

Information Sheet on Ramsar Wetlands

Categories approved by Recommendation 4.7 of the Conference of the Contracting Parties.

NOTE: It is important that you read the accompanying *Explanatory Note and Guidelines* document before completing this form.

1. Date this sheet was completed/updated:

February, 1997

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Designation date

Site Reference Number

2. Country: Slovak Republic

3. Name of wetland: Orava River and its tributaries

4. Geographical coordinates: 48° 14' 30" N 19° 28' 30" E

5. Altitude: (average and/or max. & min) 429 - 800 m a. s. l.

6. Area: 865

7. Overview: (general summary, in two or three sentences, of the wetland's principal characteristics)

The site represents the major part of the system of submontane streams within the catchment of Orava River, one of the best preserved and the most important river ecosystems not only in Slovakia, but also in Europe regarding both the conservation of native species diversity and the natural physical conditions. The central part of the site - Orava River - can be considered as the rare stream ecosystem with importance at the level of central Europe.

8. Wetland Type (please circle the applicable codes for wetland types as listed in Annex I of the *Explanatory Note and Guidelines* document)

marine-coastal: A . B . C . D . E . F . G . H . I . J . K

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

man-made: 1 . 2 . 3 . 4 . 5 . 6 . 7 . 8 . 9

Please now rank these wetland types by listing them from the most to the least dominant: M, Ts, W, Tp, Xf

9. Ramsar Criteria: (please circle the applicable criteria; see point 12, next page)

(1a) . 1b . 1c . 1d | (2a) . (2b) . 2c . 2d | 3a . 3b . 3c | (4a) . (4b)

Please specify the most significant criterion applicable to the site:

10. Map of site included? Please tick yes -or- no

(please refer to the *Explanatory Note and Guidelines* document for information regarding desirable map traits)

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

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Please provide additional information on each of the following categories by attaching extra pages (please limit extra pages to no more than 10):

12. Justification of the criteria selected under point 9, on previous page: (please refer to Annex II in the Explanatory Note and Guidelines document)

- 1a The river system and its plant communities (largely submontane floodplain forests) provide the representative example of submontane stream ecosystem with near-natural state, particularly with respect to biocoenoses unique in Western Carpathians.
- 2a The whole river ecosystem offers temporary or permanent habitats for 50 species of vulnerable, rare or endangered vertebrates: mammals 2 (E), 2 (V), 2 (R); birds 3 (E), 28 (V), 7 (R); reptiles 3 (V); amphibians 1 (E), 4 (V); fish 1 (E), 6 (V), 1 (R) and several invertebrate species, e. g. mayflies *Oligoneuriella rhenana*, *Ephemerella notata*; stoneflies *Perla bipunctata* (the only Slovakian site); caddisfly *Micrasema setiferum*.
- 2b The latest research has confirmed that Orava River with its riparian vegetation (rare remnants of submontane floodplain forests and wetland communities) show vital signs of a healthy stream ecosystem rich in genetic and ecological diversity with presence of vulnerable, rare and endangered species that are expected to persist here in viable populations until at least current ecological quality of the ecosystem will be maintained. Water ecosystems exhibit high stability at low trophic levels. Species composition of both ciliate and benthic macroinvertebrate communities indicates β -mesosaprobic level of the water quality and high level of self-purification, particularly in reaches where vegetation is well-developed.
- 4a Fish fauna of the stream system (till 1994) consists of 18 species (more than 1/3 of fish fauna of Slovakia) that belong to 7 families (about half of all fish families in Slovakia). The list of fish taxa is as follows:

Order	Family	Species
Anguilliformes	Anguillidae	<i>Anguilla anguilla</i>
Cypriniformes	Cyprinidae	<i>Alburnoides bipunctatus</i>
		<i>Alburnus alburnus</i>
		<i>Barbus barbus</i>
		<i>Chondrostoma nasus</i>
		<i>Gobio gobio</i>
		<i>Leuciscus cephalus</i>
		<i>Leuciscus leuciscus</i>
		<i>Phoxinus phoxinus</i>
		<i>Rutilus rutilus</i>
		<i>Vimba vimba</i>
	Balitoridae	<i>Barbatula barbatula</i>
Clupeiformes	Thymallidae	<i>Thymallus thymallus</i>
	Salmonidae	<i>Hucho hucho</i>
		<i>Oncorhynchus mykiss</i>
		<i>Salmo trutta morpha fario</i>
Perciformes	Percidae	<i>Perca fluviatilis</i>
	Cottidae	<i>Cottus gobio</i>

Besides two alien species (*Oncorhynchus mykiss* and *Anguilla anguilla*) ichthyofauna of the site is autochthonous, 12 species of them being rare and endangered. The occurrence of several other fish species such as *Gobio uranoscopus* (Cyprinidae), *Zingel streber* (Percidae), *Acerina cernua* (Percidae), *Cottus poecilopus* (Cottidae), *Lota lota* (Gadidae) reported in previous studies was not confirmed by the latest study (1994), but this does not necessarily mean that these species are now missing (the study was based on a limited sample size). The fundamental prerequisite for survival and reproduction of all these fish species is to maintain the physical channel conditions of streams (especially well-preserved banks and river bed with lot of shelters), water quality, quality of riparian vegetation and river continua necessary for successful migrations both within the Orava river ecosystem (including tributaries) and between Orava River and Váh River. The fish stock of this river system shows high autoreproductive abilities. Particularly important are the species which are themselves not rare or endangered, but play a key role in predator-prey interactions or in energy flow through the ecosystem. In Orava River, *Chondrostoma nasus* - an obligatory phytophagous fish that feeds on diatoms and algae and serves as main prey for critically endangered Huchen *Hucho hucho* - is a good example.

4b The Orava River and some of its near-natural tributaries provide autochthonous, rare and endangered fish species with feeding, spawning and nursery grounds of high quality and function also as important migration corridor.

13. General location: (include the nearest large town and its administrative region)
northern part of central Slovakia, Žilina region, Dolný Kubín and Tvrdošín districts, c. 45 km E from Žilina

14. Physical features: (e. g. geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth; water permanence; fluctuations in water level; tidal variations; catchment area, downstream area; climate)

Geology: the bedrock of the whole territory consists of Mesozoic, Palaeogene and Quaternary rocks/sediments associated in the three basic tectonic units: cliff zone, central-Carpathian and (to the lesser extent) outer-Carpathian Palaeogene. The streams flow in their Holocene deposits except for riffle, gully or stepped-bed sections where deeper bedrock is denuded. Quaternary bedrock in the Orava river basin comprises chiefly gravel and either stony (in torrential reaches) or sand-gravel deposits (in more fluvial reaches) derived chiefly from granites and gneisses that were transported from Západné Tatry Mts.

Geomorphology: The largest part of the area might be classified as submontane to montane hilly upland. It belongs mostly to Oravská Vrchovina Mts and marginally also to other geomorphological units: Oravská Kotlina Basin, Oravská Magura Mts, Skorušinské Vrchy Mts, Podtatranská Brázda, Krivánska Fatra Mts, Kysucká Vrchovina Mts. Holocene deposits are accumulated in the form of alluvial floodplains (mostly not very wide), alluvial fans and well-developed river terraces that originate successively in four periods of Pleistocene glaciation. Within the river channel, pattern of erosion and deposition generates some fluvial landforms such as point bars, pools and riffles, small islands, etc.

Origin: The stream system is of natural origin.

Hydrology: The stream system experiences relatively wide seasonal fluctuations of water discharge because of the specific Palaeogene hydrogeology of the region. These fluctuations are in part reduced by Orava Reservoir and Tvrdošín Compensating Reservoir immediately below. The annual discharge is $34 \text{ m}^3 \cdot \text{s}^{-1}$, peak discharges occur in spring (April), minima in January. The area of the Orava River watershed is 1991.8 km^2 , Slovak part contributing 1632.5 km^2 and Polish part 359.3 km^2 .

Soils: Geomorphological and geological factors seem to be the most important for regional pedogenetic processes. A variety of soil types has evolved here, particularly eutric, dystric and stagno-gleyic cambisols, eutric fluvisols, gleysols, additionally planosols and rendzinas.

Water quality: Appropriate indices show good quality of water in the streams of the site, including Orava River itself. According to State Standards of water quality (STN 757221), the river water belongs to the second class in terms of the dissolved oxygen regime and exhibits good self-purification ability. In some reaches the values of N-NO_2 , $\text{C}_{90} = 0.03 \text{ mg} \cdot \text{l}^{-1}$ do not exceed the standard limits for drinking water. The BOD limits are positive; in the major part of the stream system standards for the second class of water quality have not been exceeded and limits for heavy metal concentrations did not exceed the first class of water quality.

Water depth: The water depth varies greatly in time and space. In tributaries the water level ranges between 0.15 - 0.6 (1) m, in Orava River between 0.3 - 2 m (in lowest reaches even greater depth).

Climate: The climate of the area is a transition between the moderately warm and humid and moderately cold climatic type. Average air temperatures vary between $-7 \text{ }^\circ\text{C}$ to $-4 \text{ }^\circ\text{C}$ in January and $12 \text{ }^\circ\text{C}$ to $18 \text{ }^\circ\text{C}$ in July. Average annual rainfall is 800 - 1,200 mm.

15. Hydrological values: (groundwater recharge, flood control, sediment trapping, shoreline stabilisation, etc.)

Due to great self-purification ability the stream system in the area plays an important role in the municipal waste water treatment and via the Orava River high-quality water contributes also to the water quality of Váh River. The stream system with riparian vegetation provides the vital food supply, breeding grounds and other habitats for both resident and temporary members of local animal communities. Orava River and its riparian vegetation belt play a key role as an important hydric biocorridor and/or biocentre particularly for birds, fishes and benthic macroinvertebrates. The river and its valley is inhabited by a variety of less-disturbed native ecosystems and well-preserved plant communities with fragments of submontane or montane floodplain forest. It meets also some further requirements for effective conservation of indigenous taxa and groups of organisms confined to these rare and endangered habitats.

16. Ecological features: (main habitats and vegetation types)

Indigenous riparian plant communities such as *Alnetum incanae carpaticum*, *Petasitetum hybridi* (the dominant one), fragments of *Valeriano sambucifolii-Caricetum davalianae* have great biological, sanitary and landscape-ecological importance. The riparian vegetation belt is nearly continuous and mostly of edge character. However, several patches of floodplain forest persisted here and show also well-developed shrub and

herb layer. Riparian vegetation of the river belongs to association *Alnetum incanae* dominated by *Salix fragilis*, *Prunus padus* subsp. *padus*, in shrub layer by *Salix purpurea*, *Corylus avellana*, *Viburnum opulus*, *Frangula alnus*, *Rubus idaeus*, *Lonicera xylosteum*, etc. The tree and shrub formations are interspersed with herbaceous communities such as *Petasitetum hybridi* together with the fragments of *Valeriano sambucifolii-Caricetum davaliana* in which some protected plant species occur (e. g. *Dactylorhiza majalis* and *Trollius altissimus*). The river islands are of special value from the scientific and conservation point of view as they represent the course of natural succession in alluvial habitats in various stages of the dynamic fluvial successional sere. Riparian vegetation along the river tributaries belong to the *Alnetum incanae* as well, but with greater proportion of shrub formations that are locally disturbed. The surrounding landscape is to various extent influenced by settlements and their infrastructure, agricultural and forestry activities.

17. Noteworthy flora: (indicating, e. g. which species/communities are unique, rare, endangered or biologically important, etc.)

Thorough floristic inventory has not been performed yet. Among the rare or endangered species, following can be mentioned: *Dactylorhiza majalis*, *D. fuchsi*, *Trollius altissimus*, *Hippochaete hyemalis*, *Listera ovata*, *Utricularia* sp. and relatively abundant population of *Epipactis palustris*. Sites in deep channel downcuttings in the limestone bedrock are inhabited by open woodland communities with the specific flora (calciphilous herbs and grasses such as *Calamagrostis varia*, *Peucedanum cervaria*, *Laserpitium latifolium*, *Inula ensifolia*, *Epipactis purpurea*, etc.). The presence of several orchid species and other rare or endangered species can be expected.

18. Noteworthy fauna: (indicating, e. g. which species are unique, rare, endangered, abundant or biogeographically important; include count data, etc.)

Fauna of the area includes many aquatic and semiaquatic taxa and communities of distinct montane and submontane stream ecosystems. Fauna is considered important as to its high diversity and well-preserved state of less disturbed autochthonous zoocoenoses. Many species are regarded as unique, rare, vulnerable or endangered not only in Slovakia but also in Europe. The area is a part of the most important ecosystem that provides favourable habitats for several taxa of these groups on a sustainable basis. Faunistical studies of local wetland habitats have not been completed yet. It is necessary to monitor the changes in important populations of invertebrates and vertebrates more regularly. Results of earlier research imply that the site provides favourable temporary and permanent habitats and feeding grounds for more than 50 rare or endangered vertebrate species: mammals 2 (E), 2 (V), 2 (R); birds 3 (E), 28 (V), 7 (R); reptiles 3 (V); amphibians 1 (E), 4 (V); fish 1 (E), 6 (V), 1 (R) and several invertebrate species (e. g. mayflies *Oligoneuriella rhenana*, *Ephemerella notata*; stonefly *Perla bipunctata* - the only Slovakian finding place; caddisfly *Micrasema setiferum*).

The study of all groups of invertebrates has not finished yet but vertebrates need regular monitoring as well. The vulnerable, rare or endangered species of local fauna are in the following list:

Class	Species	Red List Category
Mammals	<i>Lutra lutra</i>	E
	<i>Sicista betulina</i>	E
	<i>Putorius putorius</i>	V
	<i>Sciurus vulgaris</i>	V
	<i>Neomys anomalus</i>	R
	<i>Sorex alpinus</i>	R
Birds	<i>Ixobrychus minutus</i>	V
	<i>Ardeola ralloides</i>	R
	<i>Ardea cinerea</i>	V
	<i>Ardea purpurea</i>	E
	<i>Ciconia ciconia</i>	I
	<i>Ciconia nigra</i>	V
	<i>Anas crecca</i>	V
	<i>Anas querquedula</i>	V
	<i>Anas clypeata</i>	V
	<i>Netta rufina</i>	R
	<i>Bucephala clangula</i>	R
	<i>Milvus milvus</i>	E
	<i>Haliaeetus albicilla</i>	E
<i>Accipiter nisus</i>	V	

	<i>Accipiter gentilis</i>	V
	<i>Aquila chrysaetos</i>	E
	<i>Aquila pomarina</i>	V
	<i>Falco subbuteo</i>	V
	<i>Perdix perdix</i>	V
	<i>Rallus aquaticus</i>	V
	<i>Porzana porzana</i>	V
	<i>Crex crex</i>	V
	<i>Actitis hypoleucos</i>	V
	<i>Tringa ochropus</i>	R
	<i>Tringa totanus</i>	V
	<i>Sterna hirundo</i>	V
	<i>Columba oenas</i>	V
	<i>Bubo bubo</i>	V
	<i>Anthus spinoletta</i>	R
	<i>Motacilla flava</i>	V
	<i>Luscinia luscinia</i>	R
	<i>Phoenicurus phoenicurus</i>	V
	<i>Saxicola rubetra</i>	V
	<i>Saxicola torquata</i>	V
	<i>Turdus iliacus</i>	R
	<i>Acrocephalus arundinaceus</i>	V
	<i>Muscicapa striata</i>	V
	<i>Lanius collurio</i>	V
	<i>Carpodacus erythrinus</i>	R
Reptiles	<i>Lacerta vivipara</i>	V
	<i>Natrix natrix</i>	V
	<i>Vipera berus</i>	V
Amphibians	<i>Triturus vulgaris</i>	V
	<i>Triturus alpestris</i>	V
	<i>Triturus montandoni</i>	E
	<i>Salamandra salamandra</i>	V
	<i>Rana lessonae</i>	V

Fishes

[categories according to Red List (HOLČIK, BASTL 1996); O = Orava River, S = Slovakia, E = Europe]

	O	S	E
<i>Phoxinus phoxinus</i>	-	I	V
<i>Cottus gobio</i>	I	-	V
<i>Hucho hucho</i>	E	E	E
<i>Gobio gobio</i>	-	-	R
<i>Leuciscus leuciscus</i>	-	I	I-V
<i>Thymallus thymallus</i>	I	-	V
<i>Barbus barbus</i>	-	-	V
<i>Vimba vimba</i>	R	I	I-R
<i>Alburnoides bipunctatus</i>	-	R	V-E
<i>Chondrostoma nasus</i>	I	-	I-V
<i>Salmo trutta morpha fario</i>	-	-	V
<i>Barbatula barbatula</i>	-	-	R-V

Invertebrates:

(only endangered species found during casual studies are listed):

- Oligoneuriella rhenana* (mayfly)
- Ephemereilla notata* (mayfly)
- Perla bipunctata* (stonefly)
- Micrasema setiferum* (caddisfly)

19. Social and cultural values: (e. g. fisheries production, forestry, religious importance, archaeological site, etc.)

The area has been used for outdoor recreation, fishing, research and environmental education including field excursions and training for university students. Negative impacts of these activities seem to be insignificant. In the past, Orava River was used for transport of timber and for rafting. The current human exploitation of local wetlands could be reconciled with the effective biodiversity and landscape conservation on the basis of specific limits for sustainable use of the whole stream system.

20. Land tenure/ownership of:

(a) site:

Watercourses and their riparian belts are in state ownership. Another wetland segments (floodplain forests, wet meadows) are in state or private ownership.

(b) surrounding area:

Fields, meadows and pastures are mostly private. Forests are mostly in state ownership, partly private.

21. Current land use:

(a) site

While local wetlands are not exploited intensively, the fundamental river ecosystem processes and functions (including maintenance of biological diversity of rare or endangered species) remain almost unaltered.

Current use: angling, regulated hunting; recreation activities (rowing and swimming), industrial water consumption (the amount of water consumption is very small, water is treated before its discharge to recipient) and gravel extraction to a small extent.

surroundings/catchment

The territory of the site is rather sparsely inhabited (c. 70 - 80 inhabitants.km⁻²) with irregular distribution of smaller to medium-size settlements. Small-scale industrial enterprises include particularly those of metallurgy, textile, electric engineering, foodstuff production and woodworking. Agricultural production is oriented towards the cultivation of vegetables, root crops, some grain crops and livestock grazing.

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

(a) at the site

The water quality in wetlands is adversely affected by municipal wastewater draining but stream ecosystems are still able to cope with these effects particularly owing to their great self-purification capacity. The influence of wastewater gradually becomes less significant due to growing number of efficient wastewater treatment plants. Some risk is induced by atmospheric and agricultural non-point sources of pollution but the situation is getting better due to more efficient gas emission control in industrial plants and gradual shift in use of household heating sources towards the gas and electric energy. The specific danger for the river ecosystem could be caused by industrial pollution accidents.

(b) around the site

The urbanization of the river basin with infrastructure development and gradual deforestation in the past were probably the most adverse impacts on nature in the area. Deforestation and tillage reached the peak in the past, now some tracts of arable land are abandoned or reforested so as to improve the water retention capacity of the landscape. The chemical pollution from traffic and agriculture has contributed to the pollution of the area.

23. Conservation measures taken: (national category and legal status of protected areas - including any boundary changes which have been made; management practices; whether an officially approved management plan exist and whether it has been implemented)

The wetlands in question are the most important constituents of the system of ecological stability in the sense of "Regional System of Ecological Stability of the District Dolný Kubín" (1994), a landscape and nature conservation tool valid also for Tvrdošín district. Most of the wetlands are included in protected sites according to Nature and Landscape Conservation Act (No. 287/1994). The state nature conservancy authorities adopt feasible management practices in protected areas on the basis of both legislation and results of research and monitoring of the stream system. The conservation of wetlands without special conservation status is ensured by the articles of the above-mentioned Act (§ 7b, 8, 9, 25, 26) and by the following tools of the state nature conservation administration:

- the updated proposal of the preventive measures of nature conservation in the former Dolný Kubín district (1989)

- the strategy, directions and aims of state environmental policy in the former Dolný Kubín district (1994)
 - the second level of protection (§ 13 of the Act):
 - the reach of Orava River from the mouth of Žaškovský Potok brook to confluence with Váh River (the buffer zone of Malá Fatra National Park)
 - the reach of Zázrivka Brook from the village Zázrivá to the mouth of Čremoš Brook (the buffer zone of Malá Fatra National Park)
 - the third level of protection (§ 14 of the Act):
 - the reach of Zázrivka Brook from the mouth of Čremoš Brook to the confluence with Orava River (Malá Fatra National Park)
-

24. Conservation measures proposed but not yet implemented: (e. g. management plan in preparation; officially proposed as a protected area, etc.)

The part of the Orava River between the towns Tvrdošín and Kral'ovany has been proposed as a protected site by the Regional Office at Žilina (§ 16 of the Act). At present, the study aimed at integrated water management of streams in the Orava River basin has been compiled with regard to stream conservation and their sustainable use. The proposal of particular preventive and curative measures that ensure sustainability of natural and ecological values of the Orava River basin will be the result.

25. Current scientific research and facilities: (e. g. details of current projects, existence of field station, etc.)

The wetland complex has been monitored by the regional nature conservation organizations. University students have conducted some special inventories in few wetland sites. Since 1995, the research of amphibians has been done in the Orava River basin. The avifaunal research has been well-organized with several specialists of nature conservation organizations, NGOs and individual volunteers involved. Several authorities have participated on the integrated water management study of the Orava River basin. The research of otters has been one of the special interest. The whole area needs more intensive research of flora and invertebrates.

26. Current conservation education: (e. g. visitors centre, hides, information booklet, facilities for school visit, etc.)

The wetland complex is important for ecological education of different groups of population, e. g. university students (excursions, data acquisition for theses), pupils and students of secondary schools (regular excursions, talks, weekend camps of landscape conservationists, etc.). A seminar "Orava River and its natural values" held in November, 1995 was one of the most important special educational events presenting the results of various researches within the Orava River basin to the broader public.

27. Current recreation and tourism: (state if wetland is used for recreation/tourism; indicate type and frequency/intensity)

The recreation use is unimportant and the area is used for regulated fishing, hunting, individual recreation including rafting and walking.

28. Jurisdiction: (territorial e. g. state/region and functional e. g. Dept. of Agriculture/Dept. of Environment, etc.)

State (Slovak Republic): Ministry of Environment, Ministry of Agriculture, Ministry of Interior.
Regional: Regional Office at Žilina, District Office at Dolný Kubín and Tvrdošín.

29. Management authority: (name and address of local body directly responsible for managing the wetland)

Administration of Malá Fatra National Park, SK-013 03 Varín, phone 421-89-692311, fax 421-89-692 101
Slovak Environment Agency, Centre of Nature and Landscape Conservation, M. M. Hodžu 11, SK-03101 Liptovský Mikuláš, phone 421-849-24551, fax 421-849-24557

30. Bibliographical references: (scientific/technical only)

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