and the noise disturb the birds in the most sensitive period of their life cycle. Redshank and tufted duck were regular nesting birds of the Vlasina peat bog. Due to the more intensive sport fishing and increased disturbances, these species now nest rarely and occasionally. Mowing of meadows is the potential threat factor for the nesting population of the corncrake.

Regarding the herpetofauna and the theriofauna, the basic threat factor is the alteration of the hydrological regime of the entire area and destruction of aquatic ecosystems.

Urban zones are rapidly spreading in all directions for more than half a century, often with unplanned building, and during the last 20 – 30 years in the closest vicinity around the lake, particularly in the northwestern part. Considering the increasing anthropogenic influence in this area, due to the existing infrastructural objects, it is supposed that in the future the problem of habitat threat will be more prominent, particularly regarding the realisation of the planned activities on building.

b) in the surrounding area:

The intensive alteration of the autochthonous landscapes in Vlasina is taking place for more than two centuries. Until that time, these areas were covered by a dense coniferous forest that was destroyed by the

development of mining. Beech forests, which were formed afterwards owing to the regression of coniferous forests, are mainly cleared. Forest thinning and barrening of the terrain lead to erosion that further degrades the surface layer of the soil. The afforestation of barren areas is done with the allochthonous species of trees. Mainly black and white pine, Douglas-fir, and Norway spruce, the monocultures of which can be seen throughout the area, are used for this purpose in Vlasina. The areas under these cultures are becoming of the same size as the areas under beech forests. The exploitation of the medicinal herbs, edible wild plants, and forest fruits, used in different industries, is excessive and uncontrolled. The classic example of the excessive exploitation is that of the blueberry, in the form of inadequate picking and usage of the so-called combs. The intensive and continuing cattle breeding is a factor the negative effects of which reflect both through destruction and alteration of the vegetation and through intensification of the erosive processes. The water erosion represents one of the major factors of the relief modification and threat in this area, in the form of the surface erosion, vertical cutting, and accumulation of the deposits.

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27. Conservation measures taken:

a) List national and/or international category and legal status of protected areas, including boundary relationships with the Ramsar site:

In particular, if the site is partly or wholly a World Heritage Site and/or a UNESCO Biosphere Reserve, please give the names of the site under these designations.

In 1947, a group of experts of the Natural History Museum of Serbia, in the report on their research of Lake Vlasinsko and its surroundings, proposed that Vlasinsko Blato, for its natural values, should be protected from anthropogenic influence. The report was not positively appraised, and in 1948, the year to follow, the construction of the large Vlasina hydro-reservoir started. The next effort to protect the rest of the Vlasina peat bog were made through the works of V. F. Vasić and J. Šoti. The results of this research were presented to the Republic Institute for Nature Conservation. In the period 1980-1982, the Institute gave propositions for protection of certain parts of Lake Vlasinsko, where the most valuable remains of Vlasinsko Blato were preserved – the representatives of the relic flora and fauna. The propositions for protection, together with sketches of the reserve were on several occasions delivered to the municipality assemblies of Surdulica, Crna Trava, and Bosilegrad. The attempts were made to mark the reserve and place the warning and information boards in several parts around Lake Vlasinsko. The boards were placed on previously chosen locations and some of them remained there until the renewal of the research activities on Lake Vlasinsko in 1995. As the result of the research of a group of experts of the Institute for Nature Conservation of Serbia, the Decree on preliminary protection of the natural asset "Vlasinsko Jezero" was issued in 1999, by which it was attempted to protect the area around the lake, the peat islands, as well as the belt around the lake 500 m wide measured from the highest water level.

The Government of the Republic of Serbia in the Official Gazette No. 30 from April 11, 2006, issued the Decree on Protection of the Landscape of Outstanding Features "Vlasina" over the area of 12,740 hectares, which comprises the entire Ramsar site. Along with the Ramsar site this Landscape of Outstanding Features includes the surrounding hilly-mountain areas. A three-level protection regime was introduced. Most of the Ramsar site is located within the 2nd level protection regime.

Among the most important protection measures related to the Ramsar site are the following:

In the part of the natural asset protected within the 3rd level protection regime, the following is forbidden:

- To exploit and use the peat;
- Ploughing of pastures and natural meadows, as well as ploughing of arable land and doing other actions on places and in ways that can trigger the process of the water erosion and unfavourable changes of the landscape image;

- Disposal of communal, industrial, and building waste, packaging, worn up motor vehicles, other machines and appliances, except communal and agricultural waste from the protected area, which can be disposed in a proscribed manner in places that are designated for this purpose and marked;

- Uncontrolled release of waste waters from households, industrial and other objects.

In areas protected within the 2nd level protection regime, in addition to the bans defined for the 3rd level protection regime, the following is forbidden:

- Works and activities that change the size and appearance of the floating peat islands and threat or damage their biota;

- Usage of springs for water supplying;

- Fishing, except sport fishing and fishing for scientific purposes, or for monitoring of aquatic ecosystems and fish stocks and for regulation of the number of overpopulated and less valuable fish species, in keeping with the fishery improvement programme;

- Unplanned stocking with fish and introduction of fish species that are allochthonous, except restricted and strictly controlled introduction for the purpose of improving the fish stock in the lake;

- Usage of boats and other vessels without the adequate permission.

The 1st level protection regime stipulates the ban of usage of the natural wealth and exclusion of all types of activities and ways of land usage, except for monitoring scientific research, and controlled education. The localities (reserves) protected within the 1st level protection regime are the islands Dugi Del and Stratorija.

In 2000, the area of Vlasina is included into the registry of areas of international importance for birds, according to the **IBA** project, over the area of 22,000 hectares.

b) If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box or boxes as appropriate):

Ia ❑;Ib ❑; II ❑; III ❑; IV ❑; V ❑; VI☑

c) Does an officially approved management plan exist; and is it being implemented?:

A middle-term management programme was issued and accepted for the Landscape of Outstanding Features "Vlasina", for the period 2006-2011, according to which the annual programmes are planned.

d) Describe any other current management practices:

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28. Conservation measures proposed but not yet implemented:
e.g. management plan in preparation; official proposal as a legally protected area, etc.

The basic purpose of the Management Programme is to define the conditions necessary for maintenance of the biological equilibrium, namely the existing typical and specific autochthonous ecosystems, which represent fundamental values as a whole or in some of their components that are the reason for the implementation of the protection regime. This Programme contains measures and solutions planned for the following:

- Conservation, protection, and improvement of natural values and features of the complex of the natural asset "Vlasina" along with the protection of natural resources, where the land usage is coordinated with the conservation of diversity in the area and with the principles of sustainable development;

- Programme of involvement of the local community in activities related to nature and environmental protection;

- Realisation of measures that will guarantee and maintain the planned regime and quality of ground and surface waters;

- Implementation of measures of protection, conservation, improvement, and usage of the vegetation and flora, and particularly of edible and medicinal species;

- Implementation of measures of protection, conservation, improvement, and usage of the fauna;

- Reintroduction of extinct or threatened plant species as a measure for biodiversity protection within the natural asset;

- Programme of monitoring of forest dying;

- Programme of revival of traditional trades;

- Programme of recultivation of existing peat borrow pits;

- Programme of protection and usage of agricultural land.

29. Current scientific research and facilities:

e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

The area of Vlasina even today represents an exceptional scientific proving ground, on which numerous studies and scientific papers bear witness. Coordinated planning and monitoring of scientific research would result in providing answers to many questions of fundamental importance, directives and practical solutions for the future management of the protected natural asset. At the beginning of 21st century, the Institute for Nature Conservation of Serbia realises extensive, multidisciplinary research necessary for the realisation of the Protection Study for the Landscape of Outstanding Features "Vlasina". The basis for continuation of the research is the Management Programme, which includes the programme for biomonitoring of the complex physical-geographical environmental conditions of meteorological parameters, pedological characteristics and the regime of ground waters, as well as rare species of flora and fauna; the research and regular monitoring of physical-chemical and biological characteristics of the lake water; the project of monitoring of the primeval nature using the bioindicator organisms (test organisms – vegetation, flora, fauna); the project of determination of the flora inventory; the project of vegetation mapping of the natural asset; the monitoring of the population dynamics of the natural rarities from the Red List of the Fauna of Serbia (with the priority of monitoring the otter, corncrake, and minnow populations); the project of research of the qualitative and quantitative composition of the fauna of the natural asset. In scope of this last project, the faunistic and ecological research of the vertebrate and invertebrate fauna should be planned, as well as specific individual projects on protection of rare species of birds, minnow, and other significant species, and the programme of systematic, complex research of the theriofauna in this area – the inventory of this faunal group and biocoenological research as the basis for implementation of adequate protection measures.

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitors' centre, observation hides and nature trails, information booklets, facilities for school visits, etc.
The Municipality of Surdulica has included the natural values of Vlasina in its tourist offer. In scope of this programme, the promotional material is printed and distributed (posters, leaflets, etc.), which promotes the nature of Vlasina and the necessities for its protection. Ecological programmes are included in the schedule of the manifestation "Vlasinsko Leto" (Vlasina Summer), held on the shores of Lake Vlasinsko, in addition to entertaining and cultural-artistic programmes

31. Current recreation and tourism:
State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

The richness of the tourist potential of this unique mountain area, with its natural rarities, is out of step with the inclusion of natural and cultural-historical potentials into the development of the tourism through the tourist offer.

Vlasina is one of the most attractive tourist destinations primarily for its natural features: healthy environment, numerous clear waterways, numerous attractive lookouts, high-montane grass terraces, rich flora and fauna, geographical position, cultural-historical localities, and far from negligible potentials of the lake.

The area of Vlasina offers possibilities for the development of various types of tourism: sport-recreational, medicinal, outing, educational, conference, village, hunting, and fishing. It is suitable both for winter and summer tourism. The presence of specific tourist capacities, such as hotels, restaurants, sport playgrounds, camping sites, facilitates the improvement and planned tourist management. Particularly favourable for the development of the village tourism is the presence of villages that preserved their traditional image, way of life, and customs.

From the infrastructural aspect, the development of tourism supports the presence of a number of tourist object, both in the immediate vicinity of the lake and in the wider surroundings.

There are two hotels near the lake, one motel, six resorts, and two camping sites. In addition to that, there are several annexee buildings and weekend settlements.

Starting from the cited potentials for the development of tourism in Vlasina and the fact that some forms of mass tourism are already developed in this area, there is a need to direct the development towards the sustainable development of the area, primarily through planned programmes of eco-tourism. The negative effects of some forms of the mass tourism, which lead to degradation of the natural environment, can be avoided in this way and the commercial profit increased in the same time.

As principal advantages for the development of tourism in Vlasina, the following can be mentioned:

Natural features that signify highly attractive, representative tourist motifs; ecological values: preserved, quiet, and clean natural environment, rich and diverse ecosystems and rural village milieus; possibilities for development and advantages – for its characteristics Vlasina gained the status of development priority in the tourism of the Republic of Serbia, and as a bordering area it also has a role in encouraging the commercial development and prevention of human migrations. Because of the small number of industrial objects and low level of urbanisation in this area, ecological and tourist development can be planned in the most optimal manner.

In the same time, there are some restrictions and obstacles for the tourist development in the area: unfavourable traffic-tourist position for transitory tourists; poorly inhabited areas and the constant process of depopulation because of which households with old inhabitants prevail, which hinders the source of the necessary workforce for the tourism purposes.

32. Jurisdiction:
Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept of Agriculture/Dept. of Environment, etc.

Depending on the authority and the degree of management and usage, this area is managed and cared at several levels of jurisdiction:

a) The Government of the Republic of Serbia with competent ministries

b) The Institute for Nature Conservation of Serbia.

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33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

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34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see 15 above), list full reference citation for the scheme.

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