

The importance of impacts of the proposed motorway D1 Turany - Hubová on species, habitats, Natura 2000 sites and landscape

specialist opinion

Authors:

Ing. Ján Topercer, PhD, Comenius University, Botanical Garden at Blatnica and Institute of Nature Conservation

Ing. Marián Jasík, Institute of Nature Conservation at Banská Bystrica

RNDr. Daniel Dítě, PhD, Slovak Academy of Sciences, Institute of Botany at Bratislava and Institute of Nature Conservation

RNDr. Dana Bernátová, PhD, Comenius University, Botanical Garden at Blatnica

Mgr. Jozef Ridzoň, SOS/BirdLife Slovakia at Bratislava

Blatnica, Banská Bystrica, Ružomberok, Bratislava
November 2009

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1. Introduction

The aim of this work is: 1) to assess the importance of the key impacts of the approved "above ground-tunnel" variant of the motorway D1 Turany - Hubová (hereafter referred to as the "approved variant") on species and habitats of Community and national importance, Natura 2000 sites and landscape, and 2) to recommend appropriate changes in the project of this D1 motorway section.

We undertook this work because we found the earlier assessments of the approved variant seriously flawed, data-deficient and methodically insufficient, as well as not complying with Article 6 of Directive 92/43/EEC dated 21. 5. 1992 on the Conservation of natural habitats and wild fauna and flora (hereafter referred to as the "Habitats Directive") and with Directive 85/337/EEC on the Assessment of the effects of certain public and private projects on the environment, amended by Directives 97/11/EC and 2003/35/EC (hereafter referred to as the "EIA Directive").

The other reasons for undertaking this study were: the fact that the national and regional authorities, i.e. the Ministry of Transport, Post and Telecommunications (MTPT) and district environmental offices (DEO) at Ružomberok, Martin and Dolný Kubín have not implemented even those mitigation and compensation measures, which were recommended in the study "The assessment of importance of impacts of the proposed motorway D1 Turany - Hubová on Natura 2000 sites" (Hodnotenie významnosti vplyvov navrhovanej diaľnice D1 Turany - Hubová na územia sústavy Natura 2000) by PEŤKOVÁ & MIKA 2007 (hereafter referred to as "the study by PEŤKOVÁ & MIKA") and that another more acceptable variant of the D1 has already been assessed.

Our information sources include both published (letter from Friends of Earth-CEPA dated 4. 5. 2009, and cited literature) and our own extensive unpublished data, relevant laws and professional standards. These include:

- The Habitats Directive,
- The Birds Directive,
- methodological guidance on the provisions of Article 6 of the Habitats Directive and others),
- the final statement of the Ministry of the Environment of the Slovak Republic about the environmental impact assessment of the project "Motorway D1 Martin - Ľubochňa" No. 1832/02-4.3 of 12. 11. 2002,
- the documentation for the land-use permit for the "Motorway D1 Turany - Hubová" (Dopravoprojekt, a. s., division Bratislava, September 2007, approved by resolution No. 753 of the Government of the SR on 5. 9. 2007),
- the study by PEŤKOVÁ & MIKA,
- the decisions of the nature protection and construction authorities: the land-use permit issued by the town of Ružomberok on 18. 1. 2008 No. SP-4050/2007-Ta1-1-Ta; building permit issued by the MTPT on 3. 3. 2009 No. 01934/2009-SCDPK/9102; the decisions of DEO Ružomberok on 22. 7. 2008 No. OP 2008/1250-11; DEO Martin on 24. 7. 2008 No. ŽP-2008/01368-OPaK-Mu and DEO Dolný Kubín on 29. 7. 2008 No. ŽP-2008/00968-STJ).

Spatially our interest is focused particularly on the section Šútovo - Rojkov as a section with both the largest volume of the most demanding construction works and the highest concentration of nature and landscape assets. Temporally we deal mainly with the long-term and persistent impacts that pose the risk of destruction of ecological characteristics of sites and are likely to cause substantial changes in the biological diversity, structure and functions of ecosystems. Materially we would like to document primarily the most powerful impacts on the conservation status of species, habitats, SACs and landscapes with their relative importance, directions, rates, contexts/domains and possibilities of their compensation or mitigation. Methodologically we follow a critical approach focused on revealing errors,

uncertainties, implicit assumptions, undetected and/or underestimated facts and other weaknesses of the approved variant and its earlier assessments.

2. Spatial, temporal and evolutionary context

The area of interest embraces one of the largest, most compact and most valuable clusters of natural regions of Community importance in the Western Carpathians (SKUEV 0238 Veľká Fatra, SKUEV 0252 and SKCHVU 013 Malá Fatra, SKUEV 0253 River Váh, SKUEV 0243 River Orava). Simultaneously, a “multi-level” busy crossroads of biogeographical and ecological corridors of European importance operates here, maintaining the connectivity between the Natura 2000 sites within this part of the Carpathians and outwards to the adjacent regions. It consists of: 1) a pair of terrestrial-hydric corridors of supraregional importance with the unique confluence of the two large submontane rivers Orava and Váh, 2) a long and intricate contact zone of three large mountain regions (Malá Fatra Mts, Veľká Fatra Mts and through Šípska Fatra Mts also Chočské Vrchy Mts) along the deep valleys of the Váh and Orava Rivers, 3) contact between several regionally important forest and non-forest ecotones along the boundaries of mountains and basins (particularly Fatra Mts and Turčianska Kotlina Basin).

This complex shows representativeness for mountain, forest, rock, wetland and water biota of the Western Carpathians and is endowed with **high landscape heterogeneity, an extraordinary diversity of habitats** (at least **26** types of Community and national importance) and plant and animal **species** (tens of rare, endangered, endemic or otherwise important species, some of them surviving only in minimum viable populations), concentrated **connectivity** and important **refugial functions**. Around the proto- and early-historic trade routes along the valleys of Váh and Orava Rivers since the early Middle Ages, a diffuse colonisation has taken place (small mountain settlements, pastoralism, small-scale agriculture, logging and transportation of timber, fishing) and since the end of 19th century the expansion of long-distance transportation has led to the today's multimodal corridor exerting a cumulative barrier effect and other negative influences on the biota and landscape.

As the approved variant of D1 might considerably strengthen those influences, it is necessary to point out that unlike transport infrastructure, 1) the “production process” (evolution) of natural value operates on a time scale of thousands to tens of thousands years; 2) its results are largely **site- or structure-specific** (closely confined to particular places and/or structures of landscape, e.g. Rojkovské Rašelinisko Mire) and thus **non-transferable**. Therefore **the losses of these specific natural features could be neither compensated** nor mitigated (or only to a very limited extent) and some of them may have a substantial impact on Slovak as well as European natural heritage. Moreover, these specific natural features are now largely in the position of **valuable remnants brought to the brink of long-term viable persistence** (particularly in valley bottoms) precisely by the fragmentation caused by earlier transport and water construction.

3. Impacts on species, habitats and Natura 2000 sites

3.1. SKUEV 0252 Malá Fatra

From the habitats that are subject to conservation in SAC Malá Fatra, we found that the routing of the approved variant of D1 **interferes not only** with habitats 9130 *Asperulo-Fagetum* beech forests and 9110 *Luzulo-Fagetum* beech forests, **but also with habitat 6430 Hygrophilous tall herb fringe communities** (fragment with an area of c. 0.05 ha) and **priority habitats 91E0* Mixed ash-alder alluvial forests** of temperate and boreal Europe (area of c. 0.4 ha in the lower part of the Suchie valley; a **specific segment** hosting a rare population of *Erysimum hungaricum*, the overall adverse effect would be **significant and not compensable**) and **9180* Tilio-Acerion forests on slopes, scree and ravines** (at the mouth of the Suchie valley, area of c. 0.3 ha), that **are not mentioned in the study by PEŤKOVÁ & MIKA**. **Outside the SAC** we found that the routing interferes also with **habitats of**

Community importance 6510 Lowland hay meadows (area of c. 1.5 ha) and 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (area of c. 0.2 ha).

Of the species that are subject to conservation in SAC Malá Fatra, we found that the routing of approved variant of D1 **interferes also with *Rosalia alpina*** (construction would destroy c. 0.1 ha of its reproductive sites in the Suchie Valley) that is not mentioned in the study of PEŤKOVÁ & MIKA. **Of the species of Community importance that are not** subject to conservation in SAC Malá Fatra and **are not recorded** in the study by PEŤKOVÁ & MIKA, we have discovered the following (the type and intensity/importance of expected impact is specified in brackets after the species' name):

- *Erysimum hungaricum* (one of the two known sites in SAC Malá Fatra - significant non-compensable loss of more than 50 % of the population size in the entire SAC),
- *Coronella austriaca* (destruction of c. 1 ha of habitat outside the SAC),
- *Ciconia nigra* (disruption of c. 10 % of home range of 1 pair and c. 20 % of its hunting grounds),
- *Pernis apivorus* (disruption of c. 10 % of home range of 1 pair and c. 20 % of its hunting grounds),
- *Aquila chrysaetos* (disruption of c. 5 % of home range of 1 pair and c. 10 % of its hunting grounds),
- *Falco peregrinus* (disruption of c. 5 % of home range of 1 pair and c. 5 % of its hunting grounds),
- *Bonasa bonasia* (disruption of c. 40 % of home range of 1 pair),
- *Crex crex* (disruption of habitats of 1 - 2 pairs outside the SPA),
- *Bubo bubo* (disruption of c. 5 % of home range of 1 pair and c. 10 % of its hunting grounds),
- *Caprimulgus europaeus* (disruption of c. 10 % of home range of 1 pair and c. 20 % of its hunting grounds),
- *Dendrocopos leucotos* (disruption of c. 30 % of home range of 1 pair),
- *Alcedo atthis* (disruption of wintering and hunting grounds of 1 individual outside the SPA),
- *Ficedula parva* (disruption of c. 20 - 30 % of home range of 2 pairs).

Main weaknesses and not assessed/inappropriately assessed impacts in the study by PEŤKOVÁ & MIKA:

3.1.1. The authors have carried out **only a short-term survey outside the vegetation and reproduction period that is not sufficient for the given purpose** (as they have admitted themselves several times).

3.1.2. The authors have **omitted/excluded from the assessment three habitats of Community importance that are** subject to conservation in the SAC (**6430, 91E0*** and **9180***, i.e. **2 priority habitats, in 1 of them an imminent important impact**), and 1 species of Community importance (*Rosalia alpina*, impact less important).

3.1.3. The authors have seriously **underestimated** the risk of **significant changes in species composition** and subsequent **deterioration of habitats** due to both extinction of sensitive native species (*Erysimum hungaricum*) and **colonisation of expansive and invasive species** (*Aster lanceolatus*, *Calamagrostis epigejos*, *Cirsium arvense*, *Fallopia japonica*, *Impatiens glandulifera*, *I. parviflora*, *Solidago canadensis*, *S. gigantea* and others) as a result of extensive construction works whose impacts can propagate up to several tens of metres into the adjacent habitats. This might be demonstrated by the long-term data from Turčianska Kotlina Basin (BERNÁTOVÁ et al. 2006, TOPERCER 2003) and from Veľka Fatra Mts (KLIMENT et al. 2008b).

3.1.4. The authors have seriously **underestimated** the risk of **significant losses and fragmentation** of habitats of national and Community importance as well as related risk of **significant loss in population connectivity** in many species of national and Community importance (**large carnivores**, ungulates, bats, ground-dwelling mammals, amphibians and others) as a consequence of **the barrier effect** exerted by the construction, traffic and

maintenance of the approved variant of the D1. High heterogeneity, a high degree of specificity in local habitats and their topological relationships have elicited adaptive responses in the mobility pattern of local populations in the form of **preferred migration and dispersal routes**.

Apparently these routes are fixed not only ecologically, but also behaviourally and genetically, as indicated by the **distinct zones of highest transport mortality** of large mammals on the existing roads (Turany - Ratkovo and Kraľoviansky meander - Kraľovany, KALAŠ unpubl., Fig. 14). The number of collisions is already **large** (within the 3.6 km long section Turany – Ratkovo in 1997 - 2009 a total of 67 cases, 8 of them involving *Ursus arctos* - KALAŠ unpubl., KALAŠ 2009).

As the collision sections are also rather long, the **contribution of the approved variant to the fragmentation of habitats and disruption of the migration routes would be highly important and leaving very little room for mitigation measures (fencing and ecoducts)**. Though they could reduce mortality, they would simultaneously **to a much greater extent reduce the connectivity** since the available several km wide migration routes would be **effectively narrowed by a factor of 100** using proposed **fences** and an ecoduct. Besides, the position of the proposed ecoduct in the Kraľoviansky meander does not correspond with the importance of migration routes according to the available knowledge on migration and the mortality of large mammals (KALAŠ unpubl., KALAŠ 2009). The ecoduct has been proposed on the less important migration route, while the most important section Turany – Ratkovo remains unsolved, which **considerably increases the risk of connectivity losses**. Moreover, the approved variant would interfere with less disturbed **core parts of home ranges** in species as *Ursus arctos*, *Lynx lynx*, and *Felis silvestris*, particularly in the mouth of the Suchie Valley (Fig. 12) and in the Kraľoviansky meander.

3.1.5. The authors **have not assessed the important and persistent impacts** of the approved variant on the **structure and appearance of the Upper Váh River valley landscape**, on its perception and on the **opportunities for long-term sustainable multiple use of its ecosystem services** by visitors and **local residents** in Ratkovo, Šútovo and Kraľovany-Rieka (not to mention the other aspects of their environment, property rights etc).

3.2. SKUEV 0238 Veľká Fatra

Of the habitats that **are subject to conservation** in SAC Veľká Fatra, we found the following habitats **threatened by the routing** of the approved variant of D1, which are **not mentioned in the study by PEŤKOVÁ & MIKA** (in addition to habitat 9130 *Asperulo-Fagetum* beech forests and not counting habitats 6430 and 7230 from Nature Reserve Rojkovské Rašelinisko Mire - see part 3.4. and habitat 6430 from below Kopa Mt. - see Fig. 6):

- **habitat 9150** Medio-European limestone beech forests (*Cephalanthero-Fagion*, area of c. 0.7 ha, Fig. 2)
- **priority habitat 9180*** *Tilio-Acerion* forests on slopes, screes and ravines (in the unnamed small ravine on the northern slope of Mt. Kopa, area of c. 0.2 ha, Fig. 3 - 5) with several smaller **hard water spring habitats including 2 rare patches** with presence of *Silene pusilla*, *Arabis soyeri* subsp. *subcoriacea*, *Pinguicula vulgaris* and *Swertia perennis* subsp. *alpestris* (compare KLIMENT et al. 2008a, Fig. 3 and 13; the only known segments of this type in SAC, the adverse influence would be **significant and non-compensable** and would affect the water regime also upstream in the ravine).

Outside the SAC we also found following **habitats of Community importance** in the routing: 6510 Lowland hay meadows (area of c. 3 ha, Fig. 7) and 6430 Hygrophilous tall-herb fringe communities (area of c. 1 ha).

In addition to the **species that are** subject to conservation in SAC Veľká Fatra, we found following species **threatened by the routing** that are not mentioned in the study by PEŤKOVÁ & MIKA: *Cypripedium calceolus* (construction would destroy c. 20 individuals with their habitat and damage the habitat of another c. 30 individuals in the local rare population), *Carabus*

variolosus (construction would destroy c. 0.2 ha of its habitat in the unnamed small ravine on the northern slope of Mt. Kopa) and *Rosalia alpina* (construction would destroy c. 0.1 ha of reproduction sites at the base of the northern slopes of Mt. Kopa). The reproduction site of 10 - 20 individuals of Carpathian Newt *Lissotriton (Triturus) montandoni* (Fig. 8) in the hard water springs at the base of the northern slopes of Mt. Kopa would be destroyed as well.

Of the species of Community importance that are not subject to conservation in SAC Veľká Fatra and are not reported in the study by PEŤKOVÁ & MIKA, we have recorded the following (the type and intensity/importance of expected impact is specified in brackets after the species' name):

- *Ciconia nigra* (disruption of c. 10 % of home range of 1 pair and c. 20 % of its hunting grounds),
- *Pernis apivorus* (disruption of c. 5 % of home range of 1 pair and c. 20 % of its hunting grounds),
- *Aquila chrysaetos* (disruption of c. 10 % of home range of 1 pair and c. 15 % of its hunting grounds),
- *Falco peregrinus* (disruption of c. 10 % of home range of 1 pair and c. 10 % of its hunting grounds; the routing leads as close as c. 500 m to the breeding site)
- *Bonasa bonasia* [disruption of c. 50 % of home range of 2 pairs (1 with breeding site exactly in the projected routing) and c. 20 % of its hunting grounds],
- *Crex crex* (disruption of habitats of 1 - 2 pairs),
- *Bubo bubo* (disruption of c. 5 % of home range of 1 pair and c. 10 % of its hunting grounds),
- *Aegolius funereus* (disruption of c. 10 % of home range of 1 pair),
- *Glaucidium passerinum* (disruption of c. 20 % of home range of 1 pair with breeding site only a few metres from the projected routing),
- *Strix uralensis* (disruption of c. 10 % of home range of 1 pair),
- *Caprimulgus europaeus* (disruption of c. 10 % of home range of 1 pair and c. 15 % of its hunting grounds),
- *Dendrocopos leucotos* (disruption of c. 10 % of home range of 2 pairs),
- *Alcedo atthis* (destruction of breeding site of 1 pair and disruption of wintering grounds of 1 - 3 individuals),
- *Ficedula parva* (disruption of c. 10 - 20 % of home ranges of 2 pairs).

Main weaknesses and not assessed/inappropriately assessed impacts in the study by PEŤKOVÁ & MIKA:

3.2.1. The authors have carried out **only a short-term survey outside the vegetation and reproduction period that is not sufficient for the given purpose** (as they have admitted themselves several times).

3.2.2. The authors have **omitted/excluded from the assessment two habitats of Community importance that are** subject to conservation in the SAC (**9150 and 9180***, i.e. **1 priority habitat, 1 with important influence**), and 3 species of Community importance (*Cypripedium calceolus*, *Carabus variolosus* and *Rosalia alpina*, influences less intense).

3.2.3. The authors have seriously **underestimated** the risk of **significant changes in species composition** and subsequent **deterioration of habitats** due to both decline of sensitive native species (*Phyllitis scolopendrium*, *Silene pusilla*, *Bonasa bonasia*, *Ficedula parva*, *Glaucidium passerinum* and others) and **spread of expansive and invasive species** (*Aster lanceolatus*, *Calamagrostis epigijos*, *Cirsium arvense*, *Fallopia japonica*, *Impatiens glandulifera*, *I. parviflora*, *Solidago canadensis*, *S. gigantea* and others) as a result of extensive construction works whose impacts can spread up to several tens of metres into the adjacent habitats. This might be demonstrated by the long-term data from Turčianska Kotlina Basin (BERNÁTOVÁ et al. 2006, TOPERCER 2003) and from Veľká Fatra (KLIMENT et al. 2008b). The underestimation of such significant changes involves also the underestimate of negative impacts of the construction on the neighbouring SPA Veľká Fatra, where these

processes would lead to the further progressive degradation of habitats of the mentioned priority bird species.

3.2.4. The authors have seriously **underestimated** the risk of **significant losses and fragmentation** in habitats of national and European importance and related risk of **significant reduction in population connectivity** in various species of national and Community importance (**large carnivores, ungulates**, bats, ground-dwelling mammals, amphibians and others) as a consequence of the barrier effect of the construction, road traffic and maintenance of the approved variant of D1 (for details see part 3.1.4.).

Moreover, the approved variant would also **severely interfere with yet largely undisturbed core parts of home ranges** in species as *Ursus arctos*, *Lynx lynx*, *Canis lupus*, particularly on the left bank of Váh River below Mt. Kopa - Síňava (see also Fig. 13).

3.2.5. The authors **have not assessed the important and persistent impacts** of the approved variant of the D1 on the **structure and appearance of the Upper Váh River valley landscape**, on its perception and on the **opportunities for long-term sustainable multiple use of its ecosystem services** by visitors and **local residents** in Kľačany and Rojkov (not to mention the other aspects of their environment).

In this regard, strikingly rare and vulnerable are the ecologically functional and perceptually attractive **patterns of several habitats of national and Community importance** with characteristic **patchy structure**, frequent occurrence of transitional and fringe types and **uninterrupted traditional land use along the left bank of Váh River**, particularly in the **area below Síňava** (Fig. 7).

3.3. SKUEV 0253 Váh River

From the **habitats that are subject to conservation** in SAC Váh River, we have confirmed the occurrence of the following habitats **threatened by the routing** of the approved variant of D1:

- **habitat 3260** Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation,
- **habitat 3220** Alpine rivers and the herbaceous vegetation along their banks and **6430** Hygrophilous tall herb fringe communities of plains and of the montane to alpine belts, which are reported also in the study by PEŤKOVÁ & MIKA.

In addition to the study by PEŤKOVÁ & MIKA, we have recorded segments of **other habitats of Community importance** in the routing of the approved variant of D1 in this SAC:

- **habitat 3270** Muddy river banks with *Chenopodium rubri* p. p. and *Bidention* p. p. vegetation (area of c. 0.1 ha),
- **habitat 6430** Butterbur riverine communities (area of c. 0.1 ha, Fig. 6),
- **priority habitat 91E0*** Mixed ash-alder alluvial forests of temperate and Boreal Europe (area of c. 0.2 ha, Fig. 9).

Of the **species that are** subject to conservation in SAC Váh River and were not reported in the study by PEŤKOVÁ & MIKA, we found also *Bombina variegata* to be **threatened by the routing** (construction would destroy c. 0.1 ha of its reproduction habitat).

We have registered the following **species of Community importance that are not** subject to conservation in SAC Váh River and are not mentioned in the study by PEŤKOVÁ & MIKA (the type and intensity/importance of the expected impact is specified in brackets after the species' name):

- *Ciconia nigra* (disruption of c. 20 % of hunting grounds of 1 pair),
- *Haliaeetus albicilla* (disruption of c. 30 % of wintering grounds and c. 50 % of hunting grounds of 2 individuals),
- *Alcedo atthis* (destruction of breeding sites of 1 - 2 pairs and disruption of wintering and hunting grounds of 1 - 3 individuals).

Furthermore, the construction of the approved variant of D1 would have a persistent and significant barrier influence on the populations of at least 7 rare and endangered fish species (*Zingel streber*, *Hucho hucho*, *Chondrostoma nasus*, *Barbus barbus*, *Salmo labrax morpha fario*, *Thymallus thymallus*, *Cottus gobio* - compare ZONTÁG 2006), at least 6 bat species of Community importance (*Rhinolophus hipposideros*, *Rh. ferrumequinum*, *Barbastella barbastellus*, *Myotis myotis*, *M. blythii*, *M. dasycneme*) and at least 94 nonbreeding water and wetland bird species including many species of Community importance, namely *Anas acuta*, *A. clypeata*, *A. strepera*, *Anser anser*, *Ardea purpurea*, *Aythya nyroca*, *Botaurus stellaris*, *Egretta alba*, *E. garzetta*, *Chlidonias niger*, *Ch. leucopterus*, *Ixobrychus minutus*, *Numenius arquata*, *Nycticorax nycticorax*, *Podiceps grisegena*, *Porzana porzana*, *Sterna hirundo*, *Tringa totanus* and *Vanellus vanellus*. According to the results of the International Waterbird Census (SLABEYOVÁ et al. 2008, TOPERCER unpubl., Table 1 and 2) all these species either regularly migrate or regularly overwinter here in numbers from tens to hundreds of individuals annually. For species such as *Aythya fuligula* and *Bucephala clangula*, Krpeľany Hydropower Reservoir and Váh River below the confluence with Orava River are ranked among the most important wintering grounds and migration stopover sites in Slovakia. The influences of motorway would include primarily collisions of birds and bats with cars and with long bridges and could be mitigated only to a very limited extent.

Main weaknesses and not assessed/inappropriately assessed impacts in the study by PEŤKOVÁ & MIKA:

3.3.1. The authors have carried out **only a short-term survey outside the vegetation and reproduction period that is not sufficient for the given purpose** (as they have admitted themselves on page 31).

3.3.2. The authors have **omitted/excluded from the assessment three habitats of Community importance that are** subject to conservation in the SAC (**3270, 6430 and 91E0***, i.e. **1 priority habitat**, impact **moderately important**), and 4 species of Community importance (*Bombina variegata*, *Ciconia nigra*, *Haliaeetus albicilla* and *Alcedo atthis*, impact on White-tailed Eagle might be important).

3.3.3. The authors have seriously **underestimated** the risk of **significant changes in species composition** and subsequent **deterioration of habitats** due to both decline of sensitive native species (*Batrachium aquatile*, *Zingel streber*, *Alcedo atthis*) and **vigorous spread of expansive and invasive species** (*Aster lanceolatus*, *Calamagrostis epigejos*, *Cirsium arvense*, *Elodea canadensis*, *Fallopia japonica*, *Impatiens glandulifera*, *I. parviflora*, *Solidago canadensis*, *S. gigantea* etc) as a result of extensive construction works that are likely to affect the river ecosystem up to several tens or hundreds of metres into the adjacent habitats. This might be demonstrated by the long-term data from Turčianska Kotlina Basin (BERNÁTOVÁ et al. 2006, TOPERCER 2003) and from Veľká Fatra Mts (KLIMENT et al. 2008b).

3.3.4. The authors have seriously **underestimated** the risk of **significant losses and fragmentation** in habitats of national and Community importance (primarily in **habitat 3260** reaching the mean percentage 5 - 10 % and at some places even 50 % of the considered sections of Váh River - TOPERCER & BERNÁTOVÁ 2008), as well as the related risk of **significant loss in population connectivity** in many species of national and Community importance (largely already mentioned species of fish, birds, bats, Otter and others) as a consequence of the barrier effect of the construction, traffic and maintenance of the approved variant of D1 (see also part 3.1.4.).

Moreover, the approved variant would **significantly interfere with the valuable core parts of home ranges** of species such as

- *Actites hypoleucos* (destruction of home ranges of 2 - 3 pairs),
- *Alcedo atthis* (destruction of breeding sites of 1 - 2 pairs and disruption of wintering and hunting grounds of 1 - 3 individuals),
- *Cinclus cinclus* (destruction of breeding sites of 4 - 5 pairs, disruption of breeding sites of another 1 - 2 pairs and disruption of wintering grounds of 8 - 10 individuals),

- *Dendrocopos minor* (destruction of c. 60 % of the home range of 1 pair with the breeding site directly in the projected routing),
- *Rallus aquaticus* (destruction of c. 40 % of the home range of 1 pair and wintering grounds of 1 - 2 individuals),
- *Lutra lutra* (destruction of shelters of 2 - 3 individuals, disruption of one of the best hunting grounds in the region).

Most of these species concentrate along the left bank of Váh River in the area below Mt. Kopa - Síňava (Fig. 1).

3.3.5. Authors **have not assessed the important and persistent impacts** of the approved variant of D1 on the **structure and appearance of the Upper Váh River valley landscape**, on its perception and on the **opportunities for long-term sustainable multiple use of its ecosystem services** by visitors and **local residents** in Ratkovo, Šútovo and Kľačany-Rieka (not to mention the other aspects of their environment).

In this regard, particularly the **unique confluence of two large submontane rivers Váh and Orava with the left bank of the Váh river ecosystem downstreams** to Kľačanský meander (see Fig. 1) showing characteristic pattern of several habitats of national and Community importance, maintained by **traditional land use and still largely unperturbed**, is of **extraordinary value and vulnerability**.

3.4. Rojkovské Rašelinisko Mire Nature Reserve (SKUEV 0238 Veľká Fatra)

Since 1950 an area of 2.88 ha of Rojkovské Rašelinisko Mire NR has been protected as a rare instance of co-occurring fen, mire and bog biocoenoses within a small area. So far **17 vegetation units** and **160 vascular plant species** have been found here (KLIKA 1934; BOSÁČKOVÁ 1965, 1967; HÁBEROVÁ & FAJMONOVÁ 1995), some of them at a single known site in the SAC (*Carex diandra*, *Drosera rotundifolia*, *Ledum palustre*, *Stellaria palustris*, *Trichophorum pumilum*, *Triglochin maritima*), some with abundant populations (*Gymnadenia densiflora*, *Menyanthes trifoliata*, *Pinguicula vulgaris*, *Salix rosmarinifolia*) or otherwise important (*Carex viridula* and *C. dioica*, a noteworthy glacial relic - KLIMENT et al. 2008b). Of many other rare animal species the site hosts e.g. *Vertigo angustior*, a species of Community importance.

Rojkovské Rašelinisko is the oldest known mire in Slovakia (age of c. **15000 years** - HORSÁK 2003) with **an outstanding biological and paleontological significance**, reaching far beyond the borders of Slovakia and central Europe. Though managed as a part of SAC Veľká Fatra, it is still an isolated small polygon, **highly specific or unique** in terms of evolution, biogeography and ecology, with its own risks as well as conservation and management needs. Thus we maintain that it should be evaluated **separately**, not hidden in the "package" of Veľká Fatra, as was done in the study by PEŤKOVÁ & MIKA.

Of the **habitats** that **are** subject to conservation in SAC Veľká Fatra and **are threatened by the routing** of the approved variant of D1, we have documented **not only type 7230** Alkaline fens (Fig. 10, area of c. 0.83 ha, i.e. c. 13 % of its area in the entire SAC) and **6430** Hygrophilous tall-herb fringe communities of plains and of the montane to alpine belts (area of c. **0.1 ha** - **not 0.01 ha**, as stated in the study by PEŤKOVÁ & MIKA), **but also**

- **habitat 7140** Transition mires and quaking bogs (area of c. 0.3 ha),
- **habitat 3160** Natural dystrophic lakes and ponds (Fig. 11, area of c. 0.011 ha; see also DITĚ et al. 2006), **both plainly ignored in the study by PEŤKOVÁ & MIKA** (compare BOSÁČKOVÁ 1965, 1967; HÁBEROVÁ & FAJMONOVÁ 1995).

Moreover, the study by PEŤKOVÁ & MIKA ignores even **the very rare priority habitat of Community importance - 91D0*** Bog woodland with birch (area of c. 0.1 ha, Fig. 11) representing **the only segment of this endangered habitat in SAC Veľká Fatra and one of the few in the Slovak Republic**.

Of the **species** that **are** subject to conservation in SAC Veľká Fatra and **are threatened by the routing** of the approved variant, we record the viable population of *Vertigo angustior* (on

one of 2 sites in the entire SAC, i.e. c. 50 % of population in the SAC; the lack of data for the assessment of its conservation status is admitted even by ŠTÁTNA OCHRANA PRÍRODY SR 2007). The species *Vertigo geyeri*, reported in the study by PEŤKOVÁ & MIKA, was not found here despite the repeated detailed surveys (HORSÁK 2003, HORSÁK & HÁJEK 2005).

Main weaknesses and not assessed/inappropriately assessed impacts in the study by PEŤKOVÁ & MIKA:

3.4.1. The authors have carried out **only a short-term survey outside the vegetation and reproduction period that is not sufficient for the given purpose** (as they have admitted themselves on page 24).

3.4.2. The authors have **omitted/excluded from the assessment 3 habitats of Community importance that are** subject to conservation in the SAC (of which 1 is priority habitat).

3.4.3. The authors provide no indication of **extraordinary importance and uniqueness** of this site at the national and European level.

3.4.4. Their judgements are **inconsistent or even contradictory**. On page 24, 26, 41 and in attachment No. 1 authors **admit a critical threat to the site** due to changes in water regime and chemical properties during the construction of D1. Furthermore, they admit also **their own inability to predict these changes**, which, interestingly, **does not prevent them from concluding that impacts of these changes will not be significant**.

3.4.5. Their claim that impacts of the construction of D1 on the water and nutrient regimes of the site will not be significant, rests solely on the hydrogeological assessment by POSPIECHOVÁ (2007) that **does not meet the necessary criteria**: it provides no information on methods and material (whether published and/or unpublished sources were used, or author's own sampling), on results of analysis or modelling etc. Instead it provides **several unsupported conclusions** (e.g. about the vital importance of surface water or even adjacent road to the persistence of the mire), which support our **doubts about the professional competence of the author** in the area of mire hydrology.

3.4.6. The authors have seriously **underestimated** the risk of **significant changes in species composition** and subsequent **deterioration of habitats** due to both extinction of sensitive native species (*Ledum palustre*, *Trichophorum pumilum*, *Vertigo angustior* and others) and **colonisation of expansive and invasive species** (*Aster lanceolatus*, *Calamagrostis epigejos*, *Cirsium arvense*, *Fallopia japonica*, *Impatiens glandulifera*, *I. parviflora*, *Solidago canadensis*, *S. gigantea* and others) as a result of extensive construction works (road pavement, tunnel entrance, building site equipment, depository for tunnel debris etc) in the close proximity of this highly vulnerable site. It might be demonstrated by the long-term data from Veľká Fatra Mts (KLIMENT et al. 2008b). Negative changes in favour of species as *Molinia caerulea* and *Frangula alnus* are already visible at the site.

3.4.7. The authors have disregarded the **cumulative impacts** on Rojkovské Rašelinisko Mire NR.

4. Cumulative impacts

Construction and operation of the approved variant of the motorway D1 Turany - Hubová may have **highly significant adverse impacts** on the species and habitats of Community and national importance, Natura 2000 sites and landscape particularly in combination with implementation of project by Slovenské elektrárne, a.s. Bratislava "Exploitation of hydroelectric potential of Váh River in the section Krpeľany - Ružomberok by small hydroelectric power stations" (SHPS, primarily with proposed SHPS Kraľovany and SHPS Stankovany), and particularly on the sites of Community importance **SKUEV 0253 Váh River** and **SKUEV 0243 Orava River** (for details see e.g. TOPERCER & BERNÁTOVÁ 2008). Other significant impacts one can expect to be linked to the modernisation of railways, to projects of

cableway and ski pistes on Mt. Chleb and of resuming mining in the quarry Bystrička (both sites are in SAC Malá Fatra).

5. Errors and shortcomings in the earlier impact assessment

As late as three years after identification of Natura 2000 sites in the proposed routing of D1, Dopravoprojekt, a. s. Bratislava ordered the study *“The assessment of the significance of impacts of the proposed motorway D1 Turany - Hubová on the Natura 2000 sites”* (*Hodnotenie významnosti vplyvov navrhovanej diaľnice D1 Turany - Hubová na územia sústavy Natura 2000*) from the company Creative, spol. s r. o. Pezinok, which submitted the study in November 2007 (PEŤKOVÁ & MIKA 2007). Our data show that this study by PEŤKOVÁ & MIKA does not comply with either the new EIA Act or Act No. 543/2002 on nature and landscape conservation. The public did not have opportunities to give comments and opinions, which is required by the Habitats Directive and EIA Directive.

To our knowledge the study by PEŤKOVÁ & MIKA **cannot be used in lieu of the process of appropriate assessment** that is required by the article 6.3 of the Habitats Directive. Even the authors themselves admit on page 11 that “our study **to some extent** substitutes only this phase of project assessment” (i.e. the phase of screening, comment and emphasis added by J. T.).

The study is based on **incomplete, not representative (in terms of both data and methods) and misinterpreted sources of information**. This applies primarily to the **field surveys** that were extremely short-term and seasonally distorted outside the vegetation and reproduction period in 2007 and thereby **severely limiting the information value of the study**. Its information value is further diminished by the approach used in assessment that **relativises the importance of the negative impacts** by merely **comparing the percentages** of threatened habitat patches with the totals in the corresponding SACs without considering the unique and specific properties of particular habitat patches and their importance at the relevant (i.e. national and central European) levels.

On the other hand, it **exaggerates the importance of the proposed mitigation and compensation measures**, disregarding **rather scanty (and often ambiguous) results** that such measures have so far yielded in comparable settings in Slovakia.

The data deficiency of the study resulted also in incorrect proposals for some measures (e.g. incorrect location of ecoduct). In addition, proposed measures were implemented in the decisions of nature conservation and construction authorities only to a minor extent (mitigation measures) or **not at all** (compensation/restoration measures - see part 6).

Our data demonstrate that the **study by PEŤKOVÁ & MIKA** has **several fundamental material and methodological shortcomings** in term of **omissions, errors or even deceptions**. The fact that on the basis of such a study (*inter alia*) it may be possible to permit the construction of such a motorway variant in the Natura 2000 sites in this country of the EU, should not escape the attention of the European Commission and the European Investment Bank. The fact that 5 of 10 authors of this poor quality study are the employees of the State Nature Conservancy of the Slovak Republic (with ŠOP SR; Ing. Ľuboslav Mika one of the two principal authors), is a concern that should be addressed by the **Ministry of the Environment and ŠOP SR**.

6. Implementation of conclusions and recommendations from the assessment process in decisions of nature conservation and construction authorities

When analysing the implementation of conclusions of impact assessment and proposed mitigation measures in the subsequent decisions of nature conservation and construction authorities we found the facts that we describe separately for mitigation and compensation measures (restoration measures according to Act No. 543/2002).

6.1. Mitigation measures

6.1.1. In the land-use permit (issued by Mesto Ružomberok on 18. 1. 2008 under No. SP-4050/2007-TA1-1-Ta) we **did not find any regulations** about mitigation and compensation measures for the construction of the approved variant of the D1.

6.1.2. The nature conservation authority (NCA) at Ružomberok by its decision on 22. 7. 2008 No. OP 2008/1250-11 granted permission to intervene in habitats of Community and national importance that obliges the applicant (developer) **only to reimburse financial compensation** (payable to the Environmental fund) in the amount of the determined public value of the habitats **without any conditions of decision**. From this decision it is obvious that when intervening in the habitats of national and Community importance (including their damage and destruction), the developer is not obliged to carry out **any mitigation measures** nor to meet **any particular requirements** within the territory of SACs or outside them that would restrict or regulate him at any stage of the development of the approved variant of D1, be it deforestation, terrain alteration, construction itself or revegetation. A corresponding decision was also made by NCA at Martin dated 24. 7. 2008 under No. ŽP-2008/01368-OPaK-Mu and NCA at Dolný Kubín dated 29. 7. 2008 under No. ŽP-2008/00968-STJ.

6.1.3. **Only part of the proposed mitigation measures**, namely the ecoduct in Kral'oviansky meander (object composition code SO 215), biocorridor at the village Ratkovo (object composition code SO 202) and motorway fencing (object composition code SO 310-00) were included in the **building permit** (issued by the Ministry of Transport, Post and Telecommunications SR on 3. 3. 2009 under No. 01934/2009-SCDPK/9102).

From the text of the building permit, however, **one is unable to learn whether those objects have the adequate parameters** or whether their proposal was consulted with relevant agencies or experts. On the contrary, **several proposed mitigation measures have not appeared** in the building permit itself (object composition) nor in the accompanying documentation, for instance:

- modification of bridge SO 207-00 (this object was not found in the object composition)
- a substitute for destroyed amphibian reproduction sites (not found in the object composition)
- a requirement to place the bridge pillars out of the Váh River channel (cannot be assessed from the building permit, but according to the available information in case of bridges at Stankovany and Hubová not fulfilled)
- a requirement to construct a protective waterproof wall for the protection of Rojkovské Rašelinisko Mire NR before the construction commences (not found in the object composition; deforestation and drilling has been done in close proximity of the NR)
- a requirement to build a waterproof barrier along the outside lane of the motorway at its contact with Váh River SAC (not found in the object composition)
- recovery of damaged riverbanks including habitat restoration (not found in the object composition, not imposed by the decision of NCA at Ružomberok)
- restoration of damaged habitats after completion of the construction (the decision of NCA at Ružomberok does not impose this duty).

Implementation of some **other very important mitigation measures cannot be evaluated** on the basis of available documentation, for instance:

- thorough isolation of Rojkov tunnel pipe in the catchment area of Rojkovské Rašelinisko Mire
- ensuring the discharge of polluted water from the motorway without impacts on SACs

- enhancing the visibility of noise control barriers and placement of optical barriers so as to eliminate bird and bat mortality on bridges, putting the new power transmission lines into the ground for the same purpose.

6.2. Compensation measures

6.2.1. According to the study by PEŤKOVÁ & MIKA it is needed **to compensate for the loss of habitats** of Community importance and habitats of species of Community importance within the SACs either by establishing compensation areas that will be integrated into the network or by the selection of appropriate sites on which it will be possible to recover the required habitat types using restoration measures. It is also suggested to substitute the destroyed reproduction sites of amphibians.

6.2.2. The developer - National Motorway Company (NDS) - along with the application for permission to intervene in habitats of Community and national importance on 13. 6. 2008 submitted also the documentation "*Inventory and valuation of habitats of Community and national importance*" (*Inventarizácia a spoločenské ohodnotenie biotopov európskeho a národného významu*, issued by Dopravoprojekt, a. s., divízia Bratislava in May 2008).

6.2.3. The nature conservation authority (NCA) at Ružomberok by its decision on 22. 7. 2008 No. OP 2008/1250-11 granted permission to intervene in habitats of Community and national importance that obliges the developer **only to reimburse financial compensation** (payable to the Environmental fund) in the amount of the determined public value of the habitats **without any conditions of decision**. From this decision it is obvious that when intervening in the habitats of national and Community importance (including their disruption and destruction), the developer is not obliged to carry out **any compensation or restoration measures** nor to fulfil **any particular requirements** related to the **substitution of destroyed habitats** of Community importance, substitution of destroyed reproduction sites of amphibians and other species of Community importance or the **restoration of damaged habitats**. The office points out in its decision justification that the organisation units of **ŠOP SR have not submitted any documentation** that would enable the NCA to impose the **appropriate restoration or compensation measures** and therefore permission has been granted **unconditionally**, i.e. **only financial compensation without any conditions** has been imposed. The corresponding decision was also made by the NCA at Martin on 24. 7. 2008 under No. ŽP-2008/01368-OPaK-Mu and NCA at Dolný Kubín on 29. 7. 2008 under No. ŽP-2008/00968-STJ.

6.2.4. As financial compensation cannot be regarded as a compensation measure under Article 6 of the Habitat Directive, when developing the approved variant of D1, the developer is not obliged to carry out **any compensation measures**. Neither the developer nor any state authority or state agency (ŠOP SR, State Fund of Environment) is legally bound to carry out the compensation measures proposed in the study by PEŤKOVÁ & MIKA.

7. Conclusions

7.1. The study “*The assessment of the significance of impacts of the proposed motorway D1 Turany - Hubová on the Natura 2000 sites*” by PEŤKOVÁ & MIKA (2007) does not meet the requirements either for sufficient documentation in the screening, nor for appropriate assessment under the Article 6.3 of the Habitats Directive 92/43/EEC.

7.2. The results of our work show that the approved variant of the motorway D1 section Turany - Hubová would have significant negative impacts on Natura 2000 sites. This variant poses the risk of serious damage and/or destruction of ecological characteristics of the habitats, ecosystems and landscape, especially in the area of Šútovo - Rojkov (SACs Malá Fatra, Veľká Fatra and Váh River). Particularly the habitats of Community importance 7230 Alkaline fens, 7140 Transition mires and quaking bogs, 3160 Natural dystrophic lakes and ponds, 91D0* Bog woodland and 9180* *Tilio-Acerion* forests on slopes, screes and ravines (with hard water springs), and species of Community importance *Vertigo angustior* (c. 50 % of population in SAC Veľká Fatra), *Erysimum hungaricum* (>50 % of population in SAC Malá Fatra), many breeding, migratory and wintering birds, bats, amphibians and large carnivores are at severe risk.

7.3. When analysing the decisions made by the relevant nature conservation and construction authorities, one can conclude that no compensation and only partial mitigation measures are imposed on the developer of the approved variant of D1 motorway. This is to say that hardly compensable or even non-compensable losses have been already taking place at the current stage of works (deforestation - Fig. 12, 13).

7.4. Taking into consideration the availability of alternatives to the approved variant of the motorway D1 (e.g. the already assessed variant B1 with the Korbeltka tunnel), we request a proper assessment of the alternative solutions to be urgently provided.

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<http://www.sopsr.sk/natura/images/mapy_dab/areal/pic-range-7230.jpg>;
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<http://www.sopsr.sk/natura/images/mapy_dab/areal/pic-range-91d0.jpg>;
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9. Acknowledgements

We would like to thank RNDr. Dušan Karaska, RNDr. Ján Kliment, PhD, Mgr. Peter Kučera and Tomáš Flajs for willingly providing us with their unpublished data on species and habitats as well as with some photographs. We thank also to Mgr. Rastislav Rybanič and to Ing. Roman Havlíček for the cooperation in the preparation of this work.

10. Supporting material

Photographs

Photographic documentation of selected habitats of Community and national importance, species of Community importance, characteristic landscape segments and ongoing interferences (deforestation) is provided in Fig. 1 to Fig. 13 below.

Phytosociological data

Habitat 9180* *Tilio-Acerion* forests on slopes, screes and ravines with hard water springs, a ravine on the northern slopes of Mt. Kopa - KLIMENT et al. (2008a), Table 3, relevés no. 3 and 4 (including geographical coordinates).

Habitat 91E0* Mixed ash-alder alluvial forests of temperate and Boreal Europe, lower part of Suchie Valley, a segment with presence of *Erysimum hungaricum*, species list of herbs and forbs according to BERNÁTOVÁ & KUČERA (unpubl.): *Circaea alpina*, *Dentaria glandulosa*, *Erysimum hungaricum*, *Eupatorium cannabinum*, *Lunaria rediviva*, *Senecio ovatus*.

Home ranges of selected bird species in the area of interest

(in separate attachment 10a)

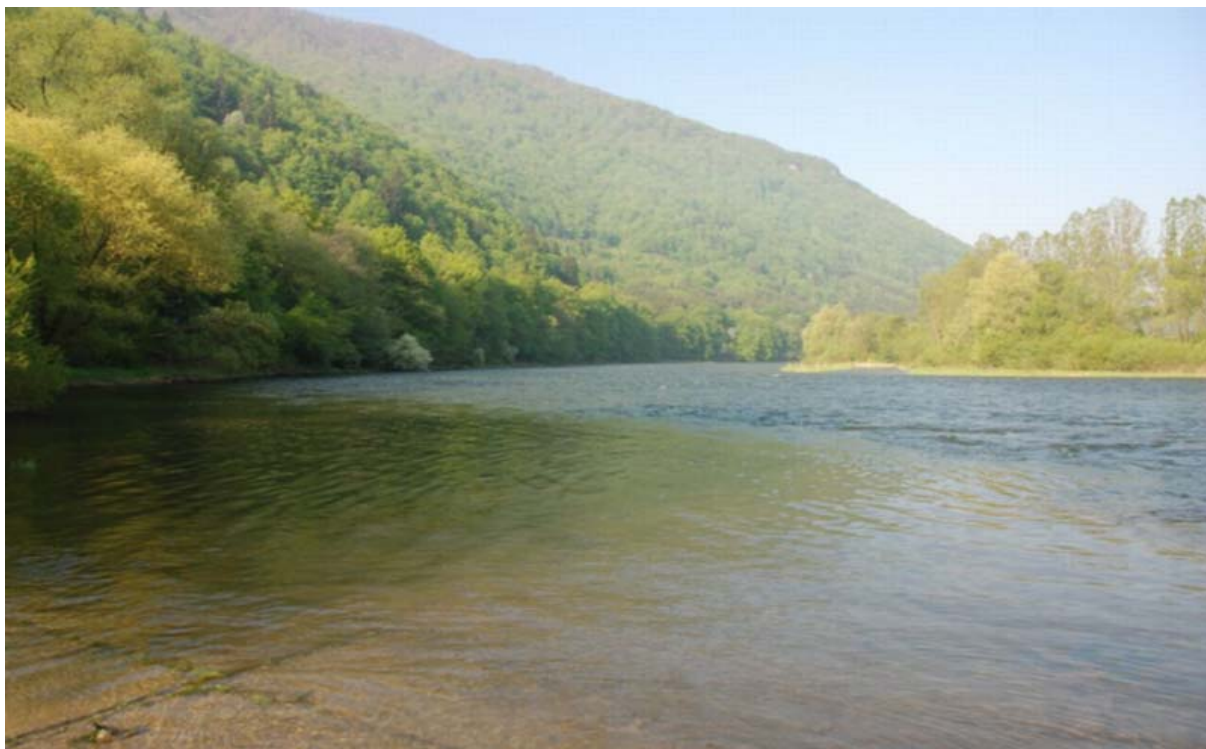


Fig. 1. Váh River below the confluence with Orava River and the northern slopes of Mt. Kopa (1187 m a.s.l.) in May 2009 (before disruption)



Fig. 2 and 3. Habitat of Medio-European limestone beech forests (code 9150, left) and of *Tilio-Acerion* forests on slopes, screes and ravines (code 9180*, right) with hard water springs at the base of the northern slopes of Mt. Kopa (1187 m a.s.l.) in the routing of the approved variant of D1 in May 2009 (before disruption).



Fig. 4 and 5. Habitat of *Tilio-Acerion* forests on slopes, screes and ravines (code 9180*) in the ravine at the base of the northern slopes of Mt. Kopa (1187 m a.s.l.) in the routing of the approved variant of D1 in May 2009 (before disruption).



Fig. 6. Habitat of butterbur riverine communities (code 6430) on the left bank of Váh River at the base of Mt. Kopa (1187 m a.s.l.) in the routing of the approved variant of D1 in May 2009 (before disruption).



Fig. 7. Habitat of lowland hay meadows (code 6510), temperate hazel thickets and other ecotone communities in ecologically functional and perceptually appealing pattern below Síňava in the routing of the approved variant of D1 in May 2009 (before disruption).



Fig. 8 and 9. Carpathian Newt *Lissotriton (Triturus) montandoni* (larva) in a spring at the base of the northern slopes of Mt. Kopa (1187 m a.s.l.) in May 2009 (left) and habitat of mixed ash-alder alluvial forests of temperate and Boreal Europe (code 91E0*) on the left bank of Váh River in the routing of the approved variant of D1 in May 2009 (right).

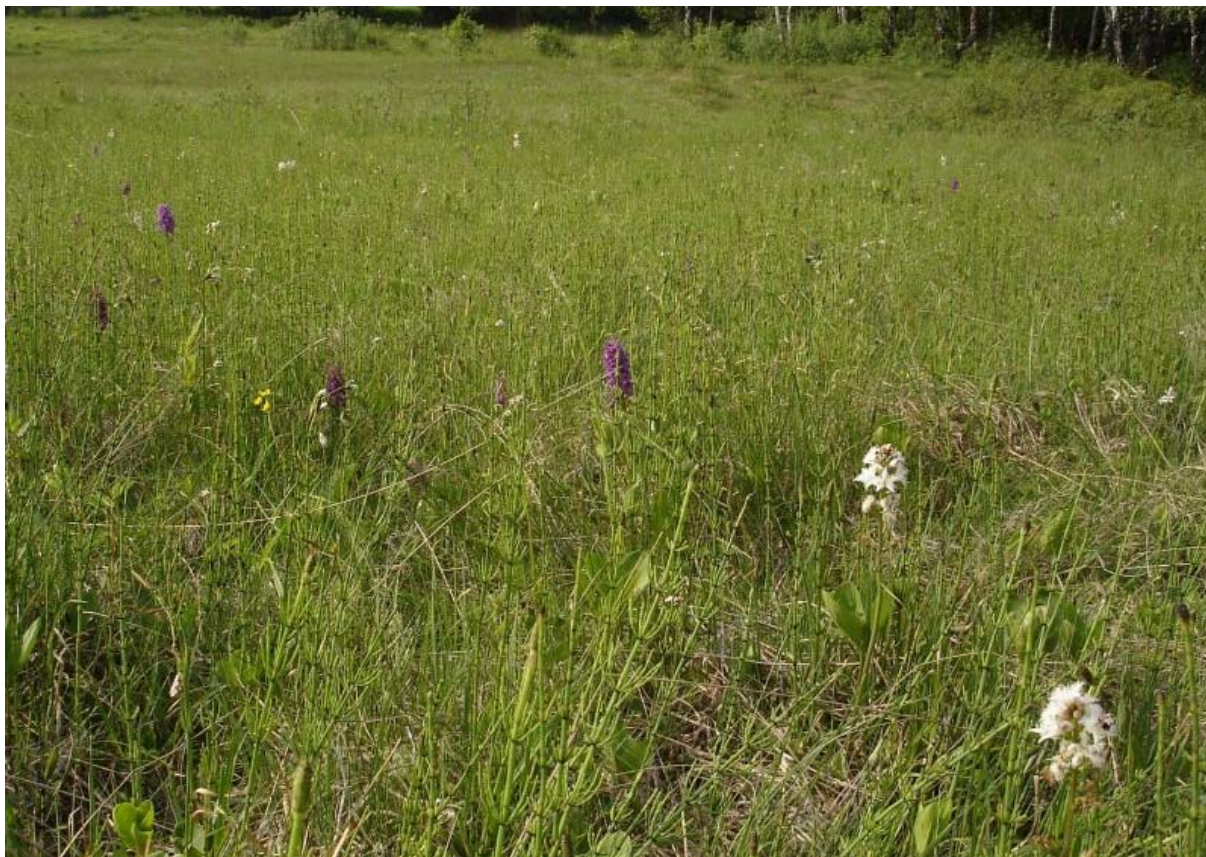


Fig. 10. Habitat of alkaline fens (code 7230) in NR Rojkovské Rašelinisko Mire in May 2007 (photographed by P. Kučera).



Fig. 11. Habitat of natural dystrophic lakes and ponds (code 3160) and a part of bog woodland (code 91D0*) in NR Rojkovské Rašelinisko Mire in May 2007 (photographed by P. Kučera).



Fig. 12. Habitat of *Tilio-Acerion* forests on slopes, screes and ravines (code 9180*) in the mouth of Suchie Valley (SAC Malá Fatra) in the routing of the approved variant of D1 in November 2009 (disrupted by deforestation, photographed by M. Jasík).



Fig. 13. Habitats of *Tilio-Acerion* forests on slopes, screes and ravines (code 9180*) with hard water springs, Medio-European limestone beech forests (code 9150) and butterbur riverine communities (code 6430) at the base of the northern slopes of Mt. Kopa (1187 m a.s.l.) in the routing of the approved variant of D1 in November 2009 (before deforestation).

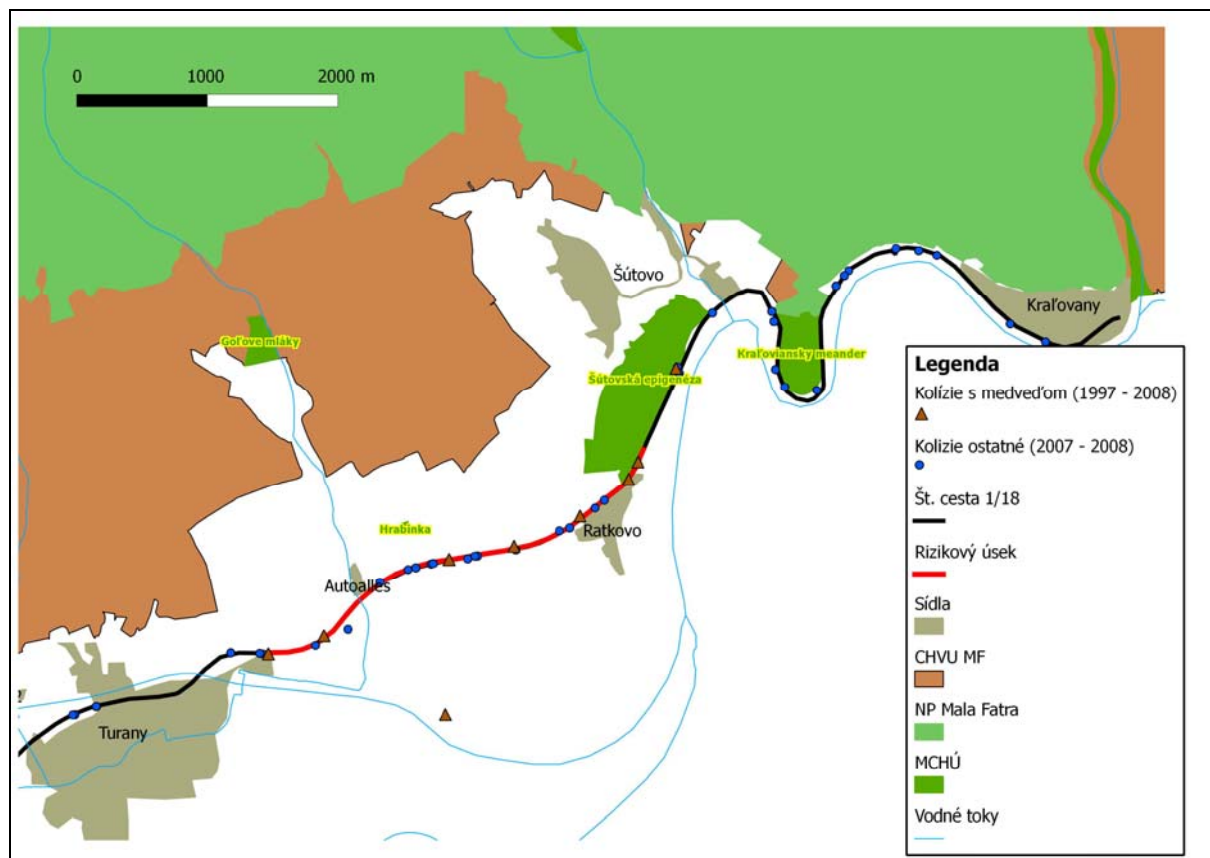


Fig. 14. Collisions between large mammals and vehicles on the road 1/18 crossing the migration corridors of large mammals (KALAŠ unpubl.). The approved variant of the motorway D1 runs parallel to the road 1/18.

Table 1. Maximum waterbird numbers counted on Váh River between the confluence with Orava River and Krpeľany Hydropower Reservoir during winters 1998/99 - 2008/09.

Species	October	November	December	January	February	March	April	Total
<i>Actites hypoleucos</i>							7	7
<i>Alcedo atthis</i>	1	2		1	1	1		2
<i>Anas crecca</i>			4	7	2	2		7
<i>Anas platyrhynchos</i>	42	44	134	109	120	113	42	134
<i>Anas strepera</i>			1					1
<i>Anthus pratensis</i>	5					1	2	5
<i>Ardea cinerea</i>	3	3	5	4	2	3	1	5
<i>Aythya fuligula</i>				114	70			114
<i>Bucephala clangula</i>		6	12	86	205	2		205
<i>Cinclus cinclus</i>	6	8	8	7	7	7	3	8
<i>Fulica atra</i>				1				1
<i>Larus argentatus/cachinnans</i>	54	12			1	4		54
<i>Larus cachinnans</i>					1			1
<i>Larus canus</i>	2							2
<i>Mergus merganser</i>			3	26	18	10	3	26
<i>Motacilla alba</i>	5					9	16	16
<i>Motacilla cinerea</i>	4					7	10	10
<i>Phalacrocorax carbo</i>	110	2		28	5	2		110
<i>Tachybaptus ruficollis</i>				1				1
Total	110	44	134	114	205	113	42	205

Table 2. Maximum waterbird numbers counted on Krpel'any Hydropower Reservoir during winters 1998/99 - 2008/09.

Species	October	November	December	January	February	March	April	Total
<i>Actites hypoleucos</i>							6	6
<i>Alcedo atthis</i>	4	1	2	2		3	4	4
<i>Anas acuta</i>		1	1	1		5		5
<i>Anas clypeata</i>	1			1			2	2
<i>Anas crecca</i>	93	111	75	63	48	50	16	111
<i>Anas penelope</i>	11	12	8	11	7	310		310
<i>Anas platyrhynchos</i>	1420	2390	1145	889	795	377	121	2390
<i>Anas querquedula</i>						15		15
<i>Anas strepera</i>	2	5	3	1	2		1	5
<i>Anthus pratensis</i>	2		1			3	2	3
<i>Anthus spinoletta</i>	6						4	6
<i>Ardea cinerea</i>	6	6	3	4	7	13	2	13
<i>Aythya ferina</i>	141	130	122	105	142	214	31	214
<i>Aythya fuligula</i>	438	387	574	497	453	586	447	586
<i>Aythya marila</i>		3				1	1	3
<i>Aythya nyroca</i>	1			1	1	1	1	1
<i>Bucephala clangula</i>	2	26	108	216	192	228	17	228
<i>Ciconia nigra</i>							1	1
<i>Cinclus cinclus</i>	1	2	2	3	3	2		3
<i>Clangula hyemalis</i>		2	1	1				2
<i>Cygnus olor</i>	32	41	46	36	37	24	26	46
<i>Emberiza schoeniclus</i>	1							1
<i>Fulica atra</i>	490	510	625	325	370	119	6	625
<i>Gavia arctica</i>		1						1
<i>Haliaeetus albicilla</i>				1	2	2		2
<i>Charadrius dubius</i>							1	1
<i>Larus argentatus/cachinnans</i>	13	12	24	22	20	45	5	45
<i>Larus cachinnans</i>	22					3		22
<i>Larus michahellis</i>					2	5	1	5
<i>Larus canus</i>					1			1
<i>Larus ridibundus</i>	2	5	1	2		37	12	37
<i>Melanitta fusca</i>		1					1	1
<i>Mergus albellus</i>			1	6	6	5		6
<i>Mergus merganser</i>		2	36	55	32	16	1	55
<i>Motacilla alba</i>	14				2	26	47	47
<i>Motacilla cinerea</i>	3					18	13	18
<i>Netta rufina</i>	1		1					1
<i>Phalacrocorax carbo</i>	380	490	390	430	350	101	9	490
<i>Phalacrocorax pygmeus</i>	1							1
<i>Podiceps cristatus</i>	6	3	1			2	5	6
<i>Podiceps grisegena</i>						1	3	3
<i>Podiceps nigricollis</i>	2						3	3
<i>Sterna hirundo</i>							4	4
<i>Tachybaptus ruficollis</i>	15	13	1		1		1	15
<i>Tringa sp.</i>				2				2
<i>Vanellus vanellus</i>						6		6
Total	1420	2390	1145	889	795	586	447	2390