

Monitoring of plants and habitats of Community interest in the Slovak Republic

Results and assessment
in the period of 2013 – 2015



State Nature Conservancy
of the Slovak Republic
2015



Monitoring of plants and habitats of Community interest in the Slovak Republic

Results and assessment in the period of 2013 – 2015



Investícia do Vašej budúcnosti

This publication has been produced in the framework of the project
*Preparation and implementation of monitoring of habitats and species and improving
the access to information to the public*, project code (ITMS):24150120030,
within the context of the Operational Programme Environment,
co-financed by the European Regional Development Fund.

Editors: Viera ŠeffEROVÁ StanOVÁ, Janka GalvÁnkOVÁ, Ivor Rizman

Group leaders and referees: Janka GalvÁnkOVÁ, Marek Garčár, Marta MÚtňanOVÁ, Radoslav Považan, Ivor Rizman, Viera ŠeffEROVÁ StanOVÁ

List of mappers/experts: Zuzana ArgalášOVÁ, Peter Baláži, Zuzana BalážOVÁ, Zuzana BarÁnkOVÁ, Milan Barlog, Eva BelanOVÁ, Alíca BeňOVÁ, Drahoš Blanár, Vincent Blanár, Ján Bobal, Katarína BotkovÁ, Štefánia BryndzOVÁ, Kateřina BubíkovÁ, Miroslav BuraĽ, Lucia CelerOVÁ, Slavomír Celer, Juraj Daniel-Szabó, Mária DankOVÁ, Elena DercOVÁ, Katarína DevÁnOVÁ, Daniel Dítě, Andrea DiviakOVÁ, Anna DobošOVÁ, Anna DobošOVÁ ml., Tomáš Dražil, Peter Drengubiak, Daniela DúbravkovÁ, Matej Dudáš, Mário Duchoň, Ján Dupkala, Anna DzivÁ, Patrícia ĎurčanOVÁ, Pavol Eliáš, Monika FarbiakovÁ, Alexander Fehér, Miroslav Fekiač, Tomáš Figura, Viliam Flachbart, Miroslav Fulín, Dobromil Galvánek, Janka GalvÁnkOVÁ, Jana GarayOVÁ, Marek Garčár, Ema GojdičOVÁ, Norbert Hatala, Ján Hrbatý, Lubomír Hrinko, Mário Humený, Viktória ChilOVÁ, Julie JandOVÁ, Monika JanišOVÁ, Juraj Jánošík, Martina JánošOVÁ, Miroslav Jarný, Ivan Jarolímek, Miroslava JedinÁkovÁ (DurilOVÁ), Michal Juříček, Květa KickOVÁ, Slavomír Kilár, Vladimír Klč, Vladimíra KlčOVÁ KunštárovÁ, Pavel Kliment, Jozef Kollár, Ján Korňan, Jaroslav Košťál, Helga KothajOVÁ, Jarmila KrajzOVÁ, Zuzana KruzecOVÁ, Rastislav Lasák, Gabriela LaukovÁ, Anna LeskovjanskÁ, Marek Leskovjanský, Rastislav Lipták, Branislav Lizoň, Ján Lukoťka, Jana MajekOVÁ, Renáta MarcinčÁkovÁ, Peter Maršálek, Zuzana MelečkovÁ, Sylva MertanOVÁ, Sergej Mochnacký, Stanislava MudrochOVÁ, Marta MÚtňanOVÁ, Martina NejezchleboVÁ, Jiří Němec, Marta NižňanskÁ, Ivan Novotný, Hana OllerOVÁ, Anton Paločko, Ladislav Palko, Dušan Pavlišin, Zuzana PčolOVÁ, Mária PetrášOVÁ, Martina PéliOVÁ, Eva PietorOVÁ, Martin Pirchala, Zuzana PleskovÁ, Pavol Polák, Radovan Pondelík, Anton Potaš, Peter Potocký, Radoslav Považan, Matúš Račko, Katarína RajcovÁ, Ivor Rizman, Boris Sabol, Andrej Saxa, Blažena SedlÁkovÁ, Heňa SedlÁkovÁ, Peter Siakel, Lucia SibilOVÁ, Martina SitarčíkovÁ, Eva SitášOVÁ, Jozef Skukálek, Zuzana SlabÁ, Janka SmatanOVÁ, Paulína SmatanOVÁ, Ivana SvitekovÁ, Juraj Szabó, Alžbeta SzabóOVÁ, Viera ŠeffEROVÁ StanOVÁ, Jozef Šibík, Andrea ŠimkovÁ, Iveta ŠkodOVÁ, Jaroslav Škovran, Jana ŠpulerOVÁ, Táňa ŠtechOVÁ, Ivan Šustr, Róbert Šuvada, Markéta Tábořská, Peter Tomáš, Roald Tretiník, Peter Turis, Ingrid TurisOVÁ, Eva UherčíkovÁ, Eva UhliarovÁ, Stanislav Uhrin, Zuzana VáclavOVÁ, Luboš Vadel, Darina VálkovÁ, Katarína VantarOVÁ, Ľudovít Vaško, Ján Vataha, Eliška VichEROVÁ, Katarína VilhanOVÁ, Ján Vnuk, Michal Vyšinský, Milan Zajac, Marica ZaliberOVÁ, Ivana ZubalOVÁ, Pavol Židek, Katarína ŽilkovanOVÁ.

State Nature Conservancy of the Slovak Republic coordinators: Janka GalvÁnkOVÁ, Marta MÚtňanOVÁ, Radoslav Považan, Andrej Saxa

DAPHNE coordinator: Viera ŠeffEROVÁ StanOVÁ

Graphical design and cover: Richard Watzka

Maps: Rastislav Lasák

Technical cooperation: Peter Andráš, Andrea BalážOVÁ, Katarína GulyášOVÁ, Richard Halmo, Martin Hrušecký, Barbara ImmerOVÁ, Tomáš Molitoris, Marek Štrbáň

English editing: Hugh Loxton, Tereza Thompson

Photo on the cover: Milan Barlog, Monika BudzÁkovÁ, Pavol Eliáš, Barbara ImmerOVÁ, Jaroslav Košťál, Marta MÚtňanOVÁ, Anton Potaš, Blažena SedlÁkovÁ, Janka SmatanOVÁ, Ján Šeffer, Róbert Šuvada

Project manager: Andrea Saxová

External monitoring coordinator: DAPHNE – Institute of Applied Ecology

Internal monitoring coordination: State Nature Conservancy of the Slovak Republic (SNC SR)

Development of Comprehensive Information and Monitoring system (CIMS): Lomtec.com, YMS, a.s., Lynx s r. o.

Citation: ŠEFFEROVÁ STANOVÁ, V., GALVÁNKOVÁ, J., RIZMAN, I. (eds.), 2015. *Monitoring of plants and habitats of Community interest in the Slovak Republic, Results and assessment in the period of 2013 – 2015*. Banská Bystrica: State Nature Conservancy of the Slovak Republic. 300 pp. ISBN 978-80-8184-023-4

Edition: 1,000 pcs.

ISBN: 978-80-8184-023-4

2015 © State Nature Conservancy of the Slovak Republic

Contents

Introduction (Janka GalvÁnkOVÁ, Ján Černecký, Andrej Saxa)	1
Legend – vascular plants	8
Legend – habitats	10
Bryophytes	
<i>Buxbaumia viridis</i> (Marta MÚtňanOVÁ)	12
<i>Dicranum viride</i> (Marta MÚtňanOVÁ)	14
<i>Hamatocaulis vernicosus</i> (Marta MÚtňanOVÁ)	16
<i>Leucobryum glaucum</i> (Marta MÚtňanOVÁ)	18
<i>Mannia triandra</i> (Marta MÚtňanOVÁ)	20
<i>Ochyraea tatrensis</i> (Marta MÚtňanOVÁ)	22
<i>Scapania carinthiaca</i> (Marta MÚtňanOVÁ)	24
<i>Sphagnum</i> spp. (Marta MÚtňanOVÁ)	26
<i>Tortella rigens</i> (Marta MÚtňanOVÁ)	28
Vascular plants	
<i>Aconitum firmum</i> subsp. <i>moravicum</i> (Róbert Šuvada)	30
<i>Adenophora liliifolia</i> (Róbert Šuvada)	32
<i>Apium repens</i> (Róbert Šuvada)	34
<i>Artemisia eriantha</i> (Róbert Šuvada)	36
<i>Asplenium adulterinum</i> (Róbert Šuvada)	38
<i>*Campanula serrata</i> (Róbert Šuvada)	40
<i>Cirsium brachycephalum</i> (Róbert Šuvada)	42
<i>*Cochlearia tatrae</i> (Róbert Šuvada)	44
<i>Colchicum arenarium</i> (Róbert Šuvada)	46
<i>Crambe tataria</i> (Róbert Šuvada)	48
<i>*Cyclamen fatrense</i> (Róbert Šuvada)	50
<i>Cypripedium calceolus</i> (Róbert Šuvada)	52
<i>*Daphne arbuscula</i> (Róbert Šuvada)	54
<i>*Dianthus nitidus</i> (Róbert Šuvada)	56
<i>*Dianthus praecox</i> subsp. <i>lumnitzeri</i> (Róbert Šuvada)	58
<i>Dracocephalum austriacum</i> (Róbert Šuvada)	60
<i>Echium russicum</i> (Róbert Šuvada)	62
<i>Eleocharis carniolica</i> (Janka GalvÁnkOVÁ)	64
<i>*Ferula sadleriana</i> (Róbert Šuvada)	66
<i>Galanthus nivalis</i> (Róbert Šuvada)	68
<i>Gladiolus palustris</i> (Róbert Šuvada)	70
<i>Himantoglossum adriaticum</i> (Róbert Šuvada)	72
<i>Himantoglossum caprinum</i> (Róbert Šuvada)	74
<i>Iris aphylla</i> subsp. <i>hungarica</i> (Róbert Šuvada)	76
<i>Iris humilis</i> subsp. <i>arenaria</i> (Róbert Šuvada)	78
<i>Ligularia sibirica</i> (Róbert Šuvada)	80
<i>Lindernia procumbens</i> (Róbert Šuvada)	82
<i>Liparis loeselii</i> (Róbert Šuvada)	84
<i>Lycopodium</i> spp. (Róbert Šuvada)	86
<i>Marsilea quadrifolia</i> (Róbert Šuvada)	88
<i>*Onosma viridis</i> (Róbert Šuvada)	90
<i>*Pulsatilla grandis</i> (Róbert Šuvada)	92
<i>*Pulsatilla patens</i> (Róbert Šuvada)	94
<i>*Pulsatilla pratensis</i> subsp. <i>hungarica</i> (Róbert Šuvada)	96

* <i>Pulsatilla slavica</i> (Róbert Šuvada)	98
* <i>Pulsatilla subslavica</i> (Róbert Šuvada)	100
* <i>Serratula lycopifolia</i> (Róbert Šuvada)	102
<i>Tephrosia longifolia</i> subsp. <i>moravica</i> (Róbert Šuvada)	104
<i>Thlaspi jankae</i> (Róbert Šuvada)	106
<i>Tozzia carpathica</i> (Róbert Šuvada)	108

Non-forest habitats

1340* Inland salt meadows (Pavol Eliáš)	110
1530* Pannonic salt steppes and salt marshes (Pavol Eliáš)	112
2340* Pannonic inland dunes (Róbert Šuvada)	114
3130 Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoëto-Nanojuncetea</i> (Kateřina Bubíková)	116
3140 Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> formations (Kateřina Bubíková)	118
3150 Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> – type vegetation (Kateřina Bubíková)	120
3160 Natural dystrophic lakes and ponds (Daniel Dítě)	122
3220 Alpine rivers and the herbaceous vegetation along their banks (Mária Zaliberová)	124
3230 Alpine rivers and their ligneous vegetation with <i>Myricaria germanica</i> (Mária Zaliberová)	126
3240 Alpine rivers and their ligneous vegetation with <i>Salix elaeagnos</i> (Mária Zaliberová)	128
3260 Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation (Kateřina Bubíková)	130
3270 Rivers with muddy banks with <i>Chenopodium rubri</i> p. p. and <i>Bidention</i> p. p. vegetation (Mária Zaliberová)	132
4030 European dry heaths (Róbert Šuvada)	134
4060 Alpine and boreal heaths (Jozef Šibík)	136
4070 Bushes with <i>Pinus mugo</i> and <i>Rhododendron hirsutum</i> (<i>Mugo-Rhododendretum hirsuti</i>) (Jozef Šibík)	138
4080 Sub-arctic <i>Salix</i> spp. scrub (Jozef Šibík)	140
40A0* Subcontinental peri-Pannonic scrub (Róbert Šuvada)	142
5130 <i>Juniperus communis</i> formations on heaths or calcareous grasslands (Róbert Šuvada)	144
6110 Rupicolous calcareous or basophilic grasslands of the <i>Alyso-Sedion albi</i> (Róbert Šuvada)	146
6120* Xeric sand calcareous grasslands (Pavol Eliáš)	148
6150 Siliceous alpine and boreal grasslands (Jozef Šibík)	150
6170 Alpine and subalpine calcareous grasslands (Jozef Šibík)	152
6190 Rupicolous pannonic grasslands (<i>Stipo-Festucetalia pallentis</i>) (Katarína Vantarová)	154
6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Iveta Škodová)	156
6210* Semi-natural dry grasslands and scrubland facies on calcareous substrates, *important orchid sites (Iveta Škodová)	158
6230* Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (Jozef Šibík)	160
6240* Sub-pannonic steppic grasslands (Pavol Eliáš)	162
6250* Pannonic loess steppic grasslands (Pavol Eliáš)	164
6260* Pannonic sand steppes (Pavol Eliáš)	166
6410 <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) (Viera Šefferová Stanová)	168
6430 Hydrophilous tall-herb fringe communities of plains and of the montane to alpine levels (Viera Šefferová Stanová)	170
6440 Alluvial meadows of river valleys of the <i>Cnidion venosi</i> (Viera Šefferová Stanová)	172
6510 Lowland hay meadows (Iveta Škodová)	174
6520 Mountain hay meadows (Katarína Vantarová)	176
7110* Active raised bogs (Daniel Dítě)	178
7120 Degraded raised bogs still capable of natural regeneration (Daniel Dítě)	180
7140 Transition mires and quaking bogs (Daniel Dítě)	182

7210* Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> (Daniel Dítě)	184
7220* Petrifying springs with tufa formation (<i>Cratoneurion</i>) (Daniel Dítě)	186
7230 Alkaline fens (Daniel Dítě)	188
8110 Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) (Róbert Šuvada)	190
8120 Calcareous and calshist screes of the montane to alpine levels (<i>Thlaspietalia rotundifolii</i>) (Róbert Šuvada)	192
8150 Medio-European upland siliceous screes (Róbert Šuvada)	194
8160* Medio-European calcareous scree of hill and montane levels (Róbert Šuvada)	196
8210 Calcareous rocky slopes with chasmophytic vegetation (Róbert Šuvada)	198
8220 Siliceous rocky slopes with chasmophytic vegetation (Róbert Šuvada)	200
8230 Siliceous rock with pioneer vegetation of the <i>Sedo-Scleranthion</i> or of the <i>Sedo albi-Veronicion dillenii</i> (Róbert Šuvada)	202

Forest habitats

9110 <i>Luzulo-Fagetum</i> beech forests (Ivor Rizman, Marek Garčár)	204
9130 <i>Asperulo-Fagetum</i> beech forests (Ivor Rizman, Marek Garčár)	206
9140 Medio-European subalpine beech woods with <i>Acer</i> and <i>Rumex arifolius</i> (Ivor Rizman, Marek Garčár)	208
9150 Medio-European limestone beech forests of the <i>Cephalanthero-Fagion</i> (Ivor Rizman, Marek Garčár)	210
9170 <i>Galio-Carpinetum</i> oak-hornbeam forests (Ivor Rizman, Marek Garčár)	212
9180* <i>Tilio-Acerion</i> forests of slopes, screes and ravines (Ivor Rizman, Marek Garčár)	214
9190 Old acidophilous oak woods with <i>Quercus robur</i> on sandy plains (Ivor Rizman, Marek Garčár)	216
91D0* Bog woodland (Ivor Rizman, Marek Garčár)	218
91E0* Alluvial forest with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) (Ivor Rizman, Marek Garčár)	220
91F0 Riparian mixed forests of <i>Quercus robur</i> , <i>Ulmus laevis</i> and <i>Ulmus minor</i> , <i>Fraxinus excelsior</i> or <i>Fraxinus angustifolia</i> , along the great rivers (<i>Ulmion minoris</i>) (Ivor Rizman, Marek Garčár)	222
91G0* Pannonic woods with <i>Quercus petraea</i> and <i>Carpinus betulus</i> (Ivor Rizman, Marek Garčár)	224
91H0* Pannonian woods with <i>Quercus pubescens</i> (Ivor Rizman, Marek Garčár)	226
91I0* Euro-Siberian steppic woods with <i>Quercus</i> spp. (Ivor Rizman, Marek Garčár)	228
91M0 Pannonian-Balkan turkey oak – sessile oak forests (Ivor Rizman, Marek Garčár)	230
91N0* Pannonic inland sand dune thicket (<i>Junipero-Populetum albae</i>) (Ivor Rizman, Marek Garčár)	232
91Q0 Western Carpathian calcicolous <i>Pinus sylvestris</i> forests (Ivor Rizman, Marek Garčár)	234
9410 Acidophilous <i>Picea</i> forests of the montane to alpine levels (<i>Vaccino-Piceetea</i>) (Ivor Rizman, Marek Garčár)	236
9420 Alpine <i>Larix decidua</i> and/or <i>Pinus cembra</i> forests (Ivor Rizman, Marek Garčár)	238

Data forms	240
-----------------------------	-----

Photo attachment	248
-----------------------------------	-----

References	284
-----------------------------	-----

I. Introduction

1. Background and objectives of monitoring

1.1 Definition of monitoring and general baseline

Monitoring of species and habitats of European interest is an important data source for nature protection in all member states of the European Union at national and international level and is the basis for decision-making, reasoning and professional preparation of documentation for natural protection as well as evaluation of the biodiversity objectives achieved.

The basic principle of monitoring is to persistently collect data on different species and habitats in the field using the same comparable methods and the precisely defined areas, so-called, permanent monitoring locality (PML). This is how it differs from classic field mapping.

The implementation of a comprehensive monitoring system is supported and encouraged by the commitments by Slovakia as a member state of the European Union. The monitoring of species and habitats of European interest, as well as reporting on their conservation status every six years to the European Commission is the responsibility of the EU Member States. These results from the provisions of Articles 11 and 17 of Council Directive no. 92/43 / EEC of 22 May 1992 on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive). The monitoring focuses on the species and habitats listed in the annexes to the Habitats Directive. Likewise, the directive implies a commitment to ensure care for the Natura 2000 sites (especially Article 6) as well as so-called species protection of selected species of plants and animals (articles 12-16).

1.2 Objectives of the monitoring

1.2.1 Monitoring as a basis for meeting of EU requirements concerning the reports on the status of plant species and habitats in the Slovak Republic

Monitoring data represent the basis for the development of reports on the status of species and habitats of European interest according to Art. 17 of the Habitats Directive (Reporting). This obligation is to be complied with at 6-year intervals. The report is relatively detailed and requires a lot of basic data. It has to be emphasized that the results of the reporting are then evaluated at European level and used as a basis to decide on the future direction and strategy of nature protection in the EU. It is also a basis for funding for Natura 2000 sites through the Structural Funds, LIFE financial instrument etc. Monitoring thus also influences the level of funding for nature protection in Slovakia.

1.2.2 Set-up of proper management at the national level

In the long run, the objective of monitoring is also to gather information for set-up of appropriate management at the national level. From the results of the monitoring it is possible to make a percentage assessment of the appropriateness of the selected management measures for the habitat. With repeated monitoring it is possible to detect and assess the changes in species composition and development trends in the observed populations.

1.2.3 Monitoring as a tool of preventive conservation of species and habitats

The information on the occurrence and conservation status of the monitored species and habitats in protected areas, as well as in the rest of the country, is an invaluable asset for practical natural conservation. In particular, it is an important information baseline for organizations dealing with nature protection (especially SNC SR), acting



© Stanislav Uhrín

in accordance with law no. 543/2002 Coll. on nature and landscape protection, as amended. It creates a framework to inform the involved parties, offices organizations and through publication of information at www.biomonitoring.sk it presents a tool for preventive conservation of species and habitats of European interest. Practical examples demonstrate that the collection of data from monitoring directly helps to protect species and habitats at the site level. Data from monitoring are public and everyone has access to them. Thus there can be no argument about lack of knowledge of a certain species/habitat in case of damage or destruction.

1.2.4 Monitoring as a basis for strategic planning at national level

Without systemic monitoring at national level, local objectives may be preferred regardless of a comprehensive assessment. Local priorities do not necessarily reflect the needs and objectives at the national level and vice versa. From the very beginning, the monitoring has become an essential source of information for development of the action plan of the SR for the biodiversity. The evaluation of the status is a tool for the assessment of the projects from the Operational Programme Environmental Quality 2014-2020. The priorities in the areas of natural protection will continue to be based on the data from the monitoring.

1.2.5 Monitoring and ecosystem services

Monitoring provides some information for the assessment of ecosystem services at the national, as well as at the local level. Monitoring data are used in the development of basic ecosystem maps.

1.2.6 Further benefits of systematic monitoring

Monitoring data provide further possibilities for the utilization of partial or summary data. They are used as basis for preparation of official statements by nature protection organizations, they are suitable for assessing of the environmental impacts and the data can be used to monitor the impact of climate change. Many other possible applications are constantly emerging and this large set of statistical data provides a framework for creative use and for further analyses, planning and evaluation.



© Janka Galvánková

2. The process of introducing monitoring of plants and habitats of European interest in Slovakia

2.1 Development of monitoring methodologies

List of the target species and habitats for monitoring was determined in the beginning of the process and based on the reference list of Annex II, IV and V of the Habitats Directive for species which occur in the Slovak Republic. For each individual species and habitat the detailed methodology has been created. The baseline was in existing monitoring methodologies, standard methods and past experience and from the other MS. All methodologies have uniform structure and part of the process was preparation of forms for each group of species and habitats. These data forms also determined the structure of the part of developed IT system, particularly the monitoring module in Comprehensive information and monitoring system (CIMS).

2.2 Proposal of permanent monitoring localities (PMLs)

Proposal of PMLs was based on the recent and historical data available on the species and habitats. During the monitoring it was necessary to verify the data and to adjust it to the actual condition. The network of PMLs was thus expanded during the course of the project and their boundaries were redefined.

Permanent monitoring localities for habitats were selected through stratified selection process in GIS, based on the following criteria:

- Area size (0.5 – 70 ha).
- Target habitat dominance within the area of PMLs in case of habitat complexes.
- Proposal and assessment of PMLs within each biogeographical bioregion (Alpine, Pannonian) independently (Figure 1).
- Geographical coverage – distribution of PMLs within the entire area of the species/habitats, to avoid large gaps and to avoid their concentration at a single location (Figure 1).
- Capturing of diverse quality of the species populations (quality of habitats, in order to capture representativeness to a large degree, i.e. to include in the PML network the localities with high quality as well as degraded sites).
- In case of rare species / habitats, all known sites should be included in the monitoring.
- Exception with respect to inclusion of the sites in the monitoring in case of the Bratislava region; based on the set-up of the European funding, where these funds are available only to a limited extent for the Bratislava Region.

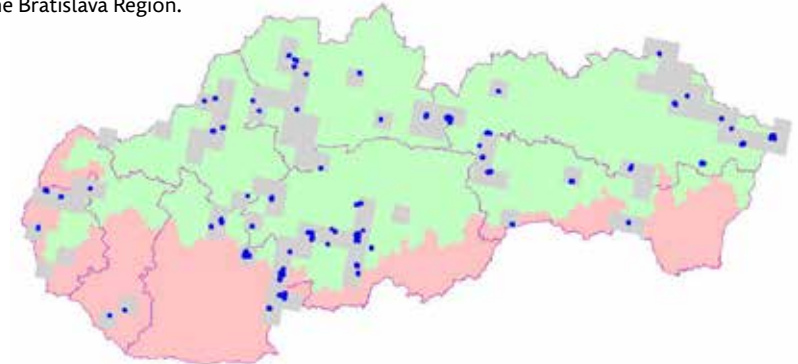


Figure 1 Distribution of PMLs for habitat 6410 based on the reporting from 2013 (grey squares) in Pannonian Bioregion (pink) and in Alpine Bioregion (green)

2.3 The establishment of new IT system – comprehensive information and monitoring system (CIMS)

For the purpose of collection, processing, evaluation and publication of data from field monitoring was new IT system developed – comprehensive information and monitoring system (CIMS) by proposal of SNC SR, which includes electronic forms for filling in data in accordance with the methodology of monitoring. CIMS development started in parallel with the development of methodologies, PML proposal and the main monitoring exercise executed in the field. Initial experiences of its use were continuously projected into the final form of the IT system.

Each record inserted into the IT system is evaluated by two levels of approval/validation by group leader and expert coordinators of the SNC SR. Approved records are displayed in a specified form to the public via portal www.biomonitoring.sk. CIMS daily summarizes and evaluates the data for the conservation status of species and its distribution.

2.4 Realization of field monitoring and processing of the data

Implementation of monitoring in the field began in the winter period of 2013 and lasted until early autumn 2015. The realization of the monitoring involved 152 mappers. The responsibility for individual plant species and habitats, monitoring was divided between the SNC SR and DAPHNE – Institute of Applied Ecology. For each taxonomic group the group leader was selected, whose task was to coordinate mappers and, where appropriate serve as methodology guide, provides communication towards the coordinators from DAPHNE and SNC SR and in particular check and approve the monitoring records from mappers. For three years of the project has been carried out and processed into CIMS over 7,800 records of plants and habitats monitoring.

2.5 Methods used to evaluate the conservation status

For the purpose of the assessment of the status of individual plant species and habitats, a new approach has been developed and implemented that uses data collected from monitoring in the field and presents the data graphically in status categories: favourable (FV), unfavourable-inadequate (U1), unfavourable-bad (U2). This assessment is based on the reports on the status of species and habitats presented periodically by the Slovak Republic to the European Commission under the provisions of the European Union directives. The conservation status is evaluated at several levels:

1. at the locality level
2. at the level of bioregion
3. at the national level
4. within Sites of Community Importance (SCIs)
5. for individual groups of plants and habitats

2.5.1 Evaluation of the conservation status at locality level (PML)

Evaluation of the conservation status of species at this level is based on the evaluation of partial parameters:

- a) Quality of the species' population at the locality.
- b) Quality of the species' habitat at the locality.
- c) Future prospects for the species at the locality.

These parameters are evaluated during a field visit, according to a defined methodology for each species separately. The method usually sets limits for individual conservation status categories (favourable, unfavourable-inadequate, unfavourable-bad).

Evaluation of the conservation status of habitats at this level is based on the evaluation of partial parameters:

- a) Quality of the habitat at the locality.
- b) Perspectives of the habitat at the locality.

These parameters are evaluated during a field visit, according to a defined methodology for each habitat separately or by an expert estimate of the mapper. The method usually sets limits for individual conservation status categories (favourable, unfavourable-inadequate, unfavourable-bad).

The parameters are expressed as percentage figures and may be categorized in individual status categories, the total for each parameter must reach 100 %. This is followed by an assessment to assess the status by individual parameters individually first, as follows:

Total status for a particular parameter is favourable, when the following values are achieved:

- favourable $\geq 85\%$, or favourable $\geq 70\%$ when unfavourable-bad at the same time = 0

Total status for a particular parameter is unfavourable-bad, when the following values are achieved:

- unfavourable-bad $\geq 50\%$

All remaining percentage values represent unfavourable-inadequate status.

This method is used to assess the quality of the species population, species habitat and the future prospects separately. In case of habitat monitoring, the same method is used to assess the quality of the habitat and the future prospects of the habitat separately. This is followed by a general evaluation of all assessed parameters. The weakest link matters here and so the assessment at the site level is carried out as follows:

- Where all three parameters for species are in favourable status (FV), the overall conservation status at the locality is also assessed as favourable (FV). If one or several parameters are assessed as unfavourable-bad (U2), the overall conservation status at the locality is assessed as unfavourable-bad (U2). All other combinations specify unfavourable-inadequate status (U1).
- Where both parameters for habitats are in favourable status (FV), the overall conservation status at the locality is also assessed as favourable (FV). If one of the two parameters is unfavourable-inadequate (U1) or unfavourable-bad (U2), the overall conservation status at the locality is assessed as unfavourable-inadequate (U1) or unfavourable-bad (U2).



© Marek Garčár

2.5.2 Assessment of the conservation status at the level of biogeographical region

The system of assessment is based on the assessment at locality level (PML). All locality assessments are summarized for the particular species/habitat, separately for the Alpine and for the Pannonian Bioregion, determining the percentage in favourable (FV), unfavourable-inadequate (U1), unfavourable-bad (U2) status. The prevailing status is decisive for the resulting status at the level of Alpine or Pannonian Bioregion.

2.5.3 Evaluation of the status at national level

The assessment of the status is the same as at the bioregion level, but the data is assessed regardless of the association with a particular bioregion, so the prevailing status is decisive for the overall status at the national level.

2.5.4 Evaluation of the conservation status at SCIs (Sites of Community Importance)

Only permanent monitoring localities (PMLs) within or bordering SCIs are assessed. The remaining localities outside the SCIs are not included in this assessment.

2.5.5 Evaluation of the conservation status for individual plant and habitat classes

The basic principle of assessment at the locality level is combined for all species/habitats in the same class. The results represent an overview of the proportion of favourable (FV), unfavourable-inadequate (U1) and unfavourable-bad (U2) assessment in summary for the entire class.

All of these assessment levels have been incorporated in the Comprehensive information and monitoring system (CIMS), performing automated assessments of conservation status based on actual data.

3. Summary information and statistical reports from monitoring of plant species and habitats

3.1 Baseline statistical data

- All reports and assessments presented in the publication are based on data collected for the period 01/2013 – 08/2015.
- The monitoring involves 65 habitat types, 18 of which are forest habitats and 47 non-forest habitats.
- The monitoring involves 49 plant species of European interest, 9 of which are bryophytes and 40 of which are vascular plants.
- Separate monitoring methodologies for each species and habitat have been developed for the purpose of data collection in the field.
- Monitoring of plant species is carried out at more than 900 localities.
- Monitoring of non-forest habitats is carried out at more than 4,400 localities.
- Monitoring of forest habitats is carried out at 2,268 localities.
- There have been more than 7,800 field visits throughout Slovakia.
- The monitoring of plant species and habitats was carried out by 152 experts/mappers.

The results were evaluated by the Comprehensive information and monitoring system (CIMS) of the State Nature Conservancy of the Slovak Republic (SNC SR) and made public via website www.biomonitoring.sk.



© Janka Galvánková

3.2 General assessment of the plant species and habitats conservation status

More than half of the localities contain populations of 49 monitored species in unfavourable status (Figure 2). Compared to the last report on the conservation status of plant species of European interest (reporting according to art. 17 of the Habitat Directive), the assessment on the basis of monitoring is approximately the same. In general the monitoring of vascular plants has a longer tradition than monitoring of habitats, therefore reporting information was confirmed. Compared to the obvious assessment of the vascular plants, in 45% of bryophytes species the reports on the conservation status of species report unknown status. New data resulted in diversification of this status proportionally in all three assessment levels (favourable, unfavourable-inadequate, unfavourable-bad).

Greater diversification of the assessment levels compared to the report on habitats of European interest appeared also in case of habitats. The monitoring supplemented the data for habitats of unknown status, especially water and rock habitats. Despite the fact that there are habitat classes mostly assessed favourably, the overall assessment was adversely affected by forest habitats and salt marshes habitats (Figure 3). Similar to plants, more than half of the habitats have favourable conservation status.

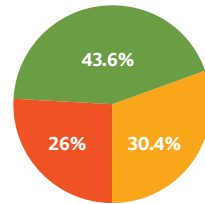


Figure 2 Plants

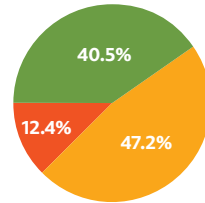


Figure 3 Habitats

Conservation status	Favourable	Unfavourable-inadequate	Unfavourable-bad
Plants	404	282	241
Habitats	2 535	3 083	810

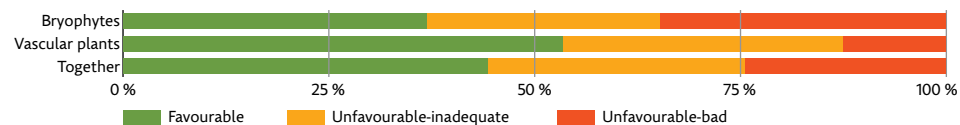
The table represent the absolute number of records from the field monitoring added into the comprehensive information system (CIMS) used to develop summary statistics. The number is always provided for the corresponding status category to which the record was assigned.

3.3 Summary assessment of the conservation status by individual groups

3.3.1 Plants

Of the total number of 50 plant species of European interest, 49 of which were monitored; the occurrence of *Angelica palustris* species was presently not confirmed in Slovakia. More than 50 % of vascular plant species were assessed in favourable conservation status. In case of bryophytes, the number is slightly over 30 % (Figure 4).

The worse results for bryophytes were caused by so-called negative records. As the selection of PMLs was based on verification of historical data, many localities have not been confirmed at all. PMLs were proposed at potential sites for occurrence of the species from the viewpoint of environmental demands, where the occurrence did not have to be confirmed. This was reflected in less favourable assessment of bryophytes.



3.3.2 Habitats

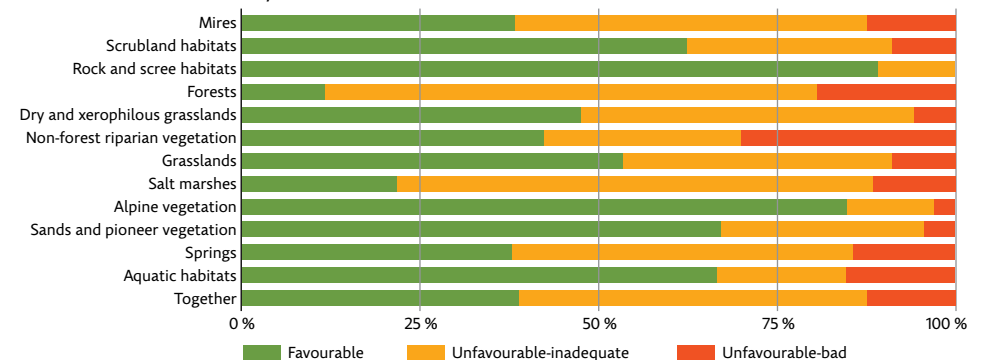
Of the total number of 67 habitats, 65 were monitored. Habitat 7150 Depressions on peat substrates with *Rhynchospora alba* was not confirmed in Borská nížina lowland, therefore it was not monitored. Habitat 91T0 Central European lichen Scots pine forests was not included in the monitoring as it was not observed in Slovakia at the time of project preparation, it was only included in the habitats checklist later.

Of all habitat classes, according to the following chart (Figure 5), forest habitats have the lowest proportion of favourable status localities. The assessment results have deteriorated significantly compared to the report on the conservation status of habitats (reporting). This is a result of the more stringent assessment methodology, where the quantity of dead wood is a limiting parameter. The overall favourable conservation status of forest habitats is positively influenced by relatively inaccessible

habitats (Western Carpathian calcicolous *Pinus sylvestris* forests, *Tilio-Acerion* forests of slopes, screes and ravines, Acidophilous *Picea* forests of the montane to alpine levels, etc.). Other forest habitats had unfavourable assessments, because PMLs were proposed primarily in commercial forests, which did not reach the required proportion of dead wood according to the established methodology.

Changes in the habitat assessments occurred also in groups – mires and fens (including petrifying springs with tufa formations), sand and pioneer vegetation and salt marshes – in favour of a favourable conservation status. The most significant positive changes compared to the Reporting on habitats conservation status were observed in case of salt meadows, which had 100 % unfavourable-bad status assessment. This is probably related to increased level of knowledge and data quality, as well as to the revitalisation measures under the project LIFE10NAT/SK/083.

The best assessments were observed in rock and screes habitats and alpine vegetation. These arise from relative inaccessibility stands of these habitats and low economic utilization.



3.4 Assessment of pressures and threats

The assessment of pressures and threats is an integral part of the monitoring because it provides essential information for initial identification of potential sources of problems that prevent the attainment of a favourable status at the site now or in the future. Data assessment demonstrates that the most common pressures to plant species and habitats arise from biotic and abiotic processes, especially secondary succession changes. The other two significant pressures are insensitive forest management and agricultural intensification.

The following table summarizes the negative pressures and threats classified in higher categories. The pressures reflect the current problems at the monitored sites; threats summarize the problems expected in the near future.

Category of pressure/threat	Plants		Habitats	
	Current pressures	Future threats	Current pressures	Future threats
natural biotic and abiotic processes (except for disasters)	19.0 %	19.0 %	23.8 %	24.6 %
forestry	14.8 %	20.1 %	12.4 %	10.4 %
agriculture	13.0 %	11.6 %	16.2 %	16.8 %
human impact	9.5 %	8.8 %	7.3 %	7.1 %
utilization of biological resources other than agriculture and forestry	8.6 %	5.3 %	8.7 %	9.2 %
pollution	7.5 %	6.7 %	2.3 %	2.0 %
natural changes of ecosystems	7.1 %	8.9 %	2.6 %	2.5 %
transport and communication	6.3 %	3.6 %	15.8 %	15.8 %
urban development, settlements and development	5.1 %	5.5 %	1.0 %	1.0 %
climate change	2.9 %	3.9 %	1.1 %	1.1 %
invasive or otherwise problematic species	2.3 %	3.2 %	6.6 %	7.6 %
unknown threats	2.0 %	1.7 %	0.0 %	0 %
mining, raw material exploitation, energy production	1.1 %	1.3 %	0.6 %	0.6 %
natural disasters	0.3 %	0.2 %	1.6 %	1.3 %

Legend – vascular plants

Scientific name of the species; author and year of description; taxonomic classification.
(an asterisk * indicates a priority species)

Total number of permanent monitoring localities (PMLs)
for the particular species.

Very brief annotation of the method used for monitoring of PML. Monitoring methods are provided in a separate publication.

Map representing permanent monitoring localities for the species in favourable status (green), unfavourable-inadequate status (orange) and unfavourable-bad status (red) from the last field visit at the locality. Blue 10×10 km grids show the distribution of the species according to the reporting under the Article 17 of the Habitats Directive (2013) Violet shows the border between Alpine and Pannonian Biogeographical Region.

Population size and estimated trend of population development – a combination of expert estimates and data reporting under the Article 17 of the Habitat Directive. Categories of population trend mean: + (increasing), – (decreasing), 0 (stable), × (unknown)

Three assessed parameters (quality of population, quality of species habitat and future prospects) are the general data determined at each PML, required for the reporting under the Article 17 of the Habitats Directive. The report is submitted to the European Commission for each species separately, for both Alpine (ALP) and Pannonian (PAN) Biogeographical Region, every 6 years. They are assessed in 3 categories: FV – favourable (green), U1 – inadequate (orange) and U2 – bad (red), resp. XX – unknown (grey). The numbers in the graphs represent the percentage of the corresponding status category.

Monitoring of plants and habitats of Community interest in the Slovak Republic

Dracocephalum austriacum L. (Lamiales, Lamiaceae)

A perennial herb or half-bush with feather-like leaves and up to 5 cm large violet-blue flowers. It occurs on carbonate rocks on rocky terraces and grasslands in the colline and submontane belts.

Number of PMLs: 13 PML average area size: 200 m²

Number of involved experts: 2 Number of PML field visits: 38

Monitoring method: In the surveyed PMLs, the number of clumps, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (May – June).

PMLs distribution and localization: The spread of the species is concentrated in Slovenský kras Mountains where it has five areas at the present time, consisting of: 12 subpopulations (Gemerské Teplice, Domic, Plešivská planina – southern part, Plešivská planina – northern part, Zádielska planina) and one location in Dreveník near the village of Spišské Podhradie.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 250 – 500 individuals
Estimate of the population size in the Pannonian Bioregion: 150 – 350 individuals
Estimate of the population development trend: ALP: 0 PAN: 0

Population quality in PMLs:

ALP: 20 51.4 28.6

PAN: 100

Overall population quality: ALP: U1 PAN: FV

Habitat quality for the species in PMLs:

ALP: 100

PAN: 100

Overall habitat quality for the species: ALP: FV PAN: FV

Future prospects of habitat for the species in PMLs:

ALP: 91.4 8.6

PAN: 100

Overall future prospects of habitat for the species: ALP: FV PAN: FV

60

The most commonly occurring pressures and threats for the species at the PMLs.

Pressures and threats: The most significant threats are succession ingrowth, insufficient grazing, the trampling and collection of plants in the locations accessible for tourists. The small populations are affected by the low genetic diversity causing a low production of seeds.

Assessment and notes on the monitoring results: Favourable status has been reached in the Pannonian Bioregion where the most numerous population occurs at the present times – in PML Domic with 262 clumps (2015), therefore the evaluation of the population quality was favourable in this location. However, the quality is insufficient in the Alpine Bioregion, only 20 % of the records of PMLs are evaluated as favourable, and only the population in Dreveník and one subpopulation in Zádielska planina have favourable evaluations for every year. Low quality of the populations is regularly recorded in up to three locations where the species did not occur or occurs only in critically small quantities. In 2004 the illegal collection of plants was detected and after the removal of the reproducing individuals the whole subpopulation disappeared within two years. The total number of the individuals, particularly the juvenile plants, is greatly dependent on the weather conditions in the spring. Since 2005, bigger declines in the populations were observed if the rainfall was insufficient. The overall quality of the habitat and its future prospects are evaluated favourably. There are at least small-scale interventions in many locations that suppress the succession of bushes and trees. The most appropriate care in the long term would be the return of these locations to pasture usage. The estimate of the trend in the population development for the coming period is stable, a more significant decrease in the quantity of the species in our country is not expected.



© Milan Barlog

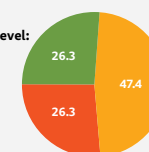


© Róbert Šuvarda

Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: U1 PAN: FV
Conservation status in SCIs: U1
Overall conservation status on national level: U1



By bioregion:

ALP: 20 51.4 28.6

PAN: 100

Images of the species or its typical habitat

Evaluation of the monitoring results, experience and proposals for species conservation in order to improve its status.

Overall assessment of the status of the species by individual biogeographical regions and at the national level.

Resulting status within the Sites of Community Importance (SCIs):

FV – Favourable
U1 – Inadequate
U2 – Bad
XX – Unknown

61

Note: All data in the publication, assessments and statistics are related to the period of 01/2013 – 08/2015.

Legend – habitats

Total number of **permanent monitoring localities (PMLs)** for the habitat type.

The most common typical plant species found in PMLs. Species data were evaluated based on data records from PMLs.

Very brief annotation of the method used for monitoring of habitat at PML. Monitoring methods are provided in a separate publication.

Map representing permanent monitoring localities for the habitat in favourable status (green), unfavourable-inadequate status (orange) and unfavourable-bad status (red) from the last field visit at the locality. Blue 10×10 km grids show the distribution of the habitat according to the reporting under the Article 17 of the Habitats Directive (2013) Violet shows the border between Alpine and Pannonian Biogeographical Region.

Estimated trend of habitat development is based on expert judgment combined with data from Habitats Directive Article 17 reporting. Categories of habitat development trend mean: + (increasing), – (decreasing), 0 (stable), × (unknown)

Three assessed parameters (quality of habitat, habitat management and future prospects) are the general data determined at each PML, required for the reporting under the Article 17 of the Habitats Directive. The report is submitted to the European Commission for each habitat separately, for both Alpine (ALP) and Pannonian (PAN) Biogeographical Region, every 6 years. They are assessed in 3 categories: FV – favourable (green), U1 – inadequate (orange) and U2 – bad (red), resp. XX – unknown (grey). The numbers in the graphs represent the percentage of the corresponding status category.

Natura 2000 code and Name of the Habitat type (under the Annex I of the Habitats Directive, an asterisk * indicates a priority habitat)

Monitoring of plants and habitats of Community interest in the Slovak Republic

1340* Inland salt meadows

In the Pannonian Region the habitat consists of open and closed grassland formations on meadows and pastures in saline soils (habitat – Inland salt marshes). In the Carpathian Region these are formed around travertine springs (habitat Carpathian Travertine Salt Marshes).

Number of PMLs: 47 **PML average area size:** 5 ha
Number of involved experts: 4 **Number of PML field visits:** 83
Average taxon count on record: 41

Typical species found in the PMLs: *Tripolium pannonicum*, *Festuca pseudovina*, *Podospermum canum*, *Atriplex littoralis*, *Carex distans*, in the inland salt marshes habitat and *Triglochin palustre*, *Glaux maritima*, *Trichophorum pumilum* in the Carpathian travertine salt marshes.

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in a period from 1st of June to 30th of September.

Habitat distribution and localization of PMLs: The centre of current distribution is in the Pannonian Bioregion, with the habitat being rare in the Alpine Bioregion (Spišská kotlina basin only). It is usually distributed in mosaic pattern together with other communities.



Monitoring results:

Estimate of trend of habitat development: ALP: – PAN: –

Habitat quality in PMLs:

ALP: 75 PAN: 25

PAN: 17.8 75.6 6.6

Overall habitat quality: ALP: FV PAN: U1

Habitat management in PMLs:

ALP: 53.8 PAN: 46.3

PAN: 29.6 70.4

Habitat prospects in PMLs:

ALP: 43.8 PAN: 56.2

PAN: 22.2 73.3 4.5

Overall prospects of habitat: ALP: U1 PAN: FV

110

The most commonly occurring pressures and threats for the habitat at the PMLs.

Non-forest habitats

Pressures and threats: Negative pressures of medium intensity on the habitat in the Alpine Bioregion come especially from succession processes (31 %), lack of grazing (23 %) and changes in hydrological regime (15 %). In the Pannonian Bioregion the most common negative pressures with medium intensity include the succession (28 %) and problematic indigenous species (26 %). Each year there is also damaging ploughing of the salt marshes' vegetation, which leads to the growth of expansive and invasive species.

Assessment and notes on the monitoring results: In the Alpine Bioregion the quality of the habitat is favourable in the vast majority of sites (75 %), yet the habitat is generally in an unfavourable condition. In the Pannonian Bioregion the quality of the habitat is unfavourable in the vast majority of sites (75 %). The reasons for this include changes in hydrological regime, lack of appropriate management or a lack of management as such. These reasons are among the most frequently mentioned pressures and threats in both bioregions. The prospects of the habitat in the Pannonian Bioregion are unfavourable (73 %), as the habitat has been preserved on only relatively small fragments of land with damaged hydrological regime, which is surrounded by intensively managed agricultural land. On the other hand, the situation in the Alpine Bioregion is much better, with up to 75 % of the sites being assessed as in favourable condition. To maintain the favourable condition of the habitat, it is necessary to ensure its regular maintenance – either mowing or grazing. The site maintenance was restored at several sites, such as Kamenínske slaniská salt marshes, Mostová, Bokroš and Pavelské slanisko salt marshes. Restoration of regular maintenance as well as of hydrological regime, elimination of problematic native and invasive species is essential for sites which are in bad and unfavourable condition.

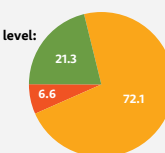


Some important species were also recorded on PMLs, for example species from Orchidaceae family, such as *Dactylorhiza majalis* and *Orchis coriophora* on the Carpathian travertine salt marshes. The Carpathian travertine salt marshes represent a unique habitat type and therefore its preservation should be made a priority. Halophytes (*Glaux maritima*, *Scorzonera parviflora*, *Trichophorum pumilum*) as well as some calcareous fen species (*Carex davalliana*, *Schoenus ferrugineus*, *Triglochin maritima*) can be found here growing side by side. Long term maintenance of favourable condition of the habitat can be secured by safeguarding the regular maintenance.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN: U1
Conservation status in SCIs: U1 U1
Overall conservation status on national level: U1



By bioregion:

ALP: 31.2 68.8
PAN: 17.8 73.3 8.9

111

Images of the habitat

Evaluation of the monitoring results, experience and proposals for habitat conservation in order to improve its status.

Overall assessment of the status of the habitat by individual biogeographical regions and at the national level.

Resulting status within the Sites of Community Importance (SCIs):

FV – Favourable
U1 – Inadequate
U2 – Bad
XX – Unknown

Note: All data in the publication, assessments and statistics are related to the period of 01/2013 – 08/2015.

***Buxbaumia viridis* (Moug. ex Lam. et DC.) Brid. ex Moug. et Nestl. (Muscopsida, Buxbaumiaceae)**

Green Shield-moss is found in shady, damp locations in old fir-beech and spruce forest stands in mountain areas. It grows on rotting logs or stumps of predominantly coniferous trees (fir, spruce).

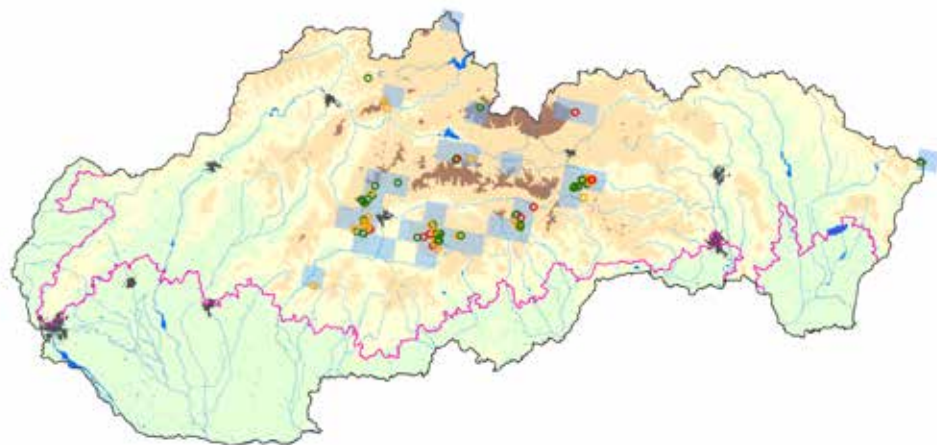
Number of PMLs: 104 **PML average area size:** 2.15 ha

Number of involved experts: 9 **Number of PML field visits:** 78

The most common accompanying species: *Herzogiella seligeri*, *Dicranum scoparium*, *Rhizomnium punctatum*, *Dicranum montanum*, *Lepidozia reptans*, *Lophocolea heterophylla*, *Blepharostoma trichophyllum*, *Tetraphis pellucida*, *Sanionia uncinata*, *Cephalozia bicuspidata*

Monitoring method: Visual identification of sporophytes (sporangia) of species on surface of dead wood on the targeted trunks. This was done once per two years at the time of snowmelt until the end of May and from September until the first major frost, and if necessary until snowfall.

PMLs distribution and localization: Occurrence of species is concentrated in the old and preserved forest stands with plenty of dead wood, mainly in Central Slovakia.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 76 – 190 trunks with species occurrence (590 – 900 species sporangia)

Estimate of the population development trend: ALP: 0 PAN:

Population quality in PMLs:

ALP: 62.8 25.6 11.6

PAN:

Overall population quality: ALP: U1 PAN:

Habitat quality for the species in PMLs:

ALP: 74.4 21.8 3.8

PAN:

Overall habitat quality for the species: ALP: U1 PAN:

Future prospects of habitat for the species in PMLs:

ALP: 70.5 28.2 1.3

PAN:

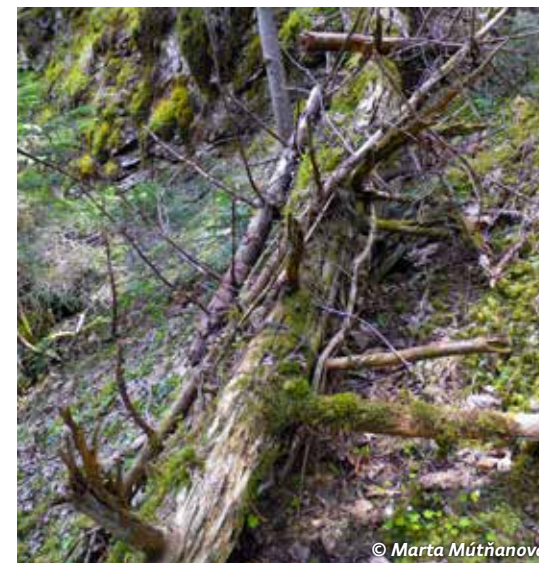
Overall future prospects of habitat for the species: ALP: U1 PAN:

Pressures and threats: Considering the ecology of the species, the biggest threat is habitat interference. The most frequently occurring adverse pressures and threats to the species include economic interventions (timber harvesting), which result in a change of sunlight and humidity conditions of the locality (91 %). Decomposing trunks are dried out and the character of the "substrate" for the species is changed and other types of mosses emerge, which endure more sunlight and a drier environment. With the creation of dense overgrowth these plants exclude Green Shield-moss.

Assessment and notes on the monitoring results: At most sites, the quality of habitat for species and species population is favourable. Considering the results of monitoring and progressive identification of new sites we



© Anton Potaš



© Marta Mútnianová

can expect the occurrence over a larger area in Slovakia than is currently known. Some of the monitored sites are in unfavourable condition, mainly because of the small size of older forest stands and lack of so-called "deadwood". This is influenced particularly by the intensity and method of managing in forest stands and the retention of a certain percentage of wood in place. Since the species can be identified in a particular area only when creating sporophytes (sporangia), the size of the population depends on this factor; this is affected for example by weather patterns in a given year.

In subsequent years it will be sufficient to continue with the monitoring of species at two-year intervals.

To support the species particularly in protected areas we can definitely recommend the retention of large dead wood in forest stands with the minimum of 5 pcs/ha.

Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: U1 PAN:

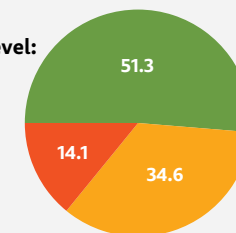
Conservation status in SCIs: U1

Overall conservation status on national level: U1

By bioregion:

ALP: 51.3 34.6 14.1

PAN:



***Dicranum viride* (Schull. et Lesq.) Lindb.**
(Muscopsida, Dicranaceae)

Dicranum viride moss is found on the bark of deciduous trees (e.g. beech, hornbeam and maple) where it grows mainly in the lower parts of the trunk. Its sites are solely located in the acidophilous beech forests in Eastern Slovakia.

Number of PMLs: 7 **PML average area size:** 17 ha

Number of involved experts: 1 **Number of PML field visits:** 27

The most common accompanying species: *Isoetecium myurum*, *Paraleucobryum longifolium*, *Dicranum montanum*, *Pterigynandrum filiforme*, *Hypnum cupressiforme*, *Metzgeria furcata*, *Hypnum andoi* (syn.), *Radula complanata*, *Pseudoleskeella nervosa*, *Anomodon attenuatus*

Monitoring method: Recording the percentage representation of the species in fixed areas each year during the period from 1st of May to 30th of October (2 visits were carried out at the site per year).

PMLs distribution and localization: Its occurrence is concentrated exclusively in Bukovské vrchy Mountains.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 0.6 – 1 m²

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: 0 PAN:

Population quality in PMLs:

ALP: 81.5 7.4 11.1

PAN:

Overall population quality: ALP: U1 PAN:

Habitat quality for the species in PMLs:

ALP: 100

PAN:

Overall habitat quality for the species: ALP: FV PAN:

Future prospects of habitat for the species in PMLs:

ALP: 100

PAN:

Overall future prospects of habitat for the species: ALP: FV PAN:

Pressures and threats: The species is not directly threatened by damaging of its populations. The only pressure on the population is the damage of its habitat. As it grows in forest stands, which are not always in reserves with non-intervention regimes, it is threatened by timber harvesting (100 %). This harvesting of the forest stand removes the trees on which the species grows; this also changes the micro-climate of surrounding peripheral stands (non-harvested), which would not be suitable for this species.

Assessment and notes on the monitoring results: The results of the three year monitoring show that the current state of the habitat, as well as its future prospects is favourable for this species because it occurs in well-preserved forest stands. In order to protect this species it is necessary to ensure the conservation of forest



stands with occurrence of *Dicranum viride* without affecting the planning of management within the forest management plans. The state of its population during the monitoring was shown as unfavourable, which affected the negative findings. Each site was visited twice annually, but the species was not always found because as we also searched new areas for its occurrence. The days the species was not found the condition of the population was rated as unfavourable-inadequate or unfavourable-bad, which affected the overall quality assessment of the population. However, we can say that the population of the species within the known sites is in favourable condition, taking into account the fact that compared to historical sites there were three new sites identified during last three years of monitoring.

In future years monitoring of the sites once a year shall be sufficient.

Overall assessment of the conservation status of species

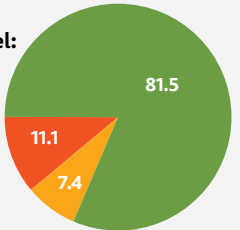
Conservation status on national level:
Con. status of species: ALP: U1 PAN:

Conservation status in SCLs: U1
Overall conservation status on national level: U1

By bioregion:

ALP: 81.5 7.4 11.1

PAN:



Hamatocaulis vernicosus (Mitt.) Hedenäs (syn. *Drepanocladus vernicosus* (Mitt.) Warnst.) (Muscopsida, *Amblystegiaceae*)

The species is limited to fens and transitional mires with well-preserved water regimes. It grows mostly in places where the groundwater level occurs near the surface. It forms a continuous layer or grows in-between the other kinds of mosses.

Number of PMLs: 40

PML average area size: 2.6 ha

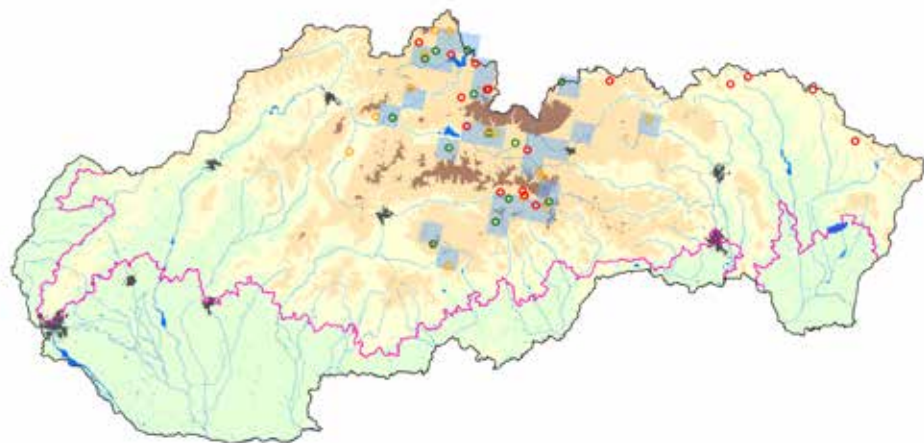
Number of involved experts: 4

Number of PML field visits: 59

The most common accompanying species: *Carex nigra*, *Equisetum palustre*, *Potentilla erecta*, *Calliergonella cuspidata*, *Filipendula ulmaria*, *Galium uliginosum*, *Carex panicea*, *Salix pentandra*, *Valeriana simplicifolia*

Monitoring method: Plant species record (relevés) with the coverage estimated according to Braun-Blanquet cover-abundance scale once every two years during the period from 1st of May to 30th of August.

PMLs distribution and localization: The occurrence of species is concentrated in the foothill areas of Central Slovakia from Poľana Mountains to Orava Region, Tatry and Pieniny Region.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 39 – 96 m²

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: 0

PAN:

Population quality in PMLs:

ALP: 40.7 22 37.3

PAN:

Overall population quality: ALP: U1

PAN:

Habitat quality for the species in PMLs:

ALP: 44.1 44.1 11.8

PAN:

Overall habitat quality for the species: ALP: U1

PAN:

Future prospects of habitat for the species in PMLs:

ALP: 37.3 47.5 15.2

PAN:

Overall future prospects of habitat for the species: ALP: U1

PAN:

Pressures and threats: The main threat to the species comes from the changing conditions on the mire by adjustment of water regime with drainage of surrounding lands, or the sites directly (12 %). Due to variations in the hydrological conditions of the sites and subsequent changes to the use (abandonment of extensive cutting) the sites are overgrown with scrubs and trees and strong competitors are expanding (72 %). Such a succession further deteriorates the hydrological conditions of the site, contributing to its drying and limiting the existence of the species. A specific negative pressure was identified on the sites where grazing was provided (5 %), the movement of animals caused the destruction of vegetation cover and eutrophication of the site. Extensive mowing of sites had a positive impact on the population of the species and its habitat (77 % of sites).



© Marta Mútnánová

Assessment and notes on the monitoring results: The overall status of the species in Slovakia is unfavourable, since the water regime is altered in the majority of its habitats. Populations of species at these sites are small and have only cover a few square decimetres. Changes in the hydrological regime are negatively impacting the quality of habitat and its future prospects, which are mostly unfavourable-inadequate or unfavourable-bad. Locations are overgrown with scrubs and trees so it is now difficult to ensure the appropriate management measures that create optimal conditions for the existence of the species. During the monitoring we verified the historical data on the occurrence of species and the species was not confirmed on about 37 % of the sites. These sites will be excluded from further monitoring.

At existing locations of species it is necessary to provide adequate care, preserve the water regime and continue to monitor the species at two-year intervals.



© Marta Mútnánová

Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: U1 PAN:

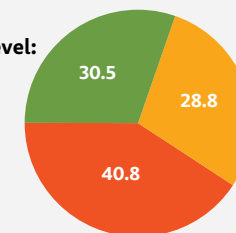
Conservation status in SCIs: U1

Overall conservation status on national level: U1

By bioregion:

ALP: 30.5 28.8 40.8

PAN:



Leucobryum glaucum (Hedw.) Angstr. (Muscopsida, Leucobryaceae)

White Pincushion Moss is a relatively common species that creates a continuous layer or grows as part of a mosaic in acidophilous oak or spruce forests.

Number of PMLs: 59 **PML average area size:** 69.7 ha

Number of involved experts: 7 **Number of PML field visits:** 74

The most common accompanying species: *Polytrichum formosum*, *Dicranum scoparium*, *Hypnum cupressiforme*, *Pleurozium schreberi*, *Hylocomium splendens*, *Dicranum polysetum*, *Pohlia nutans*, *Polytrichum commune*, *Atrichum undulatum*, *Eurhynchium striatum*

Monitoring method: Recording the percentage ground cover of the species at sites once per two years during the period without snow cover.

PMLs distribution and localization: PML occurrence is concentrated mainly in the regions of Záhorie, Malé Karpaty, Kysuce and the mountains of Central Slovakia (mainly Tatry) with rare occurrences in several sites in the Eastern Slovakia.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 800 – 1,000 m²

Estimate of the population size in the Pannonian Bioregion: 500 – 1,000 m²

Estimate of the population development trend: ALP: – PAN: 0

Population quality in PMLs:

ALP: 26 26 48

PAN: 70.8 16.7 12.5

Overall population quality: ALP: U1 PAN: U1

Habitat quality for the species in PMLs:

ALP: 46 34 20

PAN: 66.7 25 8.3

Overall habitat quality for the species: ALP: U1 PAN: U1

Future prospects of habitat for the species in PMLs:

ALP: 42 36 22

PAN: 70.8 12.5 16.7

Overall future prospects of habitat for the species: ALP: U1 PAN: U1

Pressures and threats: The species is mostly widespread in the Pannonian region and especially in Záhorie Region. The main threat to this species in this area comes from forest management (88 %), which includes frequent harsh methods of harvesting, which leads to disruption and “disposal” of the top layer of soil cover. An additional risk is mining activity (6 %), mainly sand mining. Sites in the Alpine Bioregion are negatively affected most by inappropriate method of forest management (68 %), construction of forest roads (8 %) and a large proportion by natural processes, for example calamities during strong winds (19 %).

Assessment and notes on the monitoring results: During the monitoring we assessed the current status of the sites that were identified for monitoring based on the potential for the occurrence of the species. In 48 % of the sites the



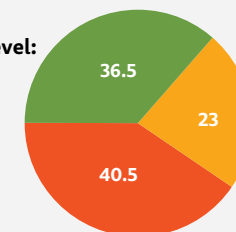
presence of the species has not been confirmed and at these sites the species population status has been assessed as unfavourable-bad. In future monitoring these sites will be excluded and only confirmed locations of the species will be further monitored. Overall, it is possible to assess that the populations of the Pannonian Bioregion have better conditions than the populations in the Alpine bioregion. The species is found here in larger areas and forms a continuous layer, while in the Alpine bioregion populations are mostly patches in mosaic layer or just occasional occurrences. Extensive sites of species in Tatry Mountains were significantly affected by the wind storm disaster in 2004. This calamity caused disappearance of multiple sites with only small isolated sites left.

In the future it will be sufficient to monitor the species at a frequency of once every two or three years.

At places where the species occurs it is necessary to ensure suitable methods of management for the future conservation of the species.

Overall assessment of the conservation status of species

Conservation status on national level:
Con. status of species: ALP: U2 PAN: U1
Conservation status in SCIs: U1
Overall conservation status on national level: U1



By bioregion:



Mannia triandra (Scop.) Grolle
(Hepaticopsida, Aytoniaceae)

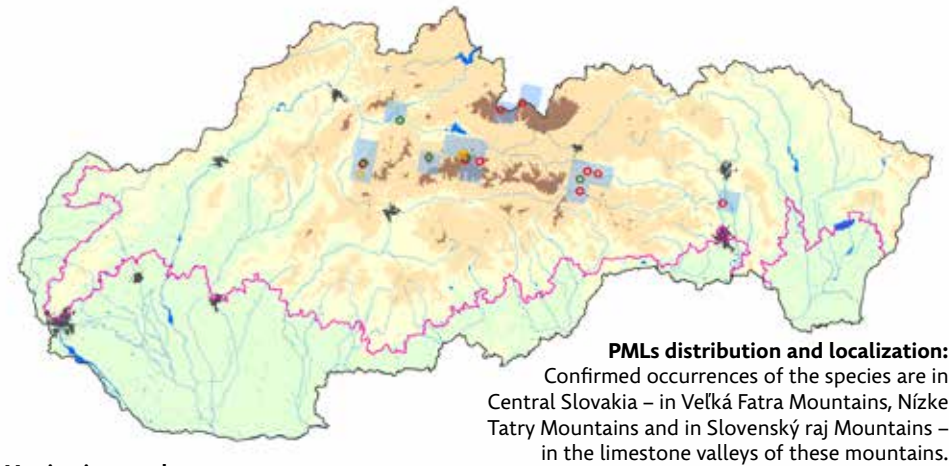
This species is found mostly on exposed substrate, which is regularly disturbed and maintained without engaging vegetation e.g. at the curbs of pavements, at the edge of small ravines, in crevices under rocks. It is only found on basic substrate (limestone and dolomites). Occurrence of the species is most commonly reported in mildly sunny and dry sites.

Number of PMLs: 15 **PML average area size:** 15 ha

Number of involved experts: 4 **Number of PML field visits:** 83

The most common accompanying species: *Tortella tortuosa*, *Fissidens dubius*, *Ctenidium molluscum*, *Encalypta streptocarpa*, *Preissia quadrata*, *Ditrichum gracile*, *Bryum pallens*, *Neckera crispa*, *Pedinophyllum interruptum*

Monitoring method: Recording of the percentage cover of the species in permanent monitoring areas; recording the occurrence of fertile thallus and their number once per year in the period from 1st of April to 30th of May (until the end of June at higher altitudes) with a frequency of three times a year for each site to identify the presence of the species.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 2,600 – 7,000 thalli

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: 0 PAN:

Population quality in PMLs:



Overall population quality: ALP: U2 PAN:

Habitat quality for the species in PMLs:



Overall habitat quality for the species: ALP: U1 PAN:

Future prospects of habitat for the species in PMLs:



Overall future prospects of habitat for the species: ALP: U1 PAN:

Pressures and threats: The species is threatened especially by negative pressures on its sites. For sites in forest stands the greatest threat is the change of actual forest management (particularly harvesting of forest stands), which changes the light conditions of the site and mechanically damages areas with the occurrence of the species. Such a threat has been identified for 56 % of monitored localities. Another threat is rock climbing (32 %), which may result in mechanical damage of the populations of the species. At 3 % of the sites we identified a negative pressure from succession, i.e. colonization by strong competitors, including mosses.

Assessment and notes on the monitoring results: The status of the species from the na-



© Marta Mútnánová



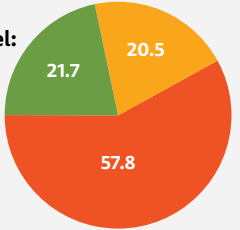
© Marta Mútnánová

tional perspective and also from bioregion perspective is favourable-bad, as the species was confirmed only on four sites in Velká Fatra Mountains, two sites in Slovenský raj Mountains and four sites in Nízke Tatry Mountains. The species was not confirmed at other locations. Each site was visited three times with each visit to different part of PML and outcomes of some of the visits were negative. PML visits without identification of new microsites with the occurrence of the species negatively affected the overall assessment of the conditions. In the future it is appropriate to propose visits to sites only once a year and so remove these distortions. We may conclude that for most of the confirmed localities the populations are stable, reproducing and in good condition.

For existing locations, it is necessary to ensure that they remain preserved in their current status, which is suitable for the species.

Overall assessment of the conservation status of species

Conservation status on national level:
Con. status of species: ALP: U2 PAN:
Conservation status in SCIs: U2
Overall conservation status on national level: U2



By bioregion:



Ochyraea tatrensis Váža
(Muscopsida, Hypnobartlettaceae)

Ochyraea tatrensis is endemic to Slovakia. It occurs only in the upper parts of streams in the subalpine and alpine belts, in areas with steep slopes (rock terraces). Its population is completely flooded with water for the most of the year, or the water flows through them at least partially.

Number of PMLs: 4 PML average area size: 2.6 ha

Number of involved experts: 1 Number of PML field visits: 16

The most common accompanying species: *Scapania undulata*, *Hygrohypnum smithii*, *Palustriella commutata*, *Brachythecium rivulare*, *Jungermannia pumila*, *Bryum pseudotriquetrum*

Monitoring method: Recording the percentage cover of species in permanent monitoring localities for each year in the period from 1st of June to 15th of September (two visits to the site made per year).

PMLs distribution and localization: The species is found only in Nízke Tatry Mountains, where it was confirmed in two valleys.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 3.5 – 4 m²

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: 0 PAN:

Population quality in PMLs:



PAN:

Overall population quality: ALP: U2 PAN:

Habitat quality for the species in PMLs:



PAN:

Overall habitat quality for the species: ALP: U1 PAN:

Future prospects of habitat for the species in PMLs:

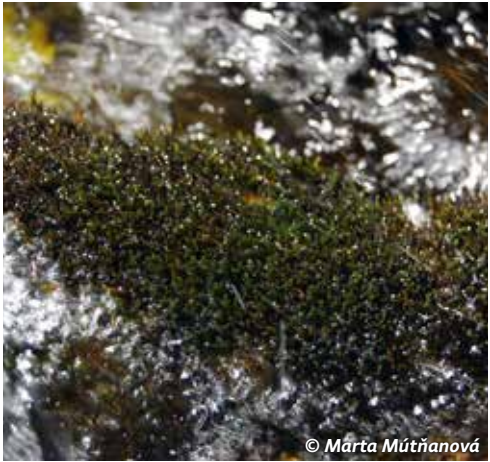


PAN:

Overall future prospects of habitat for the species: ALP: U1 PAN:

Pressures and threats: Currently, the species is not directly threatened. It is found in areas that are not directly threatened by investment activities. Threats have been established as potentially due to climate change, in particular the lack of precipitation and drying of water streams (90 %), which could allow the expansion of other species of bryophytes to the detriment of *Ochyraea tatrensis*. Potential threats in the future may also include collection as herbarium items (10 %).

Assessment and notes on the monitoring results: The species has only been confirmed in two of the four monitored localities so far, these were identified based on reference data. In the confirmed localities the population is good to inadequate, depending on the distribution of the species at different streams (if the species



© Marta Mútnánová

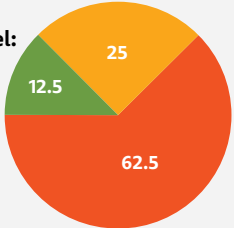


creates continuous vegetation, or its occurrence is isolated only to small pads). Status of habitat and its future prospects are assessed as favourable for both locations, which creates a starting point for further conservation of the species.

Monitoring was conducted on localities with a frequency of two visits a year, during which the existing permanent monitoring localities were checked (with recording of the species' occurrence), also other parts of the stream were searched. During the days when other parts of the stream were searched and the species was not found, the condition of the population of the species was assessed as unfavourable. The localities with unconfirmed occurrence worsen the overall status of the species. In the future it will be sufficient to monitor once a year at each site.

Overall assessment of the conservation status of species

Conservation status on national level:
Con. status of species: ALP: U2 PAN:
Conservation status in SCIs: U2
Overall conservation status on national level: U2



By bioregion:



PAN:

Scapania carinthiaca J. B. Jack x Lindb. (syn. Scapania massalongoi (Müll. Frib.) Müll. Frib.) (Hepaticopsida, Scapaniaceae)

This is a saprophytic liverwort species, growing on decaying wood, rarely on rocks (crystalline bedrock) or on moist humus in damp and shady locations from mountain to alpine belts; often near streams in mountain valleys. On its historical locations coniferous spruce forests are currently prevalent. So far, the occurrence in Slovakia has not have been confirmed.

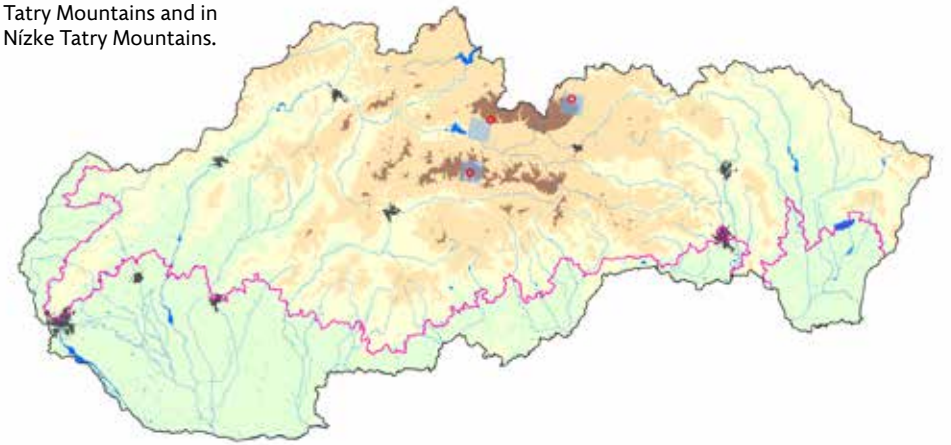
Number of PMLs: **PML average area size:** 74.7 ha

Number of involved experts: 2 **Number of PML field visits:** 15

The most common accompanying species: *Blepharostoma trichophyllum*, *Dicranum scoparium*, *Dicranum montanum*, *Lepidozia reptans*, *Pleurozium schreberi*, *Ptilidium ciliare*, *Cephalozia bicuspidata*, *Hylocomium splendens*, *Polytrichum formosum*, *Sanionia uncinata*

Monitoring method: Recording the percentage cover of species in targeted areas each year during the period from 1st of April to 30th of September (two visits were carried out once in each year for each site that was searched for evidence of species).

PMLs distribution and localization: Historically recorded occurrences of the species were in Vysoké Tatry Mountains and in Nízke Tatry Mountains.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 0.1 – 1 m²

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: x PAN:

Population quality in PMLs:



Overall population quality: ALP: U2 PAN:

Habitat quality for the species in PMLs:



Overall habitat quality for the species: ALP: U1 PAN:

Future prospects of habitat for the species in PMLs:



Overall future prospects of habitat for the species: ALP: U1 PAN:

Pressures and threats: Up to 90 % of the factors threatening the species and its habitat come from forest management and are associated with the harvesting and removal of vegetation. Such interference causes changes to localities' microclimate (especially humidity) conditions. Approximately 10 % of the negative impacts are attributable to wind-storms and subsequent bark beetle infestations that deplete the forests.

Assessment and notes on the monitoring results: During the monitoring the historical localities for the species were searched for identification purposes. The species was not found on either monitored site. Therefore, the quality of the population, and thus the overall assessment of the conservation status of the species are considered unfavourable-bad.



© Markéta Tábořská



© Markéta Tábořská

Some localities for the species were previously affected by the wind-storm calamity and subsequent infestations of spruce bark beetle, which significantly changed the habitat conditions. Forests are no longer in optimum conditions and do not provide appropriate conditions for the existence of the species. All the historical localities of species are dominated with spruce plantations, elsewhere in Europe the species was identified mainly in plantations with a beech mixture; this may also be a factor affecting the results of monitoring. The species will certainly have to be searched for elsewhere if we want to reconfirm its occurrence in Slovakia.

To identify localities with *Scapania carinthiaca* occurrence it will be necessary to ensure annual monitoring of the localities and overall population – one visit per year will be enough for this. It will be necessary to ensure adequate protection of habitat at the site without any economic interference.

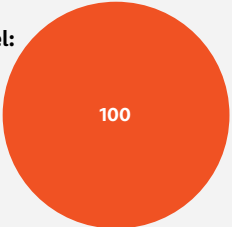
Overall assessment of the conservation status of species

Conservation status on national level:

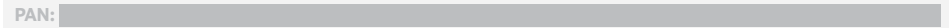
Con. status of species: ALP: U2 PAN:

Conservation status in SCIs: U2

Overall conservation status on national level: U2



By bioregion:



Sphagnum spp. (Muscopsida, *Sphagnaceae*)

The entire *Sphagnum* genus is bound to waterlogged peat soils with different soil pHs, from alkaline mires (fens) to transition mires and raised bogs. They occur in non-forest, as well as forest mires often forming the basis of the habitat. *Sphagnum* sp. was not monitored separately, but was recorded along with other bryophytes during the monitoring of non-forest and forest habitats.

Number of PMLs: 256

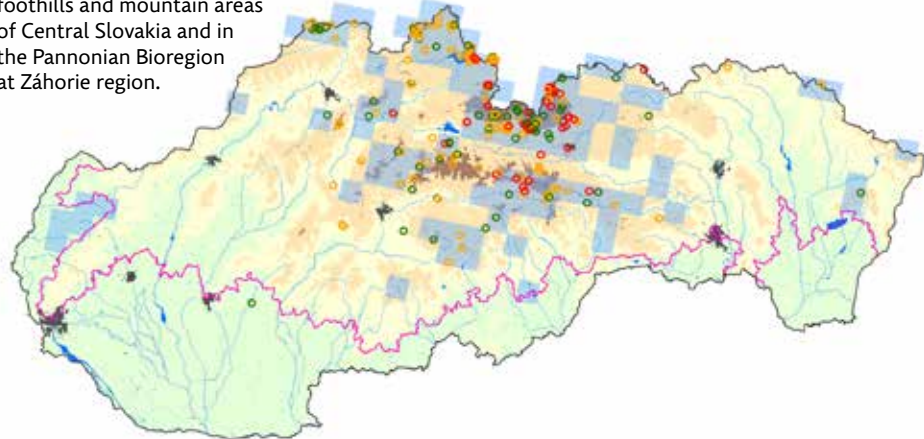
PML average area size: 5.2 ha

Number of involved experts: 28 **Number of PML field visits:** 327

The most common accompanying species: *Potentilla erecta*, *Picea abies*, *Carex nigra*, *Carex rostrata*, *Briza media*, *Carex panicea*, *Equisetum palustre*, *Ranunculus acris*, *Eriophorum angustifolium*, *Carex echinata*, *Frangula alnus*, *Betula pendula*, *Pinus sylvestris*, *Oxycoccus palustris*, *Eriophorum vaginatum*, *Vaccinium uliginosum*, *Vaccinium vitis-idaea*, *Vaccinium myrtillus*, *Salix caprea*, *Betula pubescens*, *Equisetum sylvaticum*

Monitoring method: The presence of the *Sphagnum* genus was recorded in the species record for monitored habitat locations with the coverage estimated according to the Tansley scale.

PMLs distribution and localization: The occurrence of the genus is concentrated especially in the foothills and mountain areas of Central Slovakia and in the Pannonian Bioregion at Záhorie region.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 900 – 1,200 ha

Estimate of the population size in the Pannonian Bioregion: 9 – 22 ha

Estimate of the population development trend: ALP: 0 PAN: 0

Overall 7110 habitat conservation status: ALP: U1 PAN:

ALP: 75 12.5 12.5

Overall 7120 habitat conservation status: ALP: U1 PAN:

ALP: 37.5 50 12.5

Overall 7140 habitat conservation status: ALP: U1 PAN:

ALP: 48.2 42.9 8.9

Overall 7230 habitat conservation status: ALP: U1 PAN: U1

ALP: 30.4 59.8 9.8

PAN: 100

Overall 91D0 habitat conservation status: ALP: U1 PAN:

ALP: 14.8 62 23.2

Pressures and threats: An especially positive effect on species of genus *Sphagnum*, found in fens and transition mires, comes from extensive cutting (74 %), which eliminates the succession at these localities. The most negative impact on their locations is caused by a change of water regime (15 %) and related succession (53 %). Particularly in the case of non-forest mires there is problem from colonising trees and expansion of competitively stronger plant species, these vary significantly depending on conditions on the sites. Species that create turfs, around which debris is accumulated, gradually push out the bryophytes including *Sphagnum*. A threat to some forest mire localities, as well as some non-forest mires located near forest crops, comes from forestry activities related to afforestation and logging (25 %). The wood is pulled through these sites compressing the substrate and destroying vegetation.

Assessment and notes on the monitoring results: The assessment was processed based on data about the habitat conservation status where the species of genus *Sphagnum* occur. Overall, it is possible to evaluate the situation of the genus as unfavourable, as the habitats of species are inadequate.

In the future years it will be sufficient to monitor in the same way as before, i.e. as part of the monitoring of affected habitats. At all locations where *Sphagnum* occurs it is necessary to ensure the maintenance of optimal water regime, ensure removal of trees and shrubs on overgrown areas and carry out extensive mowing. Mechanical destruction of sites, the onset of adverse succession on non-forest types of mires and the deforestation of forest mires should also be avoided.



© Viera ŠeffEROVÁ StanOVÁ



© Marta MÚTĽANOVÁ

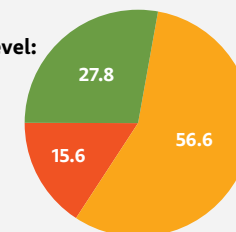
Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: U1 PAN: U1

Conservation status in SCIs: U1

Overall conservation status on national level: U1



By bioregion:

ALP: 41.2 44.4 13.4

PAN: 100

Tortella rigens (Hedw.) Loeske (Muscopsida, Pottiaceae)

This species grows in humid crevices between rocks or on accumulated humus under rocks in mountainous areas at an altitude of over 1,500 m a.s.l.; mainly on richer mineral rocks (limestone, mylonites). In Slovakia its occurrence was probably recorded by mistake, as so far its occurrence has not been confirmed in the historically reported sites and only other species of the genus *Tortella* have been identified.

Number of PMLs: 5 **PML average area size:** 11.6 ha

Number of involved experts: 1 **Number of PML field visits:** 10

The most common accompanying species: *Polytrichum alpinum*, *Polytrichum commune*, *Pleurozium schreberi*, *Rhytidiadelphus triquetrus*, *Racomitrium* sp.

Monitoring method: Recording of the percentage cover of species in targeted areas for each period from 1st of April to 30th of September (two visits were carried out, once each year, for each site that was searched for evidence of species).

PMLs distribution and localization: Historically recorded occurrences of the species were in the Vysoké Tatry Mountains and Nízke Tatry Mountains.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 0 – 1 m²

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: x PAN:

Population quality in PMLs:

ALP: 20 80

PAN:

Overall population quality: ALP: U2 PAN:

Habitat quality for the species in PMLs:

ALP: 100

PAN:

Overall habitat quality for the species: ALP: FV PAN:

Future prospects of habitat for the species in PMLs:

ALP: 100

PAN:

Overall future prospects of habitat for the species: ALP: FV PAN:

Pressures and threats: The monitoring of permanent monitoring localities showed that the only threat (100 %) for the species and its habitat, if its occurrence in Slovakia is confirmed, is damage by trampling at these sites, which are located near the hiking trails or paths occasionally used by climbers. The intensity of this pressure is relatively low.

Assessment and notes on the monitoring results: During the monitoring the historical sites were searched for species of genus *Tortella*. When identified, a sample was collected and determined. Until now, none have been identified as *Tortella rigens*. For a complete confirmation it will be necessary to send the items for identification by other professionals who deal with the genus *Tortella*.

Non-confirmation of the species is reflected in the overall quality of the population. On sites where a population of a species from genus *Tortella* was identified the status was evaluated as unfavourable – inadequate. On other sites where the genus *Tortella* was not confirmed the status was evaluated as unfavourable-bad.

Quality of habitat and its future prospects are favourable in all sites, since they occur in the national park and are not directly affected by activities that would alter the character of the habitat.



© Slavomír Celer



© Slavomír Celer

To confirm the occurrence of the species in any of the sites it will be necessary to continue annual monitoring of these sites, but it will suffice to monitor these sites with an annual frequency. If the species is not confirmed, it must be removed from the reference list for bryophytes of the Slovak Republic.

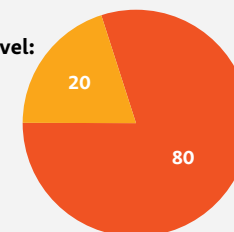
Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: U2 PAN:

Conservation status in SCIs: U2

Overall conservation status on national level: U2



By bioregion:

ALP: 20 80

PAN:

***Aconitum firmum* subsp. *moravicum* Skalický**
(*Ranunculales*, *Ranunculaceae*)

Aconitum firmum subsp. *moravicum* is a perennial, up to 150 cm high herb. It grows in wet clearings, near springs and mountain streams, in wet screes in the montane up to subalpine belts in the north-western part of Slovakia.

Number of PMLs: 3 **PML average area size:** 6.8 ha

Number of involved experts: 3 **Number of PML field visits:** 3

Monitoring method: In the surveyed PMLs, the number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (July – August).

PMLs distribution and localization: Western Carpathian endemic species. In Slovakia it was recorded in Strážovské vrchy Mountains, Malá Fatra Mountains, Oravské Beskydy Mountains. The precise spread of this sub-species is not fully known yet.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 40,000 – 50,000 individuals

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: 0 PAN:

Population quality in PMLs:

ALP: 66.7 33.3

PAN:

Overall population quality: ALP: U1 PAN:

Habitat quality for the species in PMLs:

ALP: 33.3 66.7

PAN:

Overall habitat quality for the species: ALP: U1 PAN:

Future prospects of habitat for the species in PMLs:

ALP: 66.7 33.3

PAN:

Overall future prospects of habitat for the species: ALP: U1 PAN:

Pressures and threats: The most frequent negative pressures and threats include succession, outdoor, sport and recreational activities, and negative intervention into its habitat. The positive impacts include non-intensive grazing of cattle.

Assessment and notes on the monitoring results: The population quality of the species is evaluated as favourable in 66 %. Especially the population at PML Terchová – Medziholie in Malá Fatra Mountains is extraordinary where the total number of individuals is up to 18,000 individuals. On the other hand, the population quality in the location Suchý potok near Pilsko Mt. is evaluated as unfavourable. The area is significantly influenced by succession, shading by bushes and trees reaches 85 %. The negative influence of the succession worsens the habitat quality also in the third monitored location, in Považská Teplá, Manínska tiesňava. The overall population quality as well as the habitat quality is unfavourable in all PMLs. The overall prospects of the habitat for species are unfavourable too.

In terms of management only one location (Terchová, Malá Fatra) is suitable, this is maintained by cattle grazing (heifers). To achieve a favourable status it is appropriate to ensure removal of strong competitors and ruderal species, to remove trees and scrubs, to maintain the water regime of the locations, to restore the natural forest composition of stands.



© Janka Smatanová



© Janka Smatanová

Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: U1 PAN:

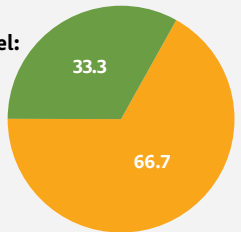
Conservation status in SCIs: U1

Overall conservation status on national level: U1

By bioregion:

ALP: 33.3 66.7

PAN:



Adenophora liliifolia (L.) Lebed. ex A. DC. (Campanulales, Campanulaceae)

A species with a stiff, straight, up to 100 cm high stalk and bright-blue corollas. It grows in light forests, bushes, in wet meadows and their edges; in the upland up to the subalpine belts.

Number of PMLs: 7 PML average area size: 2.6 ha

Number of involved experts: 3 Number of PML field visits: 9

Monitoring method: In the surveyed PMLs, the number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (June – August).

PMLs distribution and localization: In the territory of Slovakia the most numerous populations are in Muránska planina Mountains, in Slovenský raj Mountains and in Nízke Tatry Mountains. In the Pannonian Bioregion it occasionally occurs only in Slovenský kras Mountains. Several locations, particularly in the western part of the territory, are no longer present.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 3,000 – 5,000 individuals

Estimate of the population size in the Pannonian Bioregion: 10 – 50 individuals

Estimate of the population development trend: ALP: 0 PAN: 0

Population quality in PMLs:

ALP: 75 25

PAN: 100

Overall population quality: ALP: FV PAN: U1

Habitat quality for the species in PMLs:

ALP: 87.5 12.5

PAN: 100

Overall habitat quality for the species: ALP: FV PAN: U1

Future prospects of habitat for the species in PMLs:

ALP: 87.5 12.5

PAN: 100

Overall future prospects of habitat for the species: ALP: FV PAN: U1

Pressures and threats: The most frequently negative pressures and threats include succession, insensitive silvicultural interventions to the vegetation, browsing by forest animals, and intensive grazing of livestock.

Assessment and notes on the monitoring results: In the Alpine Bioregion the evaluation of the population quality is favourable, the most numerous population is in NR Suchá Belá in Slovenský raj Mountains (550 individuals in 2014) and on the northern slope of locality Cigánka in Muránska planina Mountains (490 individuals in 2013). In the Pannonian Bioregion the population quality is unfavourable. The species occurs only in one location in Silická planina Plain in Slovenský kras Mountains where the population numbered 16 individuals in 2013. The quality of the habitat for the species, as well as its future prospects, in the Alpine bioregion is evaluated as favourable. The locality on the northern slope of Cigánka in Muránska planina Mountains was evaluated as unfavourable



© Milan Barlog



© Drahoš Blanár

because the forest stand was regenerated after re-established mining. In such regenerated areas the species is no longer present. The quality of the habitat for the species and its future prospects in the Pannonian Bioregion is unfavourable – the location of the species in Silická planina in Slovenský kras Mountains is limited in size and diversity. It is a karst sink-hole with a flow of cold air where the species occurs in its northern, partially shaded aspect. The nearest grasslands are regularly grazed and are significantly warmer which does not meet the ecological requirements of the species for spreading in the environment. The estimate of the trend for population development is stable for both bioregions while the current conditions are maintained in the locations.

Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: U1 PAN: U1

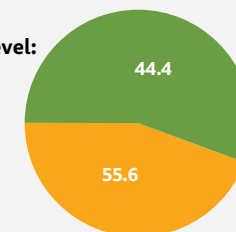
Conservation status in SCIs: U1

Overall conservation status on national level: U1

By bioregion:

ALP: 62.5 37.5

PAN: 100



Apium repens (Jacq.) Lag. (Apiales, Apiaceae)

A species with a creeping, or in case of flooding, floating stalk. It occurs in wet meadows, on the banks of water reservoirs, in saline or occasionally also in ruderal habitats in the planar belt.

Number of PMLs: 7 PML average area size: 5,500 m²

Number of involved experts: 2 Number of PML field visits: 15

Monitoring method: In the surveyed PMLs, the number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (June – August).

PMLs distribution and localization: At the present the species is spread only in the Podunajská nížina Lowland where its occurrence is concentrated mainly near the river Danube. In the past it was recorded in other parts of Slovakia, mainly in the Borská nížina Lowland.



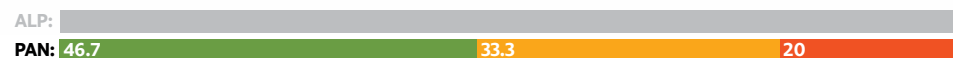
Monitoring results:

Estimate of the population size in the Alpine Bioregion:

Estimate of the population size in the Pannonian Bioregion: 25,000 – 70,000 individuals

Estimate of the population development trend: ALP: PAN: 0

Population quality in PMLs:



Overall population quality:

ALP: PAN: U1

Habitat quality for the species in PMLs:



Overall habitat quality for the species:

ALP: PAN: U1

Future prospects of habitat for the species in PMLs:



Overall future prospects of habitat for the species: ALP:

PAN: U1

Pressures and threats: In the monitored locations the negative pressures include succession, human-induced changes in the hydrological conditions, the occurrence of invasive species of plants, negative interventions into the habitat and the storage of waste. The positive influences include mowing of the location.

Assessment and notes on the monitoring results: The population quality in PMLs is unfavourable; the number of individuals has decreased in most of the locations in the last three years. The most significant decrease was recorded in the location Chorvátske rameno in Bratislava, from 37,000 individuals in 2013 there were only 10,000 in 2015. This is because of unsuitable management in the form of mowing of banks and the cane. In locality Ostrovné lúčky near the town of Rusovce no individuals were recorded in 2014 (50 individuals in 2013), the location has been permanently flooded so that the appropriate ecological conditions for this species no longer exist. The quality of the habitat for species and its future prospects are evaluated unfavourably despite the fact there is suitable management in several locations in the form of mowing (Búč, Veľký Grob, Dobrohošť, Bodíky, Bodza). If this treatment is maintained and if the management is renewed in Chorvátske rameno, the estimate of the population development trend will be stable for the following years.

To achieve overall favourable status it is necessary to ensure regular mowing, the periods of flooding should alternate with the periods of drying and trees, scrubs and invasive plants should be removed.



© Daniel Dítě



© Helga Kothajová

Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP:

PAN: U1

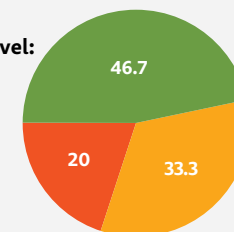
Conservation status in SCIs:

U1

Overall conservation status on national level:

U1

By bioregion:



***Artemisia eriantha* Ten.** (*Asterales, Asteraceae*)

A perennial, 25 cm high, silky and hairy herb. It grows in rock cracks on limestone and mylonite rocks, in screes and alpine ridges in the subalpine up to subnival belts.

Number of PMLs: 3 **PML average area size:** 8,300 m²

Number of involved experts: 1 **Number of PML field visits:** 3

Monitoring method: In the surveyed PMLs, the number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (July – September).

PMLs distribution and localization: In Slovakia the species can be found only in Západné Tatry Mountains, Vysoké Tatry Mountains a Belianske Tatry Mountains.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 250 – 500 individuals

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: 0 PAN:

Population quality in PMLs:

ALP: 100

PAN:

Overall population quality: ALP: **FV** PAN:

Habitat quality for the species in PMLs:

ALP: 100

PAN:

Overall habitat quality for the species: ALP: **FV** PAN:

Future prospects of habitat for the species in PMLs:

ALP: 100

PAN:

Overall future prospects of habitat for the species: ALP: **FV** PAN:

Pressures and threats: The species is not significantly threatened. Some negative impacts with low intensity from trampling by hikers may occur in the accessible locations.

Assessment and notes on the monitoring results: The population quality was favourable in all monitored locations. The highest number of individuals was recorded in the location Hlúpy in Belianske Tatry Mountains (60 individuals in 2015). The quality of the habitat for species and its future prospects are also evaluated as favourable in all cases. The species is not threatened, its occurrence is concentrated into the hard to access terrain and no other negative impacts were recorded in the monitored locations. Altogether, it occurs in about 30 locations in small populations. The estimate of the population development trend is stable.

The most suitable management is to leave the locations without any interventions. In case of a more significant damage to the plants caused by hikers (trampling, collection) it is desirable to direct or to divert the outdoor and recreational activities. The recent genetic studies (Sanz et al. 2014) assign the Tatra population to the broad distribution ribbon that occurs from the Pyrenees and the Alps to the Carpathians, as opposed to the isolated populations of the southern Balkan.



© Blažena Sedláková



© Blažena Sedláková

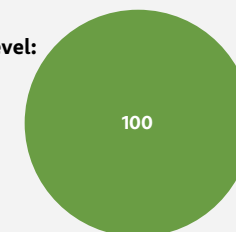
Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: **FV** PAN:

Conservation status in SCIs: **FV**

Overall conservation status on national level: **FV**



By bioregion:

ALP: 100

PAN:

***Asplenium adulterinum* Milde**
(Polypodiales, Aspleniaceae)

A densely clumped fern with hibernating leaves, on which the red-brown stipe turns to green on its upper part. It grows in rock cracks, in sun-exposed and half-shadowed locations in the colline up to the submontane belts.

Number of PMLs: 1 **PML average area size:** 100 m²

Number of involved experts: 1 **Number of PML field visits:** 1

Monitoring method: In the surveyed PMLs, the number of clumps, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of spore ripening (July – September).

PMLs distribution and localization: At the present, there are only three locations of occurrence in Slovakia, in Šarišská vrchovina Highlands (Sedlice) and in Slovenské rudohorie Mountains (Morká Lúka, Prakovce).



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 1,000 – 2,000 individuals

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: + PAN:

Population quality in PMLs:

ALP: 100

PAN:

Overall population quality: ALP: FV PAN:

Habitat quality for the species in PMLs:

ALP: 100

PAN:

Overall habitat quality for the species: ALP: FV PAN:

Future prospects of habitat for the species in PMLs:

ALP: 100

PAN:

Overall future prospects of habitat for the species: ALP: U2 PAN:

Pressures and threats: The most significant threats of the species include insensitive forestry interventions during timber production and dragging or the influences related to the eventual mining of mineral resources.

Assessment and notes on the monitoring

results: The monitoring was carried out only in one location in 2013; therefore the overall evaluation depends on this particular PML. The population quality in the monitored location is favourable, the number of the species is increasing and the habitat quality is sufficient too. Nevertheless, the overall status is unfavourable-bad due to determined future prospects of the habitat for species in the PML Mokrá Lúka near town of Revúca. In the immediate vicinity of the species occurrence there is going to be a mining area for the extraction of quarry stone for stoneware production (granite) and if it starts operating it can be expected that there will be significant negative impacts on the existing population of *Asplenium adulterinum*. At present, the monitored location is in favourable status, there are no significant negative influences recorded there and the population has increased from 80 individuals in 1997 to 600 individuals today.

The best management is to leave the locations without any interventions. It is appropriate to inform the forestry companies of the occurrence of this species in the territory so that the populations are not damaged unintentionally. This happened in 2010 during dragging of the wood mass through the location at Prakovce.



© Milan Barlog



© Milan Barlog

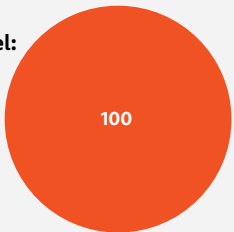
Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: U2 PAN:

Conservation status in SCIs: U2

Overall conservation status on national level: U2



By bioregion:

ALP: 100

PAN:

****Campanula serrata* (Kit. ex Schult.) Hendrych**
(*Campanulales*, *Campanulaceae*)

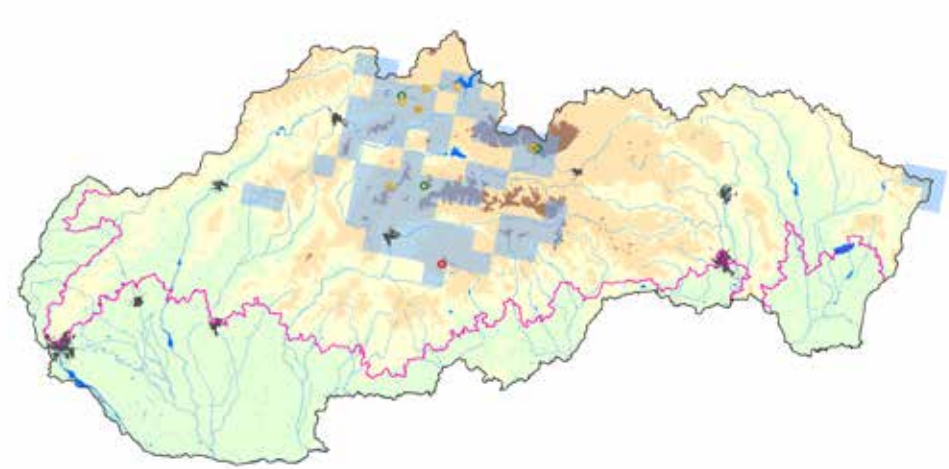
Campanula serrata is a perennial, 20-40 cm high herb. It grows on pastures, meadows, grassy ridges, and occasionally in light forests, in the montane to subalpine belts.

Number of PMLs: 10 **PML average area size:** 61.6 ha

Number of involved experts: 8 **Number of PML field visits:** 11

Monitoring method: In the surveyed PMLs, the number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (June – September).

PMLs distribution and localization: This is species endemic to the Carpathians. In Slovakia it is spread in the central part of the territory, from Kremnické vrchy Mountains, Poľana Mountains and Slovenské rudohorie Mountains to the north to Oravská Magura Mountains and Kysucká vrchovina Highlands and in the east to Bukovské vrchy Mountains.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 10,000,000 – 15,000,000 individuals

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: 0 PAN:

Population quality in PMLs:

ALP: 72.7 18.2 9.1

PAN:

Overall population quality: ALP: U1 PAN:

Habitat quality for the species in PMLs:

ALP: 54.5 36.4 9.1

PAN:

Overall habitat quality for the species: ALP: U1 PAN:

Future prospects of habitat for the species in PMLs:

ALP: 72.7 18.2 9.1

PAN:

Overall future prospects of habitat for the species: ALP: U1 PAN:

Pressures and threats: The most frequent negative pressures include succession, insufficient mowing and grazing. Non-intensive grazing and mowing were recorded as positive impacts in the monitored locations.

Assessment and notes on the monitoring results: The population quality in PMLs is favourable in most locations. The highest number of individuals was recorded in the location at Ploská – the ridge of Veľká Fatra Mountains (more than 5 million after the calculation of a 100 m² area). On the other hand, the lowest number of individuals was in the location Štrbské pleso, Solisko (8 individuals). The only location that was evaluated as unfavourable-bad in terms of population quality was NNR Zadná Poľana – Výbohove, even though the area is the second most numerous monitored population (60,000 individuals). The reason for the negative evaluation is the ongoing succession and the absence of appropriate management.

The overall status of the quality of the habitat for species and its future prospects is unfavourable. In most



© Stanislav Uhrin



© Mário Duchoň

locations the management is appropriate, in the form of mowing or non-intensive grazing (e.g. NR Zajačková lúka, Lomná, Zázrivá). While maintaining the current conditions, the estimate of the population development trend is stable in our country.

It is necessary to ensure regular non-intensive grazing or mowing of the locations and to remove trees and scrubs to improve the quality of population.

Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: U1 PAN:

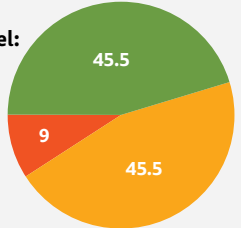
Conservation status in SCIs: U1

Overall conservation status on national level: U1

By bioregion:

ALP: 45.5 45.5 9

PAN:



***Cirsium brachycephalum* Jur.
(Asterales, Asteraceae)**

Species with a sharp-winged, 120 cm high stem that has branches in the upper part. It occurs in the planar belt on wet, boggy and saline meadows and pastures, at the edges of channels and in ditches.

Number of PMLs: 11 **PML average area size:** 36.5 ha

Number of involved experts: 3 **Number of PML field visits:** 11

Monitoring method: In the surveyed PMLs, the number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (June – September).

PMLs distribution and localization: Pannonian endemic species: In Slovakia it occurs in Podunajská nížina Lowland, Borská nížina Lowland and Východoslovenská nížina Lowland. The total number of locations is decreasing.



Monitoring results:

Estimate of the population size in the Alpine Bioregion:

Estimate of the population size in the Pannonian Bioregion: 6,000 – 12,000 individuals

Estimate of the population development trend: ALP: PAN: –

Population quality in PMLs:



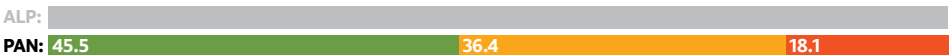
Overall population quality: ALP: PAN: **U1**

Habitat quality for the species in PMLs:



Overall habitat quality for the species: ALP: PAN: **U1**

Future prospects of habitat for the species in PMLs:



Overall future prospects of habitat for the species: ALP: PAN: **U1**

Pressures and threats: The most frequently recorded negative pressures and threats include succession, land abandonment and insufficient mowing, change in the management, occurrence of invasive plants or human-induced changes in the hydrological conditions. Mowing is among the positive influences.

Assessment and notes on the monitoring results: The population quality in PMLs is favourable in more than 70 % of cases but in some locations the species was not found during monitoring (e.g. Kucany, Borzva) so the overall status is unfavourable. The most numerous populations were recorded in the locations Kamenná Molva and Martovce (in both 1,500 individuals).

The quality of the habitat for species is evaluated as favourable in most PMLs, but its future prospects are unfavourable. At the same time, the total number of locations is decreasing so the estimate of the population development trend is decreasing.

Only in one location of adequate management was recorded – mowing at Martovce. To achieve favourable status it is therefore necessary to ensure regular mowing and removing trees, scrubs or invasive species of plants.



© Viera Šefferová Stanová



© Viera Šefferová Stanová

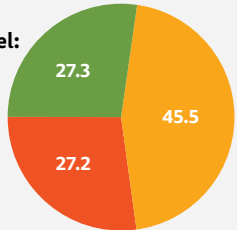
Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: PAN: **U1**

Conservation status in SCIs: **U1**

Overall conservation status on national level: **U1**



By bioregion:



****Cochlearia tatrae* Borbás**
(Capparales, Brassicaceae)

Cochlearia tatrae is a perennial, 20 cm high herb that occurs around springs, on the banks of mountain streams and lakes, in damp rock cracks and scree, in the subalpine up to subnival belts.

Number of PMLs: 4 **PML average area size:** 6.8 ha

Number of involved experts: 2 **Number of PML field visits:** 4

Monitoring method: In the surveyed PMLs, the number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (July – September).

PMLs distribution and localization: Tatra endemic species – the occurrence of the species is concentrated in Západné Tatry Mountains, Vysoké Tatry Mountains and Belianske Tatry Mountains.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 1,000 – 2,000 individuals

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: 0 PAN:

Population quality in PMLs:

ALP: 75 25

PAN:

Overall population quality: ALP: FV PAN:

Habitat quality for the species in PMLs:

ALP: 100

PAN:

Overall habitat quality for the species: ALP: FV PAN:

Future prospects of habitat for the species in PMLs:

ALP: 100

PAN:

Overall future prospects of habitat for the species: ALP: FV PAN:

Pressures and threats: The species is not significantly threatened. Some negative impacts, with low intensity, from trampling by hikers may occur in the accessible locations.

Assessment and notes on the monitoring results: In the evaluation of the population quality only one PML was evaluated as unfavourable, this was the population in Malá Studená dolina Valley under Ladový štít Peak in Vysoké Tatry Mountains. The reason for this was mainly the low number of individuals, in this area only 15 individuals were found. However the overall



population quality is favourable in our country. Similarly, the quality of the habitat for species and its future prospects are favourable in all monitored locations.

During monitoring, no threats were found so the estimate of the population development trend is stable in most of the locations. The most adequate management is to leave the locations without any interventions. In case of a more significant damage to the plants caused by hikers (trampling, collection) it is desirable to direct or to divert the outdoor and recreational activities.

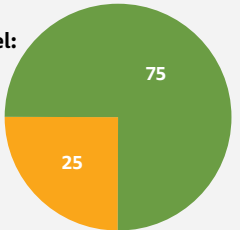
Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: FV PAN:

Conservation status in SCLs: FV

Overall conservation status on national level: FV



By bioregion:

ALP: 75 25

PAN:

Colchicum arenarium Waldst. et Kit.
(Liliales, Liliaceae)

A perennial herb – it grows in spring and flowers in autumn on dry, sandy and grassy steppes in the planar belt.

Number of PMLs: 1 **PML average area size:** 200 m²

Number of involved experts: 1 **Number of PML field visits:** 4

Monitoring method: In the surveyed PMLs, the number of individuals, the size of the occurrence area, the estimate of the population vitality and the habitat status where the species occur were recorded. Because of the atypical developmental cycle it was best to carry out monitoring in the time of flowering (September – October) as well as in the time of forming rosettes (May – June).

PMLs distribution and localization: Pannonian sub-endemic species – in Slovakia the species occurs only in one Site of Community Importance Čenkov.



Monitoring results:

Estimate of the population size in the Alpine Bioregion:
Estimate of the population size in the Pannonian Bioregion: 1,000 – 3,000 individuals
Estimate of the population development trend: ALP: PAN: 0

Population quality in PMLs:



Overall population quality: ALP: PAN: **FV**

Habitat quality for the species in PMLs:



Overall habitat quality for the species: ALP: PAN: **FV**

Future prospects of habitat for the species in PMLs:



Overall future prospects of habitat for the species: ALP: PAN: **FV**

Pressures and threats: The species is threatened mainly by the overgrowing of the location, the occurrence of invasive trees and herbs as well as by the digging out of its tubers by wild pigs.

Assessment and notes on the monitoring results: The one location was visited annually during the monitoring. The population quality in this PML is evaluated as favourable, but the decrease of flowering individuals has been significant for the last three years, from 398 individuals in 2012 to 82 individuals in 2014. The reasons of this decrease are not fully known; in the location there are no negative threats occurring. "Dry" winters have a negative impact on the existing population as the species cannot tolerate physiological dryness and the extreme situation caused by the freeze-up of the upper soil layer. Shading by scrubs and trees is approximately 40 % and this coverage is stable, it did not increase significantly during the monitoring. The quality of the habitat for species and its future prospects are evaluated favourably. Because of this the estimate of the population development trend are stable. But to maintain the favourable status it is necessary to remove the non-indigenous species of plant, trees and to prevent successional ingrowth.



© Daniel Dítě

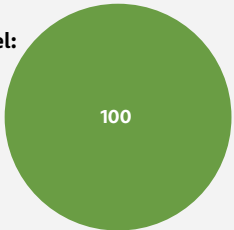


© Viera Šefferová Stanová

Overall assessment of the conservation status of species

Con. status of species: ALP: PAN: **FV**
Conservation status in SCIs: **FV**
Overall conservation status on national level: **FV**

By bioregion:



Crambe tataria Sebeók
(Capparales, Brassicaceae)

A perennial herb of a rounded shape that in the autumn spreads its seeds by rolling to new locations. It grows on sun-exposed and dry grasslands in the planar up to colline belts.

Number of PMLs: 3 **PML average area size:** 2 ha
Number of involved experts: 1 **Number of PML field visits:** 6

Monitoring method: In the surveyed PMLs, the number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (April – June).

PMLs distribution and localization: In Slovakia it occurs only in the southern part of the territory near the town of Štúrovo in Belianske kopce Hills (two populations) and in Sovie vinohrady (one population).



Monitoring results:

Estimate of the population size in the Alpine Bioregion:
Estimate of the population size in the Pannonian Bioregion: 200 – 850 individuals
Estimate of the population development trend: ALP: PAN: 0

Population quality in PMLs:



Overall population quality: ALP: PAN: **U1**

Habitat quality for the species in PMLs:



Overall habitat quality for the species: ALP: PAN: **U1**

Future prospects of habitat for the species in PMLs:



Overall future prospects of habitat for the species: ALP: PAN: **U1**

Pressures and threats: In the locations the species is threatened by successional ingrowth. During monitoring, mowing was recorded as a positive influence.

Assessment and notes on the monitoring results: The most numerous population occurs at the location on Starý vrch in Belianske kopce Hills near the town of Štúrovo, where 216 individuals were found in 2013. One year later the number decreased to 141 individuals and in 2014 the decrease was even more significant (more than 50%). In the two remaining locations the number of individuals was only 9 between both PMLs. The unfavourable status of the most numerous PMLs is reflected also in the overall population quality being unfavourable. In the locations with appropriate management in the form of mowing (Modrý vrch, Belianske kopce and NR Sovie vinohrady) the quality of the habitat for the species and its future prospects were evaluated as favourable. However the overall status is unfavourable because of



© Alžbeta Szabóová



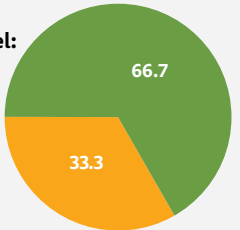
© Jaroslav Košťál

the absence of sufficient and appropriate treatment of the area at Starý vrch, Belianske kopce Hills, where succession of moderate intensity occurs in about 30 % of the area. The estimate of the population development trend is stable and there should be no further fall in the overall population.

To achieve a favourable status it is necessary to remove trees, scrubs and invasive plants and in the autumn non-intensive mowing is necessary.

Overall assessment of the conservation status of species

Conservation status on national level:
Con. status of species: ALP: PAN: **U1**
Conservation status in SCIs: **U1**
Overall conservation status on national level: **U1**



By bioregion:



**Cyclamen fatrense* Halda et Soják (Primulales, Primulaceae)

A perennial, 15 cm high herb with heart-shaped, round, hibernating leaves. It grows in beech and mixed forests with a carbonate bedrock in the submontane up to montane belts.

Number of PMLs: 4 **PML average area size:** 334 ha

Number of involved experts: 1 **Number of PML field visits:** 7

Monitoring method: In the surveyed PMLs the number of individuals and vitality of the population was determined upon the calculation of data obtained from the permanent monitoring areas according to the size of the occurrence area. The status of the habitat was also recorded for the surveyed PMLs. The best time for monitoring was the time of flowering (July – September).

PMLs distribution and localization: Sub-endemic species of Veľká Fatra Mountains – the occurrence of this species is concentrated in the southern part of Veľká Fatra Mountains and in the western part of Nízke Tatry Mountains.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 55,000,000 – 65,000,000 individuals

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: 0 PAN:

Population quality in PMLs:

ALP: 85.7 14.3

PAN:

Overall population quality: ALP: FV PAN:

Habitat quality for the species in PMLs:

ALP: 85.7 14.3

PAN:

Overall habitat quality for the species: ALP: FV PAN:

Future prospects of habitat for the species in PMLs:

ALP: 85.7 14.3

PAN:

Overall future prospects of habitat for the species: ALP: FV PAN:

Pressures and threats: The species is not endangered, but the some parts of the population may be damaged during insensitive forestry interventions into the vegetation where *Cyclamen fatrense* grows.

Assessment and notes on the monitoring results: In most PMLs the population quality is evaluated as favourable. Only in one location is it insufficient, at Mošovce-Boriny in a mono-cultural spruce stand. The population in this PML is the lowest of all the monitored locations, in 2011 only 50,000 individuals were found there. In comparison, the populations with the highest numbers are in the PML Necpálska dolina Valley in Veľká Fatra Mountains (more than 14 million individuals in 2012) and Mošovce, Rakytové (more than 12 million individuals in 2014). The overall habitat quality in the PMLs as well as their future prospects is evaluated favourably; the only location with unfavourable quality is the above-mentioned spruce stand in the location Mošovce-Boriny. The species is not threatened by negative activities and the estimate of the population development trend is stable.

To maintain the favourable status it is necessary to maintain the natural species composition of in the forest stands and to control and regulate the forestry interventions in the stands with the highest concentration of the species.



© Viktória Chilová



© Ján Černecký

Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: FV PAN:

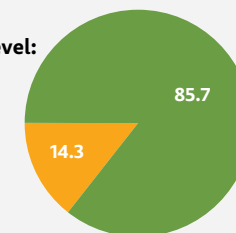
Conservation status in SCIs: FV

Overall conservation status on national level: FV

By bioregion:

ALP: 85.7 14.3

PAN:



***Cypripedium calceolus* L.**
(Orchidales, Orchidaceae)

Cypripedium calceolus creates attractive, up to 4 cm long, flowers with a calceolate hollow labium; it grows mainly in deciduous and mixed forests in the colline up to the montane belts.

Number of PMLs: 14

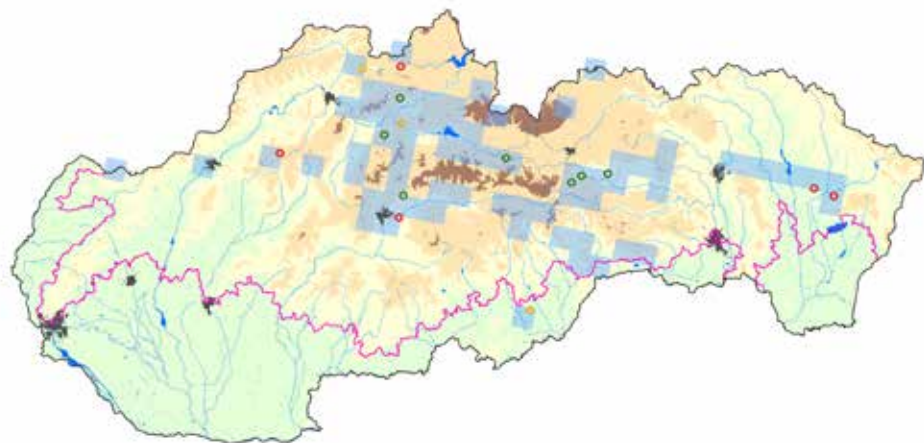
PML average area size: 9,700 m²

Number of involved experts: 10

Number of PML field visits: 24

Monitoring method: In the surveyed PMLs, the number of clumps, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (May – July).

PMLs distribution and localization: The spread of the species is concentrated mainly in the central part of Slovakia, where it occurs scattered from Malá Fatra Mountains to Veľká Fatra Mountains and Slovenský raj Mountains and in a few cases also in other parts of the territory.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 7,500 – 15,000 individuals

Estimate of the population size in the Pannonian Bioregion: 150 – 250 individuals

Estimate of the population development trend: ALP: 0 PAN: 0

Population quality in PMLs:



PAN:

Overall population quality:

ALP: U1

PAN:

Habitat quality for the species in PMLs:



PAN:

Overall habitat quality for the species:

ALP: U1

PAN:

Future prospects of habitat for the species in PMLs:



PAN:

Overall future prospects of habitat for the species: ALP: U1

PAN:

Pressures and threats: The most serious threats to this species include insensitive forestry interventions in the stands, succession or collection of plants.

Assessment and notes on the monitoring results: The population quality was evaluated as favourable in more than 66 % of the monitored locations. The most numerous populations are at Hrabušice in Slovenský raj Mountains (400 individuals) and the location near the town of Spišská Nová Ves (350 individuals). However, the population quality was evaluated as unfavourable-bad in four locations. These are small populations where less than five pieces of individuals were found during monitoring or the occurrence of the species could not be confirmed. Because of this the overall status of the population quality is unfavourable. Unfavourable status was also evaluated for the quality of the habitat for species and its future prospects. In some locations a negative influence from succession was recorded, mainly after re-established mining, so the occurring population is limited in these places.

To achieve a favourable status for the species it will be necessary to avoid interventions and to maintain the natural species composition in the forest stands. It may also be necessary to maintain open and well-lit forest areas and to control and regulate forestry interventions in the stands with the highest number of species.



Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: **U1** PAN:

Conservation status in SCIs:

Overall conservation status on national level:

By bioregion:



****Daphne arbuscula* Čelak.**
(Thymelaeales, Thymelaeaceae)

Small, evergreen bush, growing in lines or elongated clumps that occur mainly on sun-exposed steep rocky slopes, rocky edges and terraces from the sub-montane up to the montane belts.

Number of PMLs: 5 **PML average area size:** 4.4 ha

Number of involved experts: 1 **Number of PML field visits:** 5

Monitoring method: In the surveyed PMLs, the number of clumps, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (May – June).

PMLs distribution and localization: Endemic species of Muránska planina Mountains – the species occurs exclusively in the territory of Muránska planina Mountains.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 5,000 – 7,000 individuals

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: 0 PAN:

Population quality in PMLs:

ALP: 100

PAN:

Overall population quality: ALP: **FV** PAN:

Habitat quality for the species in PMLs:

ALP: 100

PAN:

Overall habitat quality for the species: ALP: **FV** PAN:

Future prospects of habitat for the species in PMLs:

ALP: 100

PAN:

Overall future prospects of habitat for the species: ALP: **FV** PAN:

Pressures and threats: The species is not endangered; some negative pressures were recorded, including the overexploitation of the floristic locations and the damage caused by hunted animals. In accessible tourist locations the plants may be trampled.

Assessment and notes on the monitoring results:

All the five locations are evaluated as favourable in terms of population quality. The most favourable situation is in the monitored location in NR Poludnica where 1,350 individuals in total were recorded. The quality of the habitat for species as well as its future prospects were evaluated as favourable in all the locations – the shading by bushes and trees does not exceed 15 %. Damage to the plant caused by deer in dry winters, when the small bushes are not covered by snow, was recorded. In some places browsing was intensive, but the plants tolerate it well and during the year they rejuvenate with new shoots. During experimental plantings the seed germination of this species was very low; the plants propagate mainly vegetatively in these locations. Because of the absence of more significant impacts, the estimate of the population development trend is stable. The best management is avoid interventions. In the case of a more significant damage to the plants caused by hikers (trampling, collection) it is desirable to direct or to divert the outdoor and recreational activities.



© Anna Dobošová



© Mário Duchoň

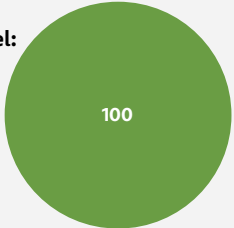
Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: **FV** PAN:

Conservation status in SCIs: **FV**

Overall conservation status on national level: **FV**



By bioregion:

ALP: 100

PAN:

****Dianthus nitidus* Waldst. et Kit.**
(Caryophyllales, Caryophyllaceae)

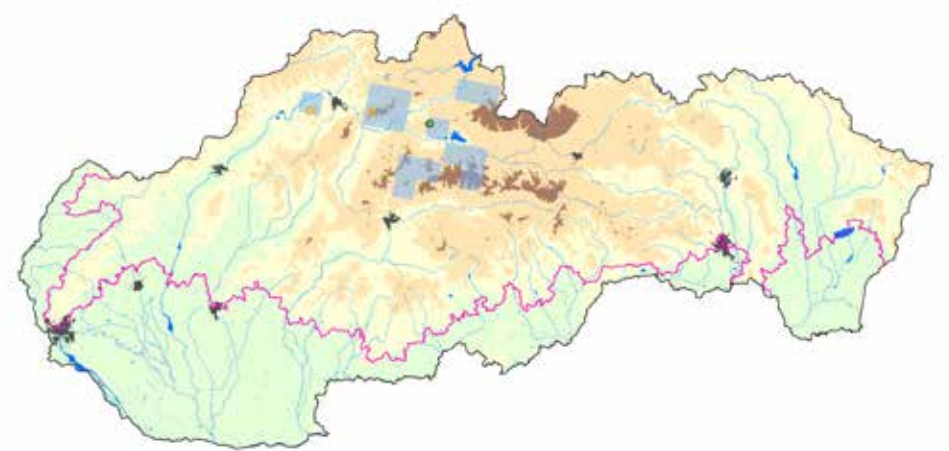
A perennial, 25 cm high, clumped herb with striking pink flowers. It grows exclusively on carbonate rocks on grassy uplands, rocks and screes in the sub-montane up to subalpine belts.

Number of PMLs: 3 **PML average area size:** 20.8 ha

Number of involved experts: 3 **Number of PML field visits:** 3

Monitoring method: In the surveyed PMLs, the number of clumps, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (July – August).

PMLs distribution and localization: *Dianthus nitidus* subsp. *nitidus* is a Western Carpathian endemic species. Its occurrence is concentrated in Malá Fatra Mountains, Chočské vrchy Mountains, Veľká Fatra Mountains; it also grows in the Západné Tatry Mountains, Súľovské vrchy Mountains and in the limestone parts of the Nízke Tatry Mountains.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 2,000,000 – 2,300,000 individuals

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: 0 PAN:

Population quality in PMLs:

ALP: 66.7 33.3

PAN:

Overall population quality: ALP: U1 PAN:

Habitat quality for the species in PMLs:

ALP: 33.3 66.7

PAN:

Overall habitat quality for the species: ALP: U1 PAN:

Future prospects of habitat for the species in PMLs:

ALP: 33.3 66.7

PAN:

Overall future prospects of habitat for the species: ALP: U1 PAN:

Pressures and threats: This species is not significantly threatened. During monitoring some negative pressures were recorded that include succession; trampling, locations being overgrown by dwarf pine; outdoor, sport and recreational activities.

Assessment and notes on the monitoring results: In the monitored locations, the largest population is found in the PML Suchý-Stratenec in Malá Fatra Mountains (up to 160,000 individuals). The population quality of Súľov-Hradná in Súľovské vrchy Mountains is unfavourable. This is a marginal occurrence of the species with a small population (500 individuals), here it is



at the lowest end of its altitude range. The overall status for the population quality is unfavourable. The quality of the habitat for species and its future prospects were evaluated favourably only in the PML Veľký Choč-Malý Choč, the only recorded negative pressure was trampling by hikers in the part of the location. The remaining two PMLs were evaluated unfavourably leading to the overall status of the habitat quality and its future prospects being unfavourable. Despite this the estimate of the population development trend is stable; as the species is not significantly threatened and the total population is large enough, a significant decrease cannot be expected.

Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: U1 PAN:

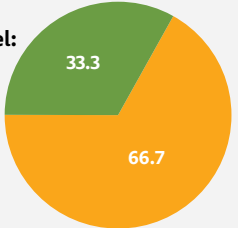
Conservation status in SCIs: U1

Overall conservation status on national level: U1

By bioregion:

ALP: 33.3 66.7

PAN:



****Dianthus praecox* subsp. *lumnitzeri* (Wiesb.) Kmeťová**
(Caryophyllales, Caryophyllaceae)

Clumped, grey-green perennial herb with a significantly ridged stem and leaves. It grows on a carbonate substrate on rocks, in rock cracks and terraces, as well as on grasslands in the colline up to submontane belts.

Number of PMLs: 4 **PML average area size:** 2.5 ha

Number of involved experts: 2 **Number of PML field visits:** 4

Monitoring method: In the surveyed PMLs, the number of clumps, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (May – July).

PMLs distribution and localization: Sub-endemic species from the front Carpathians. In Slovakia it occurs only in the south-western part, in Malé Karpaty Mountains, Považský Inovec Mountains, Devínska Kobyla Peak.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 45,000 – 70,000 individuals

Estimate of the population size in the Pannonian Bioregion: 500 – 3,000 individuals

Estimate of the population development trend: ALP: – PAN: –

Population quality in PMLs:

ALP: 100

PAN: 100

Overall population quality: ALP: **FV** PAN: **FV**

Habitat quality for the species in PMLs:

ALP: 66.7 33.3

PAN: 100

Overall habitat quality for the species: ALP: **U1** PAN: **U1**

Future prospects of habitat for the species in PMLs:

ALP: 33.3 66.7

PAN: 100

Overall future prospects of habitat for the species: ALP: **U1** PAN: **U1**

Pressures and threats: The most frequent negative pressures include succession, planting of non-indigenous species (*Fraxinus ornus*, *Pinus nigra*) and lack of grazing.

Assessment and notes on the monitoring results: The population quality was evaluated as favourable in all locations in the Alpine Bioregion as well as the Pannonian Bioregion; the highest number of clumps was recorded in the location Lúka in Považský Inovec Mountains (700 individuals). However, the indicators such as quality of the habitat for the species and its future prospects in the Alpine and the Pannonian Bioregions both have unfavourable evaluations. The only location evaluated as favourable in these indicators is the above-mentioned Lúka in Považský Inovec Mountains. The rest of PMLs are overgrown by bushes and trees with 10-20 % coverage. Some invasive species of plants were recorded in the location Devínsky hradný vrch. The estimate of the trend in the population development is decreasing for the Alpine as well as the Pannonian Bioregions. It can be assumed that several locations may be successional overgrown; the coverage of scrubs and trees will increase; and the lack of grazing and of usage of grasslands will lead to changes in the habitat.

To achieve a favourable status it is therefore necessary to limit the successional overgrowth of the locations, to ensure regular and non-intensive grazing in the accessible areas and to limit the planting of the non-original species.



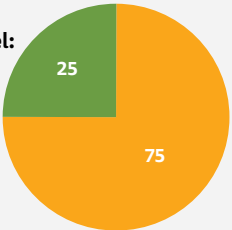
© Mário Duchoň



© Iveta Škodová

Overall assessment of the conservation status of species

Conservation status on national level:
Con. status of species: ALP: **U1** PAN: **U1**
Conservation status in SCIs: **U1**
Overall conservation status on national level: **U1**



By bioregion:

ALP: 33.3 66.7

PAN: 100

***Dracocephalum austriacum* L.** (*Lamiales, Lamiaceae*)

A perennial herb or half-bush with feather-like leaves and up to 5 cm large violet-blue flowers. It occurs on carbonate rocks on rocky terraces and grasslands in the colline and submontane belts.

Number of PMLs: 13 **PML average area size:** 200 m²

Number of involved experts: 2 **Number of PML field visits:** 38

Monitoring method: In the surveyed PMLs, the number of clumps, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (May – June).

PMLs distribution and localization: The spread of the species is concentrated in Slovenský kras Mountains where it has five areas at the present time, consisting of: 12 subpopulations (Gemerské Teplice, Dmica, Plešivská planina – southern part, Plešivská planina – northern part, Zádielska planina) and one location in Dreveník near the village of Spišské Podhradie.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 250 – 500 individuals

Estimate of the population size in the Pannonian Bioregion: 150 – 350 individuals

Estimate of the population development trend: ALP: 0 PAN: 0

Population quality in PMLs:

ALP: 20 51.4 28.6

PAN: 100

Overall population quality: ALP: **U1** PAN: **FV**

Habitat quality for the species in PMLs:

ALP: 100

PAN: 100

Overall habitat quality for the species: ALP: **FV** PAN: **FV**

Future prospects of habitat for the species in PMLs:

ALP: 91.4 8.6

PAN: 100

Overall future prospects of habitat for the species: ALP: **FV** PAN: **FV**

Pressures and threats: The most significant threats are succession ingrowth, insufficient grazing, the trampling and collection of plants in the locations accessible for tourists. The small populations are affected by the low genetic diversity causing a low production of seeds.

Assessment and notes on the monitoring results: Favourable status has been reached in the Pannonian Bioregion where the most numerous population occurs at the present times – in PML Dmica with 262 clumps (2015), therefore the evaluation of the population quality was favourable in this location. However, the quality is insufficient in the Alpine Bioregion, only 20 % of the records of PMLs are evaluated as favourable, and only the population in Dreveník and one subpopulation in Zádielska planina have favourable evaluations for every year. Low quality of the populations is regularly recorded in up to three locations where the species did not occur or occurs only in critically small quantities. In 2004 the illegal collection of plants was detected and after the removal of the reproducing individuals the whole subpopulation disappeared within two years. The total number of the individuals, particularly the juvenile plants, is greatly dependent on the weather conditions in the spring. Since 2005, bigger declines in the populations were observed if the rainfall was insufficient. The overall quality of the habitat and its future prospects are evaluated favourably. There are at least small-scale interventions in many locations that suppress the succession of bushes and trees. The most appropriate care in the long term would be the return of these locations to pasture usage. The estimate of the trend in the population development for the coming period is stable, a more significant decrease in the quantity of the species in our country is not expected.



© Milan Barlog



© Róbert Šuvada

Overall assessment of the conservation status of species

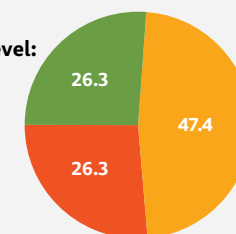
Conservation status on national level:

Con. status of species: ALP: **U1** PAN: **FV**

Conservation status in SCIs: **U1**

Overall conservation status on national level: **U1**

By bioregion:



Echium russicum J. F. Gmel.
(Boraginales, Boraginaceae)

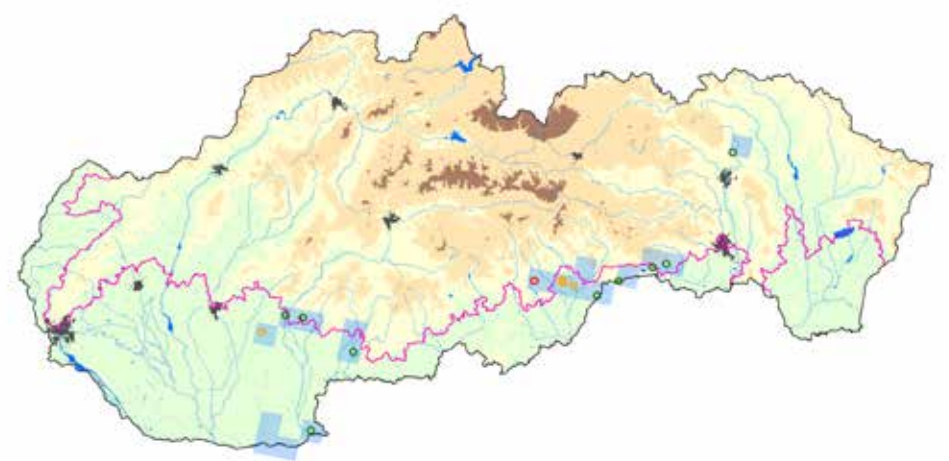
A biennial, on rare occasions perennial in the short term; up to 100 cm high herb; with a rich cluster of red flowers that grows on dry and sun-exposed grassy hillsides in the planar up to the colline belts.

Number of PMLs: 15 **PML average area size:** 7,500 m²

Number of involved experts: 6 **Number of PML field visits:** 34

Monitoring method: In the surveyed PMLs, the number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (June – July).

PMLs distribution and localization: In the territory of Slovakia the species is rare. It occurs in the southern part of the territory, particularly in the areas of Slovenský kras Mountains, Burda Mountains, Podunajská nížina Lowland, Štiavnické vrchy Mountains, Drienčanský kras Mountains and Krupinská planina Mountains, the furthest north it extends is into Šarišská vrchovina Highlands.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 750 – 1,500 individuals
Estimate of the population size in the Pannonian Bioregion: 1,500 – 2,500 individuals
Estimate of the population development trend: ALP: 0 PAN: 0

Population quality in PMLs:



Habitat quality for the species in PMLs:



Future prospects of habitat for the species in PMLs:



Pressures and threats: The species is endangered in several locations, mainly by being overgrown by scrubs or fast-growing herbs. The most frequently recorded negative pressures include succession, the lack of grazing and the damage caused by hunted animals. During monitoring, non-intensive grazing and mowing were recorded as positive effects.

Assessment and notes on the monitoring results: The population quality of the species is evaluated as unfavourable in the Alpine as well as in the Pannonian Bioregions. The population in the location of Drienčanský kras Mountains was the only one evaluated as having unfavourable-bad status for three consecutive years despite the favourable status in the number of individuals and the size of the occurrence area; the recorded negatives in this location are rather related to the quality of the habitat. The overall status is favourable in the Alpine as well as the Pannonian Bioregions. In some locations increased coverage of scrubs and trees (20-30 %) was detected. The overall future prospects of the habitat are unfavourable in the Pannonian Bioregion; in the Alpine Bioregion the habitat should keep its favourable status. In five locations proper management is ensured in the form of non-intensive grazing or mowing. Regular monitoring shows that this method of treatment can improve the sta-



© Róbert Šuvada

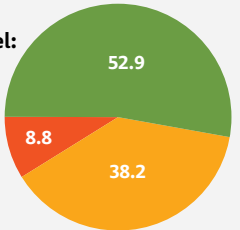


© Róbert Šuvada

status of the species. In the location of Český zvrst in Slovenský kras Mountains the population increased after annual mowing – from 34 individuals in 2006 to 213 individuals in 2015. The estimate of the development trend is stable; a more significant decrease in the number of the species is not expected in the Alpine or Pannonian Bioregions. Regular treatment of sites, in the form of non-intensive grazing or annual mowing, is necessary to improve the overall favourable status.

Overall assessment of the conservation status of species

Conservation status on national level:
Con. status of species: ALP: **U1** PAN: **U1**
Conservation status in SCIs: **U1**
Overall conservation status on national level: **U1**



By bioregion:



***Eleocharis carniolica* W. D. J. Koch**
(Cyperales, Cyperaceae)

A perennial plant, forming dense clumps, up to 20 cm high, with multiflorous spikelets. It grows in wet habitats, springs and generally on regularly flooded places from the lowlands to the highlands, up to the submontane belt.

Number of PMLs: 2 **PML average area size:** 99 m²

Number of involved experts: 1 **Number of PML field visits:** 2

Monitoring method: In the surveyed PMLs, the number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (June – July).

PMLs distribution and localization: The species is rare in Slovakia. The historical data comes from the areas of town of Lučenec, town of Poprad and Vihorlat Mountains. The species has been recorded in Východoslovenská nížina Lowland. It definitely occurs in Bukovské vrchy Mountains where there are PMLs.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 250 – 300 individuals

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: 0 PAN:

Population quality in PMLs:

ALP: 50 50

PAN:

Overall population quality: ALP: U2 PAN:

Habitat quality for the species in PMLs:

ALP: 100

PAN:

Overall habitat quality for the species: ALP: U1 PAN:

Future prospects of habitat for the species in PMLs:

ALP: 100

PAN:

Overall future prospects of habitat for the species: ALP: U1 PAN:

Pressures and threats: Changes to the habitat: the biotic conditions or the hydrological conditions are generally the most significant negative pressures. The species is threatened mainly because of its low competitiveness.

Assessment and notes on the monitoring results: The evaluation of the population quality included the results from two PMLs where the species was confirmed and monitored. In both locations *Eleocharis carniolica* grows in hydrophilic plant communities. The population in the PML in Runina was more numerous (200 individuals) than the PML in Osadné (30 individuals). The population quality is positively influenced by the movement and extensive grazing of cattle and by the disturbance of the vegetation cover. Paradoxically, the species occurs in muddy soils in the tracks of tractors and forestry machinery where temporary conditions for its growth are created. The overall unfavourable-bad evaluation of *Eleocharis carniolica* is the result the low number of locations, low number of populations and the insufficient future prospects.

Eleocharis carniolica is not sufficiently examined in the territory of Slovakia and its occurrence is not precisely known. The monitoring of this species has not been carried out for a very long time so it is not possible to evaluate the dynamics of the population. To preserve the species the disruption of the soil cover is necessary.



© Daniel Dítě



© Daniel Dítě

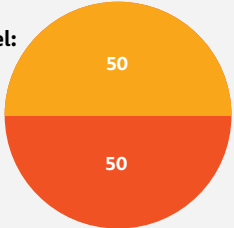
Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: U2 PAN:

Conservation status in SCIs: U1

Overall conservation status on national level: U2



By bioregion:

ALP: 50 50

PAN:

****Ferula sadleriana* Ledeb.**
(*Apiales*, *Apiaceae*)

A perennial, up to 200 cm high herb with puffy sheaths of steam leaves and with numerous flowers. It grows on limestone rocky terraces, in rocky, grassy and bushy stands in the sub-montane belt.

Number of PMLs: 4 **PML average area size:** 7,000 m²

Number of involved experts: 1 **Number of PML field visits:** 12

Monitoring method: In the surveyed PMLs, the number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (June – July).

PMLs distribution and localization: It is Pannonian endemic species. In Slovakia the species is spread only in Slovenský kras Mountains, Konianska planina Plain and in three sub-populations in Plešivská planina Plain.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 300 – 600 individuals

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: – PAN:

Population quality in PMLs:

ALP: 75 25

PAN:

Overall population quality: ALP: FV PAN:

Habitat quality for the species in PMLs:

ALP: 66.7 33.3

PAN:

Overall habitat quality for the species: ALP: U1 PAN:

Future prospects of habitat for the species in PMLs:

ALP: 50 50

PAN:

Overall future prospects of habitat for the species: ALP: U1 PAN:

Pressures and threats: The species is threatened mainly by the ingrowth of the locations by extensive grasses; by expanding coverage of bushes and trees in some places; by grazing of hunted animals as well as by the ecological limits of the nearby populations.

Assessment and notes on the monitoring results: The overall status of the species on national level as well as in the Sites of Community Importance is unfavourable. And even though the population quality is evaluated as favourable in 75 % of locations. It is recorded unfavourably only in the largest locations in Konianska planina Plain where the number of individuals decreases every year. This is mainly because of the degradation of the dealpine grass and herb vegetation and the increase of the stands of the dominant species *Sesleria heufleriana*. *Ferula sadleriana* is an ecotone species that often occurs in the transitions between forest stands, bushes and open grassland communities. The juvenile individuals use bush shading as a kind of protection against the sun in the hottest and driest part of



© Róbert Šuvada



© Róbert Šuvada

the year, at the same time this protects them against browsing. The presence of an open, bushy stand is desirable, but the excessively high coverage of bushes and trees (more than 50 % of the area) is negative. The locations in Plešivská planina Plain are evaluated as favourable in terms of population quality, but the ecological limits of the surroundings are a negative pressure. The existing sub-populations are fragmented remains of the original distribution, the rocky cliffs and terraces are surrounded by forest stands without any possibility of spreading freely into the surroundings. Therefore the future of the smaller sub-populations is questionable. The quality of the habitat and its future prospects are evaluated unfavourably. The estimate of the population development trend is decreasing.

Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: U1 PAN:

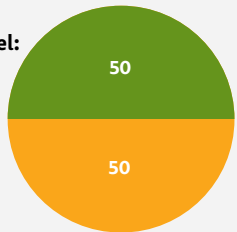
Conservation status in SCIs: U1

Overall conservation status on national level: U1

By bioregion:

ALP: 50 50

PAN:



Galanthus nivalis L. (Liliales, Amaryllidaceae)

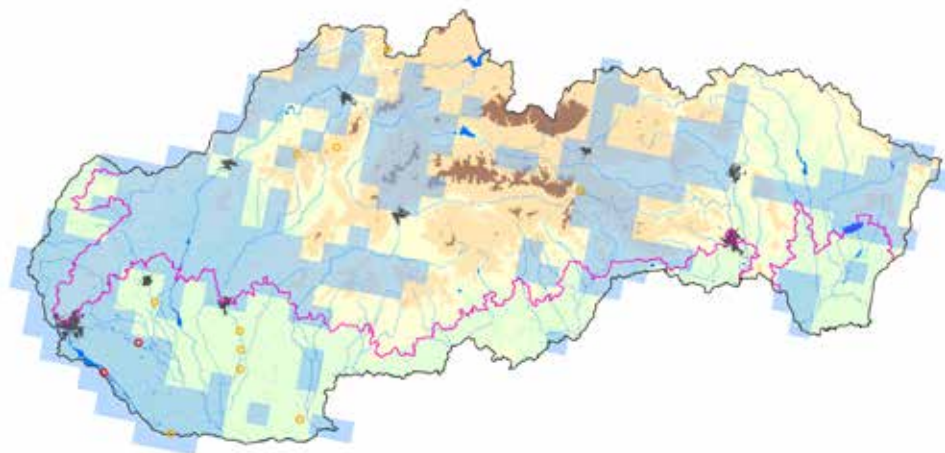
A perennial, up to 30 cm high herb, with a spherical or ovoid bulb, two developed basal leaves and a white perianth. It grows in flooded, oak, hornbeam, beech and scree forests, and also rarely in wet meadows, in the planar up to the montane belts.

Number of PMLs: 13 **PML average area size:** 10.7 ha

Number of involved experts: 4 **Number of PML field visits:** 14

Monitoring method: The presence of the *Galanthus nivalis* genus was recorded in the species record for monitored habitat locations with the coverage estimated according to the Tansley scale. The assessment of the population quality is derived from the overall quality of the habitat in the PMLs. The prospects in the habitat for the species and the quality of the habitat for the species are identical with the recorded values of habitat in PMLs. The best time for monitoring was the time of flowering (March – April).

PMLs distribution and localization: In the territory of Slovakia the species is spread over the whole territory, numerous occurrences were recorded in Slovenský kras Mountains, Tribeč Mountains, Malé Karpaty Mountains, the floodplain forests of Podunajská nížina Lowland.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 500,000 – 5,000,000 individuals

Estimate of the population size in the Pannonian Bioregion: 500,000 – 2,500,000 individuals

Estimate of the population development trend: ALP: 0 PAN: 0

Population quality in PMLs:

ALP: 16.7 **83.3**

PAN: 62.5 **37.5**

Overall population quality: ALP: **U1** PAN: **U1**

Habitat quality for the species in PMLs:

ALP: 61.7 **38.3**

PAN: 23.7 **52.6** **23.7**

Overall habitat quality for the species: ALP: **U1** PAN: **U1**

Future prospects of habitat for the species in PMLs:

ALP: 66.7 **33.3**

PAN: 28.7 **50** **21.5**

Overall future prospects of habitat for the species: ALP: **U1** PAN: **U1**

Pressures and threats: The most significant threats to the species include the collection of plants in flowering time, digging up the bulbs to transfer to gardens and rock gardens, insensitive forestry interventions in timber production and during wood handling.

Assessment and notes on the monitoring results: The overall status of the species on national level is unfavourable. The population quality that is derived from the overall quality of the habitat in PMLs with the presence of the species is also unfavourable. The species was most frequently recorded in: lowland floodplain forests (91F0), in Pannonic woods with *Quercus petraea* and hornbeam (91G0) and in Medio-European subalpine beech woods with *Acer* (9140). Of the total 14 visits to PMLs only one of them was evaluated favourably. This population grew within a habitat Semi-natural dry grasslands on calcareous substrates-important orchid sites (6210*); it is favourably evaluated in all three indicators. Unfavourable-bad status was recorded in two locations; both of them belong to the habitat of lowland floodplain forests (91F0).

The quality of the habitat for the species and its prospects are derived from the quality of the habitat and the prospects in the PML in which *Galanthus nivalis* occurs. The unfavourable status is in both cases.

Improvement in the conditions of the genus on a national level is related to the improvement of the conditions of its habitat. In forest habitats it is important careful approach by mining to avoid any undue damages to the vegetation cover. When talking about non-forest habitats is good to introduce management methods that limit the succession.



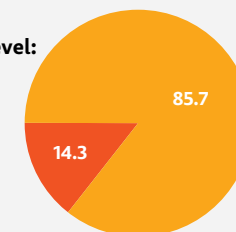
Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: **U1** PAN: **U1**

Conservation status in SCIs: **XX**

Overall conservation status on national level: **U1**



By bioregion:



Gladiolus palustris Gaudin (Asparagales, Iridaceae)

A perennial, up to 60 cm high, herb with two sword-shaped leaves and striking purple flowers; it grows on wet and fen meadows in the planar belt.

Number of PMLs: 4 **PML average area size:** 7.5 ha

Number of involved experts: 1 **Number of PML field visits:** 4

Monitoring method: In the surveyed PMLs, the number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (June – July).

PMLs distribution and localization: The species' spread has been reduced to a small area Borská nížina Lowland. In the past it was spread from Borská nížina Lowland to the central part of Slovakia.



Monitoring results:

Estimate of the population size in the Alpine Bioregion:

Estimate of the population size in the Pannonian Bioregion: 200 – 500 individuals

Estimate of the population development trend: ALP: PAN: –

Population quality in PMLs:

ALP:

PAN:

Overall population quality: ALP: PAN:

Habitat quality for the species in PMLs:

ALP:

PAN:

Overall habitat quality for the species: ALP: PAN:

Future prospects of habitat for the species in PMLs:

ALP:

PAN:

Overall future prospects of habitat for the species: ALP: PAN:

Pressures and threats: This is a highly endangered species that is in danger of extinction in Slovakia. The most significant negative impacts include drainage, succession, collection of plants, intensification and fertilization and insufficient mowing.

Assessment and notes on the monitoring results: The overall status of the species on the national level is unfavourable-bad; the same applies to the Site of Community Importance Abrod. In the location PML Abrod the species was found only in one of four PMLs. The entire recorded population of this species consisted only of 200 individuals in 2014. The territory, where the species occurs, is degraded and it is gradually being dried up. This results in a higher representation of widespread grasses and reeds, reducing the overall species diversity. The quality of the habitat and its future prospects are evaluated unfavourably. The estimate of the population development trend is decreasing and there is a threat of extinction of the population in the territory of Slovakia.

To improve the status it is necessary to stabilize the hydrological regime, to reduce the fluctuations of the ground water levels, to carry out regular mowing and seriously limit stream of fertilizers from the nearby areas.



© Jaroslav Košťál



© Jaroslav Košťál

Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: PAN:

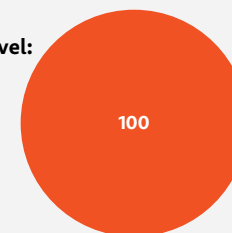
Conservation status in SCIs:

Overall conservation status on national level:

By bioregion:

ALP:

PAN:



100

***Himantoglossum adriaticum* H. Baumann**
(Orchidales, Orchidaceae)

A perennial, up to 90 cm high, herb with numerous inflorescences, on which there are usually 15-40 flowers with a three-lobate, up to 5 cm long, labium. It grows on warm grasslands and forest steppes, on bushy hillsides and in sparse forests from the planar up to the colline belts.

Number of PMLs: 5 **PML average area size:** 2.8 ha

Number of involved experts: 3 **Number of PML field visits:** 12

Monitoring method: In the surveyed PMLs, the number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (May – July).

PMLs distribution and localization: In Slovakia it grows in the south-western part of the territory, in Devínska Kobyla Peak, Malé Karpaty Mountains and Strážovské vrchy Mountains.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 300 – 600 individuals
Estimate of the population size in the Pannonian Bioregion: 1,500 – 3,000 individuals
Estimate of the population development trend: ALP: 0 PAN: 0

Population quality in PMLs:



Overall population quality: ALP: **FV** PAN: **FV**

Habitat quality for the species in PMLs:



Overall habitat quality for the species: ALP: **FV** PAN: **U1**

Future prospects of habitat for the species in PMLs:



Overall future prospects of habitat for the species: ALP: **FV** PAN: **U1**

Pressures and threats: The most frequent recorded pressures include succession, changes in management, occurrence of invasive species of plants and damage caused by hunted animals. The only positive influence is non-intensive grazing by goats at Devínska Kobyla.

Assessment and notes on the monitoring results:

The population quality in PMLs is in favourable status in both bioregions. The population in the village of Dolné Vestenice has been in favourable status for a long time, the numbers of the species are stable there and there are no significant threats. Likewise, the other location in the Alpine Bioregion Vrchná hora near town of Stupava is in a similar situation. In the Pannonian Bioregion Devínska Kobyla Peak is in favourable status in terms of the number of individuals. Since 2013 the number of this species has grown from 702 individuals up to 2,561 individuals in 2015. The growth of the population has been recorded also in the location Jarovský ostrov. The habitat quality and its future prospects were evaluated differently for the particular bioregions. The status in the Alpine Bioregion is favourable, but in half of the area in the Pannonian bioregion the situation is unfavourable, and therefore both the indicators



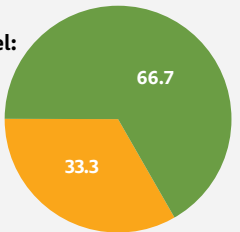
are evaluated as unfavourable.

To ensure the favourable status of the species on national level it is necessary to limit the successional ingrowth of the locations and to introduce regular management. The grasslands should be mowed in late summer or autumn after the seeding of the species. This treatment can be provided by non-intensive grazing, e.g. by goats. In forest steppes and on bushy hillsides it is necessary to protect the clearings where the species occurs against being overgrown.



Overall assessment of the conservation status of species

Conservation status on national level:
Con. status of species: ALP: **FV** PAN: **U1**
Conservation status in SCIs: **U1**
Overall conservation status on national level: **U1**



By bioregion:



Himantoglossum caprinum (M. Bieb.) Spreng. (Orchidales, Orchidaceae)

A perennial, up to 100 cm high herb, with dead basal leaves when in flower, the flowers with a three-lobate, up to 10 cm long labium. It grows on dry grasslands and forest steppes, on bushy hillsides and sparse forests from the planar up to the colline belts.

Number of PMLs: 2 **PML average area size:** 15.3 ha

Number of involved experts: 2 **Number of PML field visits:** 5

Monitoring method: In the surveyed PMLs, the number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (June – July).

PMLs distribution and localization: In the territory of Slovakia it grows in the south-western part, in Malé Karpaty Mountains, Tribeč Mountains and in Podunajská nížina Lowland.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 75 – 200 individuals

Estimate of the population size in the Pannonian Bioregion: 1 – 20 individuals

Estimate of the population development trend: ALP: 0 PAN: –

Population quality in PMLs:

ALP: 100

PAN: 50

Overall population quality: ALP: **FV** PAN: **U2**

Habitat quality for the species in PMLs:

ALP: 100

PAN: 100

Overall habitat quality for the species: ALP: **FV** PAN: **U1**

Future prospects of habitat for the species in PMLs:

ALP: 100

PAN: 100

Overall future prospects of habitat for the species: ALP: **FV** PAN: **U1**

Pressures and threats: The most important negative pressures include successional ingrowth of the locations, soil erosion, insufficient mowing and grazing.

Assessment and notes on the monitoring results: In the Alpine Bioregion the overall status is favourable, but in the Pannonian Bioregion is almost unfavourable-bad. It is caused by unfavourable-bad population quality in the only monitored location vrch Dankov near Nána in this bioregion. In 2014 only four individuals were found there, one year later only one individual. More than 20 % of this locality is shaded by bushes, the management in the form of mowing is only in about 40 % of the area and the grassy and herbal stands are degrading. The evaluation of the habitat quality and its future prospects are also different for the particular bioregions. In the Alpine Bioregion the status is favourable, but in the Pannonian Bioregion the habitat quality and its future prospects are unfavourable because of the above-mentioned reasons. The estimate of the population development trend is stable for the Alpine Bioregion, for the Pannonian Bioregion it is decreasing. But in case there is suitable management the situation can be stabilized.

To achieve a favourable status of the species on national level it is necessary to limit the successional ingrowth of the locations and to introduce regular management. The grasslands should be mowed in late summer or autumn after the seeding of the species. The suitable management include non-intensive grazing, e.g. by goats. In forest steppes and on bushy hillsides it is necessary to protect the clearings where the species occurs against overgrowth.



© archív ŠOP SR



© Jaroslav Košťál

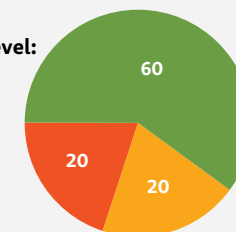
Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: **FV** PAN: **U2**

Conservation status in SCIs: **U1**

Overall conservation status on national level: **U1**



By bioregion:

ALP: 100

PAN: 50

50

Iris aphylla subsp. *hungarica* (Waldst. et Kit.) Hegi (Asparagales. Iridaceae)

A perennial, up to 30 cm high, herb with large violet-blue flowers and bent sickle-shaped leaves that are shorter than the blossoming stem. It grows on warm grasslands, rocky terraces, in forest steppes and on the edges of bushes in the planar up to submontane belts.

Number of PMLs: 15

PML average area size: 1.1 ha

Number of involved experts: 3

Number of PML field visits: 29

Monitoring method: In the surveyed PMLs, the number of clumps, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (April – June).

PMLs distribution and localization: The distribution in Slovakia is concentrated in the eastern part of the territory, in Slovenský kras Mountains, Slovenský raj Mountains, Spišská kotlina Basin and Slánske vrchy Hills up to Východoslovenská nížina Lowland.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 5,000 – 10,000 individuals

Estimate of the population size in the Pannonian Bioregion: 3,000 – 5,000 individuals

Estimate of the population development trend: ALP: 0 PAN: 0

Population quality in PMLs:

ALP: 73.9 26.1

PAN: 83.3 16.7

Overall population quality: ALP: FV PAN: U1

Habitat quality for the species in PMLs:

ALP: 82.6 17.4

PAN: 83.3 16.7

Overall habitat quality for the species: ALP: FV PAN: U1

Future prospects of habitat for the species in PMLs:

ALP: 82.6 17.4

PAN: 83.3 16.7

Overall future prospects of habitat for the species: ALP: FV PAN: U1

Pressures and threats: The most frequently recorded negative pressures are succession and the lack of grazing or mowing. Grazing has a positive effect on the locations.

Assessment and notes on the monitoring results: The overall status of the species on national level is unfavourable as well as in Sites of Community Importance despite the fact that more than 75 % of the locations are favourable. This evaluation was significantly negatively affected by the location Tarbucka, Streda nad Bodrogom in the Pannonian Bioregion, where PML was evaluated as unfavourable-bad in all three basic parameters. In the Alpine Bioregion the status of the taxon was favourable. The population quality achieved favourable status in almost 74 % of the locations. The most numerous locations include NNR Prielom Hornádu (3,000 individuals) and NR Čingovské hradisko (2,000 individuals). With the exception of the PML Tarbucka, all the other populations in the Pannonian Bioregion were evaluated as favourable, but the overall population quality is unfavourable here. This difference in the evaluations for the two bioregions also applies to the quality of the habitat and its future prospects. While in the Alpine Bioregion the status is favourable, in the Pannonian the result for the overall quality and future prospects of the habitat are unfavourable. The location Tarbucka was probably evaluated as unfavourable due to extinc-



© Milan Barlog



© Milan Barlog

tion of the population. During the monitoring it was not possible to confirm the presence of the species, the area has been significantly successional overgrown by trees here.

The measures needed for the improvement of the status include particularly the limitation of succession processes, the removal of scrubs and trees and assurance of regular and adequate treatment in the form of grazing.

Overall assessment of the conservation status of species

Conservation status on national level:

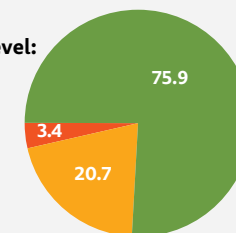
Con. status of species: ALP: FV PAN: U1

Conservation status in SCIs: U1

Overall conservation status on national level: U1

By bioregion:

ALP: 73.9 26.1
PAN: 83.3 16.7



***Iris arenaria* Waldst. et Kit.**
(Asparagales, Iridaceae)

A perennial, up to 25 cm high, herb without branches, with yellow flowers, in the bottom part of the petal there is violet veining. It grows on calcareous sands and well-lit forests in the planar belt.

Number of PMLs: 3 **PML average area size:** 900 m²

Number of involved experts: 1 **Number of PML field visits:** 6

Monitoring method: In the surveyed PMLs, the number of clumps, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (April – May).

PMLs distribution and localization: In Slovakia the species can be found only in Podunajská nížina Lowland in the territory of Site of Community Importance Čenkov.



Monitoring results:

Estimate of the population size in the Alpine Bioregion:

Estimate of the population size in the Pannonian Bioregion: 200 – 500 individuals

Estimate of the population development trend: ALP: PAN: 0

Population quality in PMLs:

ALP:

PAN: 66.7

Overall population quality: ALP: PAN: U1

Habitat quality for the species in PMLs:

ALP:

PAN: 100

Overall habitat quality for the species: ALP: PAN: FV

Future prospects of habitat for the species in PMLs:

ALP:

PAN: 66.7

Overall future prospects of habitat for the species: ALP: PAN: U1

Pressures and threats: The most significant pressures include succession, occurrence of invasive species and damage caused by hunted animals. During monitoring, mowing was recorded as a positive influence.

Assessment and notes on the monitoring results: The overall status of the species on national level is determined by the status only one location, in the Site of Community Importance Čenkov. Among three monitored locations there are two of them with a favourable status of the population. Only one sub-population in Čenkov Forest has an unfavourable evaluation where only 10 individuals were recorded in 2014 (in 2013 there was only one individual). The location is partly (20 %) overgrown by invasive species and up to 50 % of the area is shaded by bushes and trees; the population is also damaged by hunted animals. Despite this the quality of the habitat for species is evaluated favourably in all PMLs. The future prospects of the habitat are in the overall evaluation unfavourable because of the above-mentioned negatives in one of the PML.

To achieve a favourable status it is necessary to regularly remove invasive species of plants, to prevent further increase of shading by trees and if necessary to mow the area.



© Daniel Dítě



© Viera ŠeffEROVÁ StanOVÁ

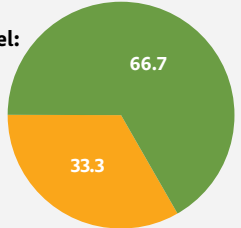
Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: PAN: U1

Conservation status in SCIs: U1

Overall conservation status on national level: U1



By bioregion:

ALP:

PAN: 66.7

Ligularia sibirica (L.) Cass. (Asterales, Asteraceae)

A perennial, up to 160 cm high, herb with an unbranched stem and strikingly large heart-shaped or kidney-shaped leaves. It grows in fen meadows, in mires and near streams in the submontane up to montane belts.

Number of PMLs: 3 **PML average area size:** 100 m²

Number of involved experts: 1 **Number of PML field visits:** 6

Monitoring method: In the surveyed PMLs, the number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (July – September).

PMLs distribution and localization: The distribution in Slovakia is concentrated in the area of Nízke Tatry Mountains and of Slovenský raj Mountains. In a few cases it can be found in Popradská kotlina Basin and near Branisko Mountain.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 50,000 – 75,000 individuals

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: 0 PAN:

Population quality in PMLs:

ALP: 100

PAN:

Overall population quality: ALP: **FV** PAN:

Habitat quality for the species in PMLs:

ALP: 100

PAN:

Overall habitat quality for the species: ALP: **FV** PAN:

Future prospects of habitat for the species in PMLs:

ALP: 100

PAN:

Overall future prospects of habitat for the species: ALP: **FV** PAN:

Pressures and threats: The most significant negative pressures include succession and locations being overgrown, changes in the hydrological regimes, changes in methods of management.

Assessment and notes on the monitoring results: All the monitored locations were evaluated favourably in terms of the population quality. The highest number of individuals was in the PML Hnilecká jelšina near Pusté pole (3,000 individuals). A favourable status was also recorded for all locations in terms of the quality of the habitat and its future prospects. The estimate of the population development trend is stable while maintaining the current conditions. The main negative pressure is the threat of locations becoming overgrown, the shading by bushes and trees reaches 50 % in some places. The appropriate method of management is regular non-intensive mowing in the autumn, either manually or by using lightweight machinery. If the number of trees and scrub is high in fen meadows these also need to be thinned or removed. It is important to prevent drainage and changes to the hydrological regime. The most suitable conditions for the species, in terms of water regime, are those places where water is permanently kept at the level of the soil surface or just below it.



© Milan Barlog



© Milan Barlog

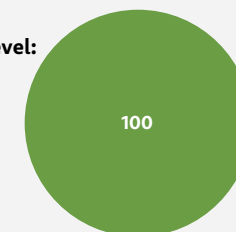
Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: **FV** PAN:

Conservation status in SCIs: **FV**

Overall conservation status on national level: **FV**



By bioregion:

ALP: 100

PAN:

***Lindernia procumbens* (Krock.) Borbás**
(Scrophulariales, Scrophulariaceae)

An annual, up to 15 cm high, herb with elliptical, opposite arranged leaves and bright-pink corollas; it grows on bare bottom of the rivers, oxbow-lakes, ponds and in wet areas on arable soil in the planar belt.

Number of PMLs: 5 **PML average area size:** 3,200 m²

Number of involved experts: 2 **Number of PML field visits:** 6

Monitoring method: In the surveyed PMLs, the number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (July – October), depending on the water level.

PMLs distribution and localization: In the territory of Slovakia the species is spread mainly in Východoslovenská nížina Lowland, but it also grows in isolation near the Hron River in Podunajská nížina Lowland. It was historically recorded in Borská nížina Lowland.



Monitoring results:

Estimate of the population size in the Alpine Bioregion:

Estimate of the population size in the Pannonian Bioregion: 1,000 – 3,000 individuals

Estimate of the population development trend: ALP: PAN: 0

Population quality in PMLs:



Overall population quality: ALP: PAN: **U2**

Habitat quality for the species in PMLs:



Overall habitat quality for the species: ALP: PAN: **U1**

Future prospects of habitat for the species in PMLs:



Overall future prospects of habitat for the species: ALP: PAN: **U1**

Pressures and threats: The species is dependent on regular denudation of pond and stream bottoms, if the water level stays high no population is formed. The species is threatened by the modification of streams and intense management of ponds to avoid them drying out even in summer.

Assessment and notes on the monitoring

results: The population quality was evaluated as unfavourable-bad based on monitoring. The reason is that in 2014 the species was not found in three permanent monitoring locations (Veľký Horeš, Svätuš, Vozokany nad Hronom). 2014 was extremely rich in rainfall; the cumulative total for July and August considerably exceeded the average level. The necessary denudation did not occur in the monitored locations, and thus these particular populations were not formed. The highest number of individuals (1,000 individuals) was recorded in 2015 in one of the branches of



© Jaroslav Košťál



© Jaroslav Košťál

the river Latorica near the village Čičarovce. The overall quality of the habitat for species and its future prospects are evaluated unfavourably. The number of the species in our territory in natural habitats is dependent on climate factors, on the management intensity in human-controlled water areas, in wet areas on arable soil and the way they are cultivated. Because of these factors the determination of the estimate of the population development trend is very complicated, in the long term the current status could be preserved, in climatically favourable years it could even slightly improve.

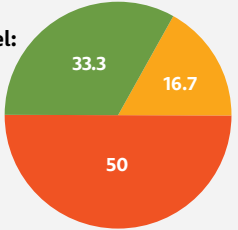
Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: PAN: **U2**

Conservation status in SCIs: **U1**

Overall conservation status on national level: **U2**



By bioregion:



Liparis loeselii (L.) Rich. (Orchidales, Orchidaceae)

A perennial, up to 20 cm high, herb with sparse green-yellow inflorescence; in which there are maximum 15 flowers with an integral longitudinally folded labium that is slightly crimped on the edges. It grows in fens and mires in the planar up to the colline belts.

Number of PMLs: 3 **PML average area size:** 4,800 m²

Number of involved experts: 3 **Number of PML field visits:** 5

Monitoring method: In the surveyed PMLs, the number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (June – July).

PMLs distribution and localization: In the territory of Slovakia the species is distributed across three locations, in Borská nížina Lowland near the villages Studienka and Plavecký Peter and in Nízke Beskydy Mountains near the village Čertižné.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 500 – 1,500 individuals

Estimate of the population size in the Pannonian Bioregion: 0 – 5 individuals

Estimate of the population development trend: ALP: – PAN: –

Population quality in PMLs:

ALP: 25 **PAN:** 75

ALP: 100 **PAN:** 100

Overall population quality: ALP: U1 PAN: U2

Habitat quality for the species in PMLs:

ALP: 50 **PAN:** 50

ALP: 100 **PAN:** 100

Overall habitat quality for the species: ALP: U1 PAN: U2

Future prospects of habitat for the species in PMLs:

ALP: 25 **PAN:** 75

ALP: 100 **PAN:** 100

Overall future prospects of habitat for the species: ALP: U1 PAN: U2

Pressures and threats: The species is threatened by peat extraction, succession, drainage and by the overall change of the hydrological regime.

Assessment and notes on the monitoring results: In the Pannonian Bioregion the overall status is unfavourable-bad; in 2014 no individuals were found there. This is because of unsuitable ways of management in the PML Studienka, U Holbičkov, where the water regime was changed so that only location for this species in this Bioregion has been permanently flooded. Since *Liparis loeselii* does not tolerate the prolonged stagnation of water above the soil surface, the population has become extinct. In the Alpine Bioregion the situation is a bit better, but the overall status is evaluated as unfavourable. The most numerous population is near the village Plavecký Peter, the population quality is in favourable status there. In the location near the village Čertižné the overall number of the species is about 10 individuals, the location is in unfavourable status because of the on-going succession and the insufficient and unsatisfactory management. The habitat quality and its future prospects are unfavourable in the Alpine Bioregion; in the Pannonian Bioregion they are unfavourable-bad. The estimate of the population development trend is decreasing for both bioregions.

To improve the status it is necessary to stop changes in the water regime, permanent flooding or drainage destroys populations of this species. In case of succession, regular mowing is necessary, either manually or by using lightweight machinery. In case of succession by trees and scrub these have to be removed.



© Dušan Valachovič



© Miroslava Durilová

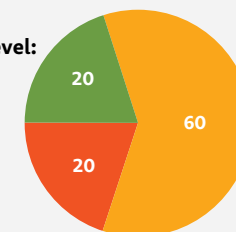
Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: U1 PAN: U2

Conservation status in SCIs: U1

Overall conservation status on national level: U1



By bioregion:

ALP: 25 **PAN:** 75

ALP: 100 **PAN:** 100

Lycopodium spp. L. em. Rothm. (Lycopodiales, Lycopodiaceae)

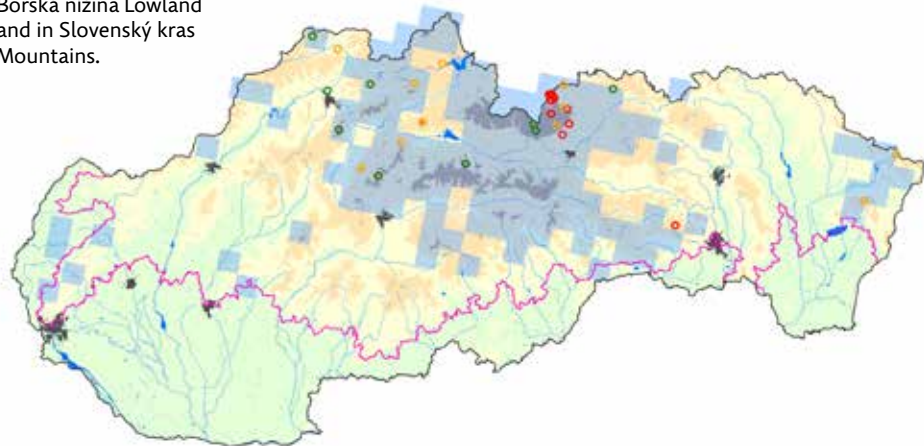
A perennial, evergreen herb with a creeping stem, alternating comma-shaped, lanced leaves and spore spikes that are seated or pediculate. The *Lycopodium* genus cover two widespread species in Slovakia, *Lycopodium clavatum* and *Lycopodium annotinum*. They grow in conifer and spruce forests; on mires and meadows; from the planar to the subalpine belt.

Number of PMLs: 34 PML average area size: 13.7 ha

Number of involved experts: 13 Number of PML field visits: 41

Monitoring method: The presence of the *Lycopodium* genus was recorded in the species record for monitored habitat locations with the coverage estimated according to the Tansley scale. The assessment of the population quality is derived from the overall quality of the habitat in the PMLs. The prospects in the habitat for the species and the quality of the habitat for the species are identical with the recorded values of habitat in PMLs. The best time for monitoring was the time of flowering (particularly in June – August).

PMLs distribution and localization: The *Lycopodium* genus in Slovakia is mainly spread in the Carpathian part of the area, scattered, but in some places is plentiful. In the Pannonian Bioregion it occurs only in Borská nížina Lowland and in Slovenský kras Mountains.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 10,000 – 100,000 individuals

Estimate of the population size in the Pannonian Bioregion: 5,000 – 50,000 individuals

Estimate of the population development trend: ALP: 0 PAN: 0

Population quality in PMLs:

ALP: 19.1 80.9

PAN:

Overall population quality: ALP: U1 PAN:

Habitat quality for the species in PMLs:

ALP: 36.3 30.5 33.2

PAN:

Overall habitat quality for the species: ALP: U1 PAN:

Future prospects of habitat for the species in PMLs:

ALP: 34.4 52.3 13.3

PAN:

Overall future prospects of habitat for the species: ALP: U1 PAN:

Pressures and threats: The *Lycopodium* genus is not threatened in Slovakia. The following negative pressures may occur: insensitive forestry interventions in timber production and during wood handling, degradation of non-forest types of habitats influenced by succession.

Assessment and notes on the monitoring results: The overall condition of the *Lycopodium* genus is unfavourable on a national level. The quality of the population that is derived from the overall quality of the habitat, in which it occurs, is also insufficient. Of the 41 visits to PMLs with the presence of the *Lycopodium* species only 9 were assessed as favourable; they are mostly non-forest habitats such as Species-rich *Nardus* grasslands on siliceous substrates (6230*) or Bushes with *Pinus mugo* (4070). Unfavourable-bad condition was detected in 20 PMLs during monitoring. It is primarily related to the conditions of the habitat Bog woodland (91D0), up to 65 % of badly assessed PMLs belong to this habitat.

The quality of the habitat for species and its prospects are derived from the quality of the habitat and the prospects in the PMLs in which the *Lycopodium* species occurs. The conditions are unfavourable in both parameters. The worst quality, as well as prospects, was found in the PMLs belonging to the habitat Bog woodland (91D0). The estimate of the population development trend is stable, especially because of the absence of a more significant threat.

The improvement in the condition of the *Lycopodium* population on a national level is related to the improvement of the conditions of its habitat. When talking about forest habitats, the most suitable management is to leave the locations without interventions, when talking about forestry interventions it is appropriate to maintain a considerate approach to timber production and wood handling without unnecessary damage to the vegetation cover. When talking about non-forest habitats it is suitable to introduce management methods that limit the succession processes in these locations.



© Jaroslav Košťál



© Milan Barlog

Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: U1 PAN:

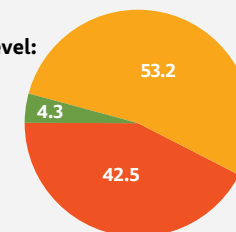
Conservation status in SCIs: XX

Overall conservation status on national level: U1

By bioregion:

ALP: 4.3 53.2 42.5

PAN:



Marsilea quadrifolia L.
(Marsileales, Marsileaceae)

A perennial water plant, rooted in mud that has a terrestrial form too. It grows on the edges and banks of warm stagnant or slowly flowing waters with fluctuating water level, in material pits or exposed beds in the planar belt.

Number of PMLs: 12 **PML average area size:** 8,900 m²

Number of involved experts: 1 **Number of PML field visits:** 13

Monitoring method: In the surveyed PMLs, the estimated number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of spore ripening (September – October).

PMLs distribution and localization: In the territory of Slovakia the species is located only in Východoslovenská nížina Lowland near the rivers Latorica and Laborec.



Monitoring results:

Estimate of the population size in the Alpine Bioregion:

Estimate of the population size in the Pannonian Bioregion: 10,000 – 20,000 individuals

Estimate of the population development trend: ALP: PAN: 0

Population quality in PMLs:

ALP:

PAN: 61.5 7.7 30.8

Overall population quality: ALP: PAN: U1

Habitat quality for the species in PMLs:

ALP:

PAN: 61.5 7.7 30.8

Overall habitat quality for the species: ALP: PAN: U1

Future prospects of habitat for the species in PMLs:

ALP:

PAN: 61.5 7.7 30.8

Overall future prospects of habitat for the species: ALP: PAN: U1

Pressures and threats: The species is threatened by changes in the hydrological regime and disruption of the water level fluctuation during the year; this can lead to the invasion of strong competitors and to the suppression of the populations of this species.

Assessment and notes on the monitoring results: In the overall evaluation of the population quality there are more than 69 % favourable locations, the best locations in terms of the number of individuals are Veľké Raškovce, Kapušanské Kľačany and Kucany. By contrast, in 30 % of PMLs the overall status of the population is evaluated as unfavourable-bad because the species was not confirmed there during monitoring. This is because the drying-up of the material pits and depressions in the terrain, in which the particular populations occurred in the past. The quality of the habitat for species and its future prospects are evaluated as the same as the population quality, i.e. they are unfavourable. The estimate of the development trend for this species in our territory is very difficult; the number depends on the climatic factors. In the long term, if there are no significant interventions into the hydrological regime, the population will have a stable number; at least it should not decrease sharply.

The favourable status of the locations should fulfil the ecological requirements of the species, i.e. in the spring flooding, subsequent evaporation and gradual decrease in the water level.



© Miloš Balla



© Miloš Balla

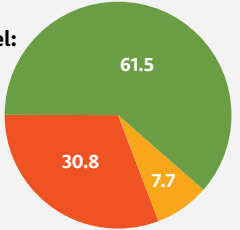
Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: PAN: U1

Conservation status in SCIs: U1

Overall conservation status on national level: U1



By bioregion:

ALP:

PAN: 61.5 7.7 30.8

****Onosma viridis* (Borbás) Jáv. (syn. *Onosma tornensis* Jáv.)**
(*Boraginales*, *Boraginaceae*)

A perennial, up to 40 cm high plant with lemon-yellow flowers and with typical small warts on leaves that have bristles placed in the shape of a star. It grows on dry and warm, rocky and south-facing hillsides and on limestone in the colline belt.

Number of PMLs: 4 **PML average area size:** 2.7 ha

Number of involved experts: 1 **Number of PML field visits:** 6

Monitoring method: In the surveyed PMLs, the number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (May – August).

PMLs distribution and localization: Until recently it was considered to be an endemic species of Slovenský kras Mountains. The spread is localised to the area of Slovenský kras Mountains where it occurs in four locations.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 1,000 – 2,000 individuals

Estimate of the population size in the Pannonian Bioregion: 400 – 600 individuals

Estimate of the population development trend: ALP: 0 PAN: –

Population quality in PMLs:

ALP: 40 40 20

PAN: 100

Overall population quality: ALP: U1 PAN: FV

Habitat quality for the species in PMLs:

ALP: 100

PAN: 100

Overall habitat quality for the species: ALP: FV PAN: FV

Future prospects of habitat for the species in PMLs:

ALP: 100

PAN: 100

Overall future prospects of habitat for the species: ALP: FV PAN: U1

Pressures and threats: The most significant threats to the species are succession and the lack of grazing. Non-native tree species (*Pinus nigra*) are planted in some parts of a particular population. The population at Hostovce is located in the mining area of a limestone quarry.

Assessment and notes on the monitoring results: The best-quality area for the population is in the location of Hradná near the village of Turňa nad Bodvou; in 2014 the population reached the total of 1,355 individuals. In the Alpine Bioregion in 2013 they found out that one subpopulation is in unfavourable-bad status in Jasovská planina Plain where only three individuals were recorded. Two years later, the monitoring detected a significant increase of up to 31 individuals; most of them were juvenile plants. The location was severely damaged by wild pigs, thus exposing places that were suitable for holding seedlings without strong competitors. In 2015, the quality of this population was evaluated as better by one point. In the Pannonian Bioregion the species can be found only on Dolný vrch in Hostovce; in general this is the most numerous location. But the evaluation of the future prospects of habitat for the species is unfavourable because the whole population occurs in the mining area of the limestone quarry. The increased dustiness, strong succession and the threat of mining negatively affect the future of this location; the estimated trend for population development in the Pannonian Bioregion is therefore decreasing, in the Alpine Bioregion it is stable.



© Róbert Šuvada



© Róbert Šuvada

Overall assessment of the conservation status of species

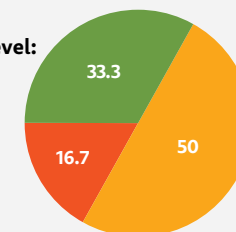
Conservation status on national level:

Con. status of species: ALP: U1 PAN: U1

Conservation status in SCIs: U1

Overall conservation status on national level: U1

By bioregion:



***Pulsatilla grandis* Wender. (Ranunculales, Ranunculaceae)**

A perennial, up to 25 cm high herb with striking, bell-shaped violet flowers and 3-4 zygomorphic leaves that grow after losing blossoms. It grows in sun-exposed and dry grassy slopes; in forest steppes and on rocky terraces; from the planar up to the montane belts.

Number of PMLs: 34 **PML average area size:** 1.5 ha

Number of involved experts: 9 **Number of PML field visits:** 35

Monitoring method: In the surveyed PMLs, the number of clumps, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The most suitable period for monitoring was the time of achene creation (April – May) because the ground leaves of the sterile individuals develop after losing blossoms.

PMLs distribution and localization: The species occurs in the southern part of Slovakia, from the lowlands to the foothills of the Carpathians, numerous populations can be found in Slovenský kras Mountains, Zemplínske vrchy Hills, Tribeč Mountains, and Malé Karpaty Mountains.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 100,000 – 150,000 individuals

Estimate of the population size in the Pannonian Bioregion: 15,000 – 20,000 individuals

Estimate of the population development trend: ALP: – PAN: –

Population quality in PMLs:

ALP: 73.7 21.1 5.2

PAN: 62.5 31.1 6.2

Overall population quality: ALP: U1 PAN: U1

Habitat quality for the species in PMLs:

ALP: 73.7 21.1 5.2

PAN: 75 18.8 6.2

Overall habitat quality for the species: ALP: U1 PAN: U1

Future prospects of habitat for the species in PMLs:

ALP: 68.4 26.3 5.3

PAN: 68.8 31.3 6.2

Overall future prospects of habitat for the species: ALP: U1 PAN: U1

Pressures and threats: The most significant threats include successional ingrowth, lack of grazing, afforestation, occurrence of non-native trees, trampling near the hiking trails.

Assessment and notes on the monitoring results: The population quality is evaluated as favourable in the majority of the monitored locations. But the overall status of the population is unfavourable-inadequate, in some PMLs it is unfavourable-bad. The main reason is the low number of the species in these locations; in seven cases it did not reach ten individuals. On the contrary, eight monitored populations consist of 1,000 or more individuals. The quality of the habitat for species and its future prospects are evaluated as unfavourable. The steep rocky, often bushy hillsides, that are the most frequent habitat of this species, are regular use and strong succession takes place here. In the past these were grazed areas, mainly grazed by goats. This method of farming is very rare in Slovakia today; it was not recorded in any of the PMLs. The correct management in non-rocky meadows would be mowing. This species reacts very positive to early spring burning, but as a replacement technique it can be used only in a very limited way and by observing all the safety measures. The estimated population development trend is decreasing in the majority of locations mainly because of the absence of proper management. The small populations will gradually cease to exist and the numbers in the larger locations will be reduced.



© Róbert Šuvada



© Drahoš Blanár

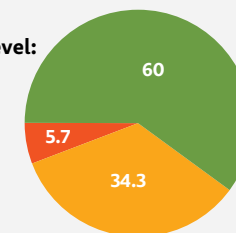
Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: U1 PAN: U1

Conservation status in SCIs: U1

Overall conservation status on national level: U1



By bioregion:

ALP: 63.2 31.6 5.2

PAN: 56.3 37.5 6.2

***Pulsatilla patens* (L.) Mill.**
(Ranunculales, Ranunculaceae)

A perennial, up to 20 cm tall herb with striking, bell-shaped violet flowers and palm-shaped leaves that grow after losing blossoms. It grows in sun-exposed and dry meadows, on rocky hillsides and bushy slopes, from the colline up to the montane belt.

Number of PMLs: 8 **PML average area size:** 21.8 ha

Number of involved experts: 3 **Number of PML field visits:** 9

Monitoring method: In the surveyed PMLs the number of clumps, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The most suitable period for monitoring was the time of achene creation (April – May) because the basal leaves of the sterile individuals develop after losing blossoms.

PMLs distribution and localization: The distribution is concentrated in the eastern part of Slovakia, particularly in Slovenský kras Mountains, occasionally in Popradská kotlina Basin and in Fintické svahy near the town of Prešov.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 5,000 – 15,000 individuals

Estimate of the population size in the Pannonian Bioregion: 1 – 10 individuals

Estimate of the population development trend: ALP: – PAN: –

Population quality in PMLs:

ALP: 62.5 25 12.5

PAN: 100

Overall population quality: ALP: U1 PAN: U2

Habitat quality for the species in PMLs:

ALP: 25 75

PAN: 100

Overall habitat quality for the species: ALP: U1 PAN: FV

Future prospects of habitat for the species in PMLs:

ALP: 25 62.5 12.5

PAN: 100

Overall future prospects of habitat for the species: ALP: U1 PAN: FV

Pressures and threats: The most frequently recorded negative pressures are succession, the ingrowth of the locations by trees, the lack of grazing and mowing. The positive ones include non-intensive sheep grazing and mowing.

Assessment and notes on the monitoring results:

The overall status of the species on national level and in the Sites of Community Importance is unfavourable. In the Pannonian Bioregion unfavourable-bad status was detected during monitoring. The reason is the very low number (six clumps) in the location of Silická planina Plain. But the actual status of the habitat here is favourable; the location is mowed every year which is followed by sheep grazing. However, in the spring the area is dominated by the numerous population of *Pulsatilla grandis* that is constantly increasing and is likely to compete with *Pulsatilla patens*. The population quality in the Alpine Bioregion is unfavourable. PML Krkavčie skaly in Zádielska planina Plain has an unfavourable-bad status where regularly only five clumps occur. The area is being gradually overgrown by juniper stands. On the contrary, the occurrence of the population in Primovce has favourable status; the overall number is up to 5,000 clumps. The overall quality of the habitat for the species and its future prospects are unfavourable for the Alpine Bioregion. In several locations succession is occurring, the grazing and mowing is insufficient or it does not cover the whole area of the species occurrence. The estimated trend of the population development is decreasing for the Alpine as well as the Pannonian Bioregions. Regular management of the locations is necessary to improve the status – in the form of non-intensive grazing or mowing, including the removal of trees and scrubs. The species reacts positive to early spring burning, but as replacement technique it can only be used very limited whilst observing all the correct safety measures.



© Viera ŠeffEROVÁ StanOVÁ



© Viera ŠeffEROVÁ StanOVÁ

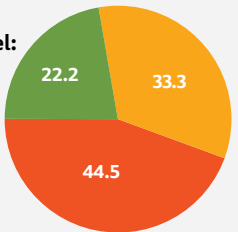
Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: U1 PAN: U2

Conservation status in SCIs: U1

Overall conservation status on national level: U1



By bioregion:

ALP: 25 50 25

PAN: 100

****Pulsatilla pratensis* subsp. *hungarica* (Soó) Soó**
(*Ranunculales*, *Ranunculaceae*)

A perennial, up to 15 cm high herb with small jug-shaped flowers that have petals, which are yellow-green on their inner side. It grows on sun-exposed and dry grassy hillsides and sandy steppes in the planar belt.

Number of PMLs: 2 **PML average area size:** 19.6 ha

Number of involved experts: 1 **Number of PML field visits:** 2

Monitoring method: In the surveyed PMLs, the number of clumps, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The most suitable period for monitoring was the time of losing blossom or achene creation (April – May) because the ground leaves of the sterile individuals fully develop after losing blossoms.

PMLs distribution and localization: The spread in Slovakia is concentrated exclusively in Východoslovenská nížina Lowland.



Monitoring results:

Estimate of the population size in the Alpine Bioregion:

Estimate of the population size in the Pannonian Bioregion: 2,000 – 4,000 individuals

Estimate of the population development trend: ALP: PAN: –

Population quality in PMLs:

ALP:

PAN: **100**

Overall population quality: ALP: PAN: **FV**

Habitat quality for the species in PMLs:

ALP:

PAN: **100**

Overall habitat quality for the species: ALP: PAN: **FV**

Future prospects of habitat for the species in PMLs:

ALP:

PAN: **100**

Overall future prospects of habitat for the species: ALP: PAN: **FV**

Pressures and threats: The species is threatened mainly by the succession and the overgrowth of the locations by trees and scrubs, the lack of grazing and the occurrence of non-native species of plants that behave invasively (*Robinia pseudoacacia*).

Assessment and notes on the monitoring results: Two locations in Východoslovenská nížina Lowland (Tarbucka near Malý Kamenec and Poniklecová lúčka near Malý Horeš) were included in the monitoring. The status of the population in both locations is favourable; the overall number is 3,000 clumps in Tarbucka and 300 clumps in Malý Horeš. In the first location the species is mostly hybridized with the species *Pulsatilla zimmermannii* so some of the plants are of hybrid origin with transient features, which has a negative impact on the genetic resource of this population. The quality of the habitat for the species and its future prospects are evaluated favourably, but Tarbucka in particular is significantly overgrown by bushes. There has not been regular and adequate management so the grasslands are degraded. In Malý Horeš there are positive effects including the non-intensive grazing of sheep, at least on part of the location. The estimated population development trend is decreasing, because of the insufficient management in the most numerous locations.

To maintain the favourable status it is necessary to ensure the removal of succession bushes in the locations of occurrence as well as regular non-intensive grazing. *Pulsatilla pratensis* subsp. *hungarica* reacts very positively to early spring burning, but as replacement management it can only be used very limited whilst observing all the correct safety measures.



© Miloš Balla



© Miloš Balla

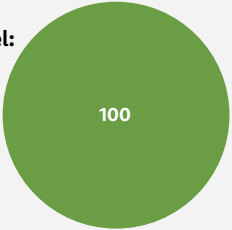
Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: PAN: **FV**

Conservation status in SCIs: **FV**

Overall conservation status on national level: **FV**



By bioregion:

ALP:

PAN: **100**

****Pulsatilla slavica* G. Reuss**
(*Ranunculales*, *Ranunculaceae*)

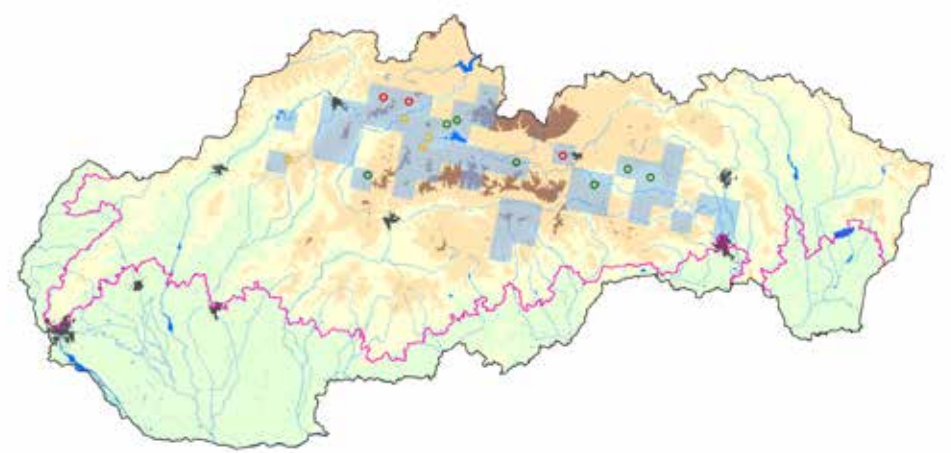
A perennial, up to 20 cm high herb with striking, bell-shaped violet flowers and 1-2 zygomorphic leaves that grow after losing blossoms. It grows on sun-exposed and dry grassy slopes, bushy hillsides and in relict pine forests in the colline up to the subalpine belts.

Number of PMLs: 13 **PML average area size:** 6.3 ha

Number of involved experts: 6 **Number of PML field visits:** 19

Monitoring method: In the surveyed PMLs, the number of clumps, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The most suitable period for monitoring was the time of achene creation (April – June) because the ground leaves of the sterile individuals develop after losing blossoms.

PMLs distribution and localization: Western Carpathian endemic species. It is distributed on carbonate rocks in the central part of Slovakia, from Malá Fatra Mountains to Slovenský raj Mountains and central Pohornádie Region.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 300,000 – 400,000 individuals

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: 0 PAN:

Population quality in PMLs:

ALP: 94.7 5.3

PAN:

Overall population quality: ALP: **FV** PAN:

Habitat quality for the species in PMLs:

ALP: 73.7 21.1 5.2

PAN:

Overall habitat quality for the species: ALP: **U1** PAN:

Future prospects of habitat for the species in PMLs:

ALP: 68.4 21.1 10.5

PAN:

Overall future prospects of habitat for the species: ALP: **U1** PAN:

Pressures and threats: The most significant negative impacts that were recorded during monitoring include succession, planting of non-native trees in the location and trampling near the hiking trails.

Assessment and notes on the monitoring results:

The population quality was evaluated as favourable in almost 95 % of PMLs. The most numerous monitored locations include Dreveník in Hornádska kotlina Basin (100,000 clumps) and Šíp Mt. near the village of Stankovany (35,000 clumps). Less good are the locations Strážov in Strážovské vrchy Mountains and Turková in Nízke Tatry Mountains where the numbers are very low, the overall populations did not reach ten clumps. The location Strážov is the westernmost monitored location of the species, but in this area *Pulsatilla sub-slavica* dominates, or transient types of hybrid origin.

The quality of the habitat for species and its future prospects are evaluated as unfavourable. Several locations are overgrown by succession of trees; the grasslands are degraded and their species composition is changing; shading by bushes and trees reaches 50-70 % in some places. The suitable management for grassy and bushy hillsides includes the removal of succession trees and if necessary also mowing of the location.



© Milan Barlog



© Milan Barlog

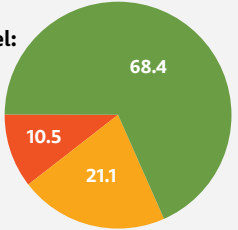
Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: **U1** PAN:

Conservation status in SCLs: **U1**

Overall conservation status on national level:



By bioregion:

ALP: 68.4 21.1 10.5

PAN:

****Pulsatilla subslavica* Futák ex Goliášová**
(*Ranunculales*, *Ranunculaceae*)

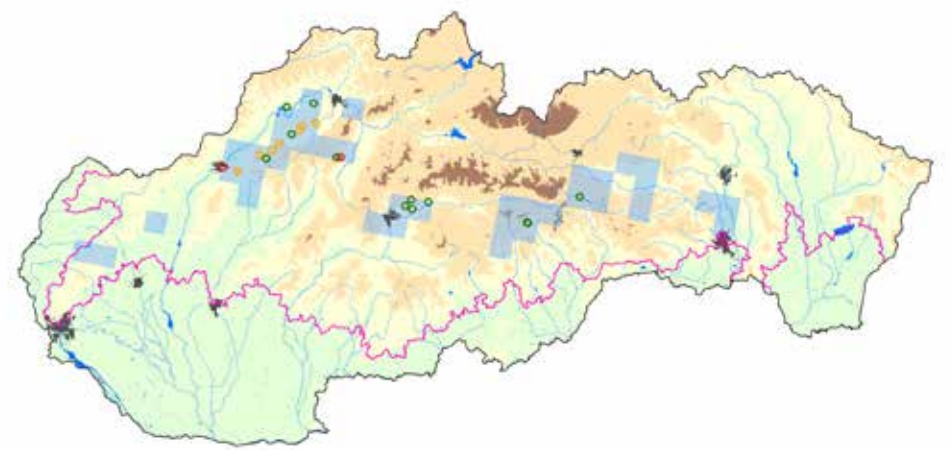
A perennial, up to 20 cm high herb with striking, bell-shaped violet flowers and with 2-3 zygomorphic leaves that grow after losing blossoms. It grows on sun-exposed and dry grassy slopes; bushy hillsides and rocky terraces; in the colline up to the subalpine belts.

Number of PMLs: 21 **PML average area size:** 6.7 ha

Number of involved experts: 7 **Number of PML field visits:** 23

Monitoring method: In the surveyed PMLs, the number of clumps, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The most suitable period for monitoring was the time of achene creation (April – June) because the ground leaves of the sterile individuals develop after losing blossoms.

PMLs distribution and localization: A Western Carpathian endemic species – it is spread mainly in Strážovské vrchy Mountains, Muránska planina Plain, in the southern part of Veľká Fatra Mountains and Nízke Tatry Mountains, Slovenský raj Mountains and the central Pohornádie Region.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 80,000 – 100,000 individuals

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: 0 PAN:

Population quality in PMLs:

ALP: 65.2 30.4 4.4

PAN:

Overall population quality: ALP: U1 PAN:

Habitat quality for the species in PMLs:

ALP: 60.9 39.1

PAN:

Overall habitat quality for the species: ALP: U1 PAN:

Future prospects of habitat for the species in PMLs:

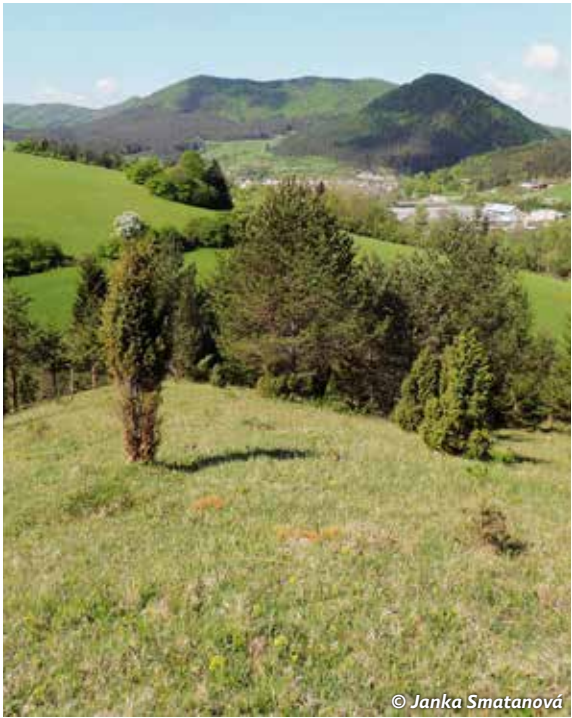
ALP: 65.2 30.4 4.4

PAN:

Overall future prospects of habitat for the species: ALP: U1 PAN:

Pressures and threats: The most significant threats include successional ingrowth of the locations, lack of grazing, trampling and collection near the hiking trails.

Assessment and notes on the monitoring results: The population quality is evaluated as favourable in 65 % of locations but the overall status of its quality is unfavourable. During monitoring, populations with clumps of less than 20 individuals were found in several cases, in PML in Trenčín there was not a single individual. This locality is overgrown by non-indigenous trees (*Pinus nigra*, *Laburnum anagyroides*) so the status of the habitat is inadequate. The most numerous populations occur in the locations of Súľov – Hradná (6,000 clumps), Vápeč near the



village of Horná Poruba (3,000 clumps) and Podskalský Roháč near the village of Podskalie (2,000 clumps). The quality of the habitat for species and its future prospects are favourable in more than 60 % of locations, but in the overall evaluation they are unfavourable. Besides the ingrowth, the negative influence of hiking was recorded in several locations. In the territories where strong erosion and excessive vegetation trampling or herb collection occurs it is necessary to divert the outdoor, sport and recreational activities away from the most numerous populations.

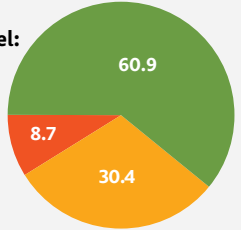
The appropriate management for grassy and bushy hillsides includes the removal of trees and scrubs and if necessary also mowing the location.

Overall assessment of the conservation status of species

Conservation status on national level:
Con. status of species: ALP: U1 PAN:

Conservation status in SCIs: U1
Overall conservation status on national level: U1

By bioregion:



****Serratula lycopifolia* (Vill.) A. Kern.**
(*Asterales, Asteraceae*)

A perennial, up to 120 cm high herb without branches; coarsely toothed saw leaves and one round seed head. It grows on sun-exposed grassy to bushy hillsides and sometimes in fen meadows in the planar up to the colline belts.

Number of PMLs: 1 PML average area size: 1,200 m²

Number of involved experts: 1 Number of PML field visits: 3

Monitoring method: In the surveyed PMLs, the number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (June – July) before mowing the location.

PMLs distribution and localization: At present the species occurs only in one location in Slovakia – in Biele Karpaty Mountains.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 1,000 – 2,000 individuals

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: 0 PAN:

Population quality in PMLs:

ALP: 100

PAN:

Overall population quality: ALP: U1 PAN:

Habitat quality for the species in PMLs:

ALP: 100

PAN:

Overall habitat quality for the species: ALP: U1 PAN:

Future prospects of habitat for the species in PMLs:

ALP: 33.3 66.7

PAN:

Overall future prospects of habitat for the species: ALP: U1 PAN:

Pressures and threats: The most significant threats include succession, caused by insufficient mowing, the invasion of expansive species and being overgrown by trees.

Assessment and notes on the monitoring results:

The species occurs only in one location in the territory of Slovakia, in Site of Community Importance Žalostiná, the population quality is evaluated as unfavourable. The number of the species in the monitored location is sufficiently high; in 2014 there were 1,600 individuals. It is interesting that there is very little sexual reproduction, the formation of mature seeds is minimal, and so the species is reproduced mainly by vegetative underground growth. Because of this *Serratula lycopifolia* is well-suited for mowing before seeding. The quality of the habitat for species in PML as well as its future prospects is evaluated as unfavourable. In the past ruderalisation and the spread of the expansive species, such as *Cirsium arvense*, were recorded here. This is because of the insufficient and irregular management, mowing was carried out only sporadically. However the future prospects improved in 2015, when the location was mowed by the owner. It can be expected that this management will be regular in the future. The estimate of the population development trend is stable, if the suitable management endures in the form of annual mowing the number can increase too.



© Sylvia Mertanová



© Jaroslav Košťál

Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: U1 PAN:

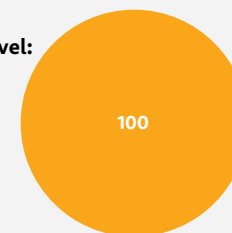
Conservation status in SCIs: U1

Overall conservation status on national level: U1

By bioregion:

ALP: 100

PAN:



***Tephroseris longifolia* subsp. *moravica* Holub**
(Asterales, Asteraceae)

A multi-annual to perennial, up to 70 cm high herb with a corymb consisting of 3-15 yellow round seed heads. It grows in mesophilic meadows and pastures, on the edges of forests and on bushy hillsides in the submontane belt.

Number of PMLs: 7 **PML average area size:** 9,800 m²

Number of involved experts: 3 **Number of PML field visits:** 21

Monitoring method: In the surveyed PMLs, the number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (June – July).

PMLs distribution and localization: It is Western Carpathian endemic species. The spread in Slovakia is concentrated into the western part of the territory in the mountains of Biele Karpaty, Tribeč, Strážovské vrchy and Vtáčnik.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 2,500 – 5,000 individuals

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: 0 PAN:

Population quality in PMLs:

ALP: 76.2 23.8

PAN:

Overall population quality: ALP: **FV** PAN:

Habitat quality for the species in PMLs:

ALP: 95.2 4.8

PAN:

Overall habitat quality for the species: ALP: **FV** PAN:

Future prospects of habitat for the species in PMLs:

ALP: 66.7 33.3

PAN:

Overall future prospects of habitat for the species: ALP: **U1** PAN:

Pressures and threats: The most significant threats include the absence of mowing or non-intensive grazing and the related succession, sites being overgrown by trees and degradation of meadow communities.

Assessment and notes on the monitoring results: Favourable status of the populations was recorded every year in the locations Čavoj, Radobica, and one sub-population near the village of Omšenie. The management in these locations includes mowing, but it is not always regular. The overall population quality is evaluated as favourable, the most numerous locations were Čavoj (855 individuals), Radobica (625 individuals) and Veľké Pole (521 individuals). The quality of the habitat for species is also evaluated as favourable, but its future prospects are unfavourable. At least partial management is ensured in several locations; the estimate of the population development trend is stable, the size of the population in the Alpine Bioregion should not decrease.

To improve the overall status it is necessary to regularly mow the locations at the end of the summer after seeding and if necessary to remove trees and scrub. As an alternative management it would be possible to use non-intensive grazing, the disturbance of the vegetation cover when the herds occasionally migrate helps seed germination.



© Janka Smatanová



© Paulína Smatanová

Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: **U1** PAN:

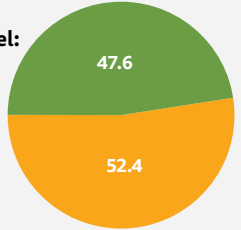
Conservation status in SCIs: **U1**

Overall conservation status on national level: **U1**

By bioregion:

ALP: 47.6 52.4

PAN:



***Thlaspi jankae* A. Kern.**
(Capparales, Brassicaceae)

A biennial or short-term perennial, 17-27 cm high herb with a simple stalk, leaves that reach the inflorescence and a basal rosette of leaves that get dry when in flowers. It grows in pastures, grasslands on rocky hillsides, in bushes and on the edges of light forests in the colline belt.

Number of PMLs: 5 **PML average area size:** 2.6 ha

Number of involved experts: 2 **Number of PML field visits:** 5

Monitoring method: In the surveyed PMLs, the number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (May – June).

PMLs distribution and localization: Endemic species of Mätra and the Carpathians. In Slovakia it is concentrated only in two locations, in the mountains of Tribeč and Slovenský kras.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 100,000 – 150,000 individuals

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: 0 PAN:

Population quality in PMLs:

ALP: 100

PAN:

Overall population quality: ALP: FV PAN:

Habitat quality for the species in PMLs:

ALP: 80 20

PAN:

Overall habitat quality for the species: ALP: FV PAN:

Future prospects of habitat for the species in PMLs:

ALP: 80 20

PAN:

Overall future prospects of habitat for the species: ALP: FV PAN:

Pressures and threats: The most significant negative pressures include succession, sites being overgrown by trees, insufficient grazing and planting of non-indigenous tree species.

Assessment and notes on the monitoring results: During monitoring, the population quality was favourable in all locations; the most numerous population was recorded in the PML Žibrica with total of 15,000 individuals. In general the species forms numerous clusters in the locations where it occurs. Management in the form of grazing is suitable for it as the cattle's movements disturb the vegetation cover. This means the seedlings are able to successfully take root in stands with strong competitors.

Likewise the occasional rooting of the soil by wild boars has a positive influence on it. The species tolerates partial shadowing among bushes or on the edges of sparse forest stands, but well-developed forest stands have a negative influence on it. The quality of the habitat for species and its future prospects are evaluated favourably. The only location with an unfavourable status is Drienovec in Slovenský kras Mountains where it grows in well-lit and open areas of *Juniperus communis* formations on dry grasslands. The



© Robert Šuvada



© Jaroslav Košťál

coverage by trees has increased in the last years and there is no suitable management of the locations so the favourable conditions for the species are gradually disappearing.

To maintain the favourable status of the species it is necessary to eliminate the succession processes in the locations where it occurs, either in the form of a non-intensive grazing or by mowing and if necessary to remove trees.

Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: FV PAN:

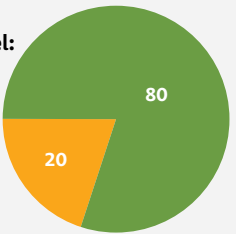
Conservation status in SCIs: FV

Overall conservation status on national level: FV

By bioregion:

ALP: 80 20

PAN:



Tozzia carpatica Wot.
(*Scrophulariales, Scrophulariaceae*)

Semi-parasitic, up to 50 cm high, herb with branches and bright-yellow corollas and simple opposite arrangement leaves. It grows on the wet edges of mountain streams, in alder stands and wet forests in the montane up to subalpine belts.

Number of PMLs: 7 **PML average area size:** 6,300 m²

Number of involved experts: 4 **Number of PML field visits:** 7

Monitoring method: In the surveyed MLs, the number of individuals, the size of the occurrence area, the population vitality and the habitat status where the species occur were recorded. The best time for monitoring was the time of flowering (June – July).

PMLs distribution and localization: The species is spread in small islands in the Carpathian Region, in Malá Fatra Mountains, Oravské Beskydy Mountains, in Západné Tatry Mountains and Bukovské vrchy Mountains.



Monitoring results:

Estimate of the population size in the Alpine Bioregion: 1,000 – 2,500 individuals

Estimate of the population size in the Pannonian Bioregion:

Estimate of the population development trend: ALP: 0 PAN:

Population quality in PMLs:



PAN:

Overall population quality: ALP: U1 PAN:

Habitat quality for the species in PMLs:



PAN:

Overall habitat quality for the species: ALP: U1 PAN:

Future prospects of habitat for the species in PMLs:



PAN:

Overall future prospects of habitat for the species: ALP: U1 PAN:

Pressures and threats: The species is not significantly threatened. The most significant negative pressures include insensitive forestry interventions near streams during timber production and wood handling and creating field and forest roads across the location of occurrence.

Assessment and notes on the monitoring results: By the evaluation of population quality more than half of the locations were in favourable status. In one of the monitored locations the species was not confirmed, this was in PML Zakamenné near the Riečka stream. During monitoring the most numerous populations were found in the locations Oravská Polhora (200 individuals in 2013) and Turany (74 individuals in 2014). The overall quality of the habitat for species and its future prospects were evaluated unfavourably. Their unfavourable status is affected by negative influences such as insensitive forestry interventions near streams or creating forest roads across the locations of occurrence. The populations also are naturally disrupted by the sharp increase of the water level in the mountain streams after storm rainfall when the substrate on which *Tozzia carpatica* grows may be washed away.

To improve the status it is necessary to ensure that the edges of mountain streams are not undermined by human activities. In cases of severe shadowing of the location it is appropriate to remove parts of trees and bushy stands.



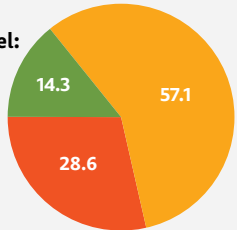
Overall assessment of the conservation status of species

Conservation status on national level:

Con. status of species: ALP: U1 PAN:

Conservation status in SCIs: U1

Overall conservation status on national level: U1



By bioregion:



PAN:

1340* Inland salt meadows

In the Pannonian Region the habitat consists of open and closed grassland formations on meadows and pastures in saline soils (habitat – Inland salt marshes). In the Carpathian Region these are formed around travertine springs (habitat Carpathian Travertine Salt Marshes).

Number of PMLs: 47

PML average area size: 5 ha

Number of involved experts: 4

Number of PML field visits: 83

Average taxon count on record: 41

Typical species found in the PMLs: *Tripolium pannonicum*, *Festuca pseudovina*, *Podospermum canum*, *Atriplex littoralis*, *Carex distans*, in the inland salt marshes habitat and *Triglochin palustre*, *Glaux maritima*, *Trichophorum pumilum* in the Carpathian travertine salt marshes.

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in a period from 1st of June to 30th of September.

Habitat distribution and localization of PMLs: The centre of current distribution is in the Pannonian Bioregion, with the habitat being rare in the Alpine Bioregion (Spišská kotlina basin only). It is usually distributed in mosaic pattern together with other communities.



Monitoring results:

Estimate of trend of habitat development: ALP: –

PAN: –

Habitat quality in PMLs:

ALP: 75 25

PAN: 17.8 75.6 6.6

Overall habitat quality:

ALP: FV

PAN: U1

Habitat management in PMLs:

ALP: 53.8 46.3

PAN: 29.6 70.4

Habitat prospects in PMLs:

ALP: 43.8 56.2

PAN: 22.2 73.3 4.5

Overall prospects of habitat:

ALP: U1

PAN: FV

Pressures and threats: Negative pressures of medium intensity on the habitat in the Alpine Bioregion come especially from succession processes (31 %), lack of grazing (23 %) and changes in hydrological regime (15 %). In the Pannonian Bioregion the most common negative pressures with medium intensity include the succession (28 %) and problematic indigenous species (26 %). Each year there is also damaging ploughing of the salt marshes' vegetation, which leads to the growth of expansive and invasive species.



© Jaroslav Košťál

Assessment and notes on the monitoring results: In the Alpine Bioregion the quality of the habitat is favourable in the vast majority of sites (75 %), yet the habitat is generally in an unfavourable condition. In the Pannonian Bioregion the quality of the habitat is unfavourable in the vast majority of sites (75 %). The reasons for this include changes in hydrological regime, lack of appropriate management or a lack of management as such. These reasons are among the most frequently mentioned pressures and threats in both bioregions. The prospects of the habitat in the Pannonian Bioregion are unfavourable (73 %), as the habitat has been preserved on only relatively small fragments of land with damaged hydrological regime, which is surrounded by intensively managed agricultural land. On the other hand, the situation in the Alpine Bioregion is much better, with up to 75 % of the sites being assessed as in favourable condition. To maintain the favourable condition of the habitat, it is necessary to ensure its regular maintenance – either mowing or grazing. The site maintenance was restored at several sites, such as Kamenínske slaniská salt marshes, Mostová, Bokroš and Pavelské slanisko salt marshes. Restoration of regular maintenance as well as of hydrological regime, elimination of problematic native and invasive species is essential for



© Pavol Eliáš

sites which are in bad and unfavourable condition. Some important species were also recorded on PMLs, for example species from Orchidaceae family, such as *Dactylorhiza majalis* and *Orchis coriophora* on the Carpathian travertine salt marshes. The Carpathian travertine salt marshes represent a unique habitat type and therefore its preservation should be made a priority. Halophytes (*Glaux maritima*, *Scorzonera parviflora*, *Trichophorum pumilum*) as well as some calcareous fen species (*Carex davalliana*, *Schoenus ferrugineus*, *Triglochin maritima*) can be found here growing side by side. Long term maintenance of favourable condition of the habitat can be secured by safeguarding the regular maintenance.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN: U1

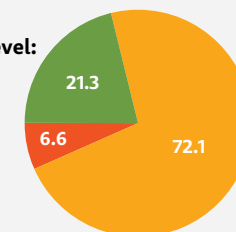
Conservation status in SCIs: U1 U1

Overall conservation status on national level: U1 U1

By bioregion:

ALP: 31.2 68.8

PAN: 17.8 73.3 8.9



1530* Pannonic salt steppes and salt marshes

Habitat consists of regularly flooded, open and connected grassland formations in meadows and pastures on saline soils with the highest concentration of salt at a depth of 25-30 cm.

Number of PMLs: 4 **PML average area size:** 9,614 m²

Number of involved experts: 2 **Number of PML field visits:** 7

Average taxon count on record: 16

Typical species found in the PMLs: *Heleochloa schoenoides*, *Chenopodium chenopodioides*, *Crypsis aculeata*, *Chenopodium glaucum*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in a period from 1st of June to 30th of September.

Habitat distribution and localization of PMLs: The habitat occurs only in the Pannonian Bioregion and is very rare in the Podunajská nížina Lowland. Usually it is found in a mosaic complex together with other salt marshes and wetlands.



Monitoring results:

Estimate of trend of habitat development: ALP:

PAN: –

Habitat quality in PMLs:



Overall habitat quality:

ALP:

PAN: U1

Habitat management in PMLs:



Habitat prospects in PMLs:



Overall prospects of habitat:

ALP:

PAN: U1

Pressures and threats: The most frequent negative pressures, of medium to high intensity, include succession (55 %) and problematic indigenous species (33 %) – particularly the expansion of *Phragmites australis*.

Assessment and notes on the monitoring results:

The main reasons for the unfavourable status of the habitat are the succession and problematic indigenous species (total 88 %). PMLs formed on the field depressions are ploughed in dry years (11 %), this, however, ensures the survival of some annual species (e.g. *Atriplex littoralis*, *Heleochloa schoenoides*). Overall, the prospects of the habitat are unfavourable as the habitat has been preserved only on very small fragments, which are surrounded by intensively used agricultural land. To maintain the favourable condition of the habitat it is necessary to ensure regular utilization – grazing, or mowing and soil disturbance by grazing animals or mechanisms (e.g. ploughing up of banks and elimination of *Phragmites australis*). Removal of the vegetation cover as a key management measure is needed to ensure the survival of species such as *Crypsis aculeata*, *Chenopodium chenopodioides* and *Heleochloa schoenoides*. This has been successfully tested on the site at Tvrdšovce, Ráczove jazierko lake. On sites in unfavourable or bad condition it is necessary to restore the hydrological regime, eliminate the problematic indigenous species and reduce pollution from agricultural areas in the vicinity (eutrophication). The second site of this habitat in the village of Tvrdšovce represents a successional advanced stage where the exposed banks were gradually occupied by competitively strong species of *Agrostis stolonifera* and *Phragmites australis*. Some of the habitat's characteristic species disappeared (*Crypsis aculeata*, *Heleochloa schoenoides*), while others were able to endure the succession for a short period of time (e.g. *Chenopodium chenopodioides*). A small area



management intervention, which included the removal of the vegetation cover, was not successful and a more radical large-scale management measure is necessary, consisting of ploughing up of the riverbed and banks. The third site is located in a field depression near the village of Močenok. Relatively large formations of species *Heleochloa schoenoides*, *Atriplex littoralis* and *A. prostrata* are being created here during the climatically favourable years. The habitat is, however, under strong impact of agricultural activity resulting in eutrophication and use of herbicides. On the other hand, occasional ploughing of the site in dry years has a positive effect, as it blocks succession and limits the spread of weeds and ruderals.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP:

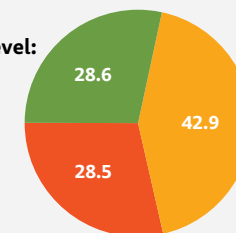
PAN: U1

Conservation status in SCIs:

U1

Overall conservation status on national level:

U1



By bioregion:



2340* Pannonic inland dunes

The habitat includes sparse and species-poor pioneer communities on soft acidic siliceous sand dunes.

Number of PMLs: 10 PML average area size: 125.7 ha

Number of involved experts: 1 Number of PML field visits: 10

Average taxon count on record: 62

Typical species found in the PMLs: *Corynephorus canescens*, *Helichrysum arenarium*, *Jasione montana*, *Thymus serpyllum*, *Filago vulgaris*, *Veronica dillenii*, *Stipa borysthena*, *Festuca vaginata*, *Psyllium arenarium*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in a period from 1st of May to 30th of August.

Habitat distribution and localization of PMLs: The habitat can be found only in the western part of Slovakia in the Borská nížina Lowland.



Monitoring results:

Estimate of trend of habitat development: ALP: PAN: +

Habitat quality in PMLs:



Overall habitat quality: ALP: PAN: FV

Habitat management in PMLs:



Habitat prospects in PMLs:



Overall prospects of habitat: ALP: PAN: FV

Pressures and threats: The most significant negative pressures include the succession and structures and buildings in the area. Among the positive pressures we can include in particular the military use (56 %), which disturbs the vegetation cover and thus limits the succession processes.

Assessment and notes on the monitoring results: The habitat occurs only in the Pannonian Bioregion where its quality was assessed as favourable in 70 % of the sites. Prospects of the habitat were also assessed as favourable. The estimate of the trend in habitat development is increasing; thus the status at the national level is not worsening.

PML Borová, an isolated dune in the alluvium of the Morava river, can be regarded as a site with overall unfavourable status. It is heavily overgrown by scots pine, even though there



were some measures taken on part of the site in the past. Unfavourable status was also recorded on PML Lakšárska duna dune, which is located on the border of the urban zone of the village Lakšárska Nová Ves. In addition to the strong overgrowth by scots pine, negative pressure also comes from construction activities on privately owned land.

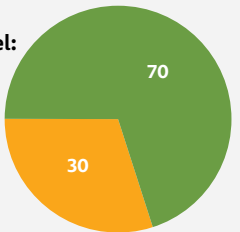
In terms of care for the individual areas, suitable management is taking place at most sites (80 %), this disturbs the processes of succession. In order to maintain the favourable condition of the habitat it is necessary to continue ensuring adequate amounts and means of disturbance, either by grazing or by heavy machinery use on military training areas. In addition to the succession, the risk factors include change in land use, conversion to construction plots, afforestation and penetration of ruderal and invasive species into these communities.

This habitat also includes many rare and protected species of plants. During monitoring of the PMLs the following were recorded: e.g. *Alyssum desertorum*, *Bassia laniflora*, *Daphne cneorum*, *Spergula morisonii* or *Teesdalia nudicaulis*.

Overall assessment of the conservation status of habitat

Overall habitat status: ALP: PAN: FV
Conservation status in SCIs: FV
Overall conservation status on national level: FV

By bioregion:



3130 Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoëto-Nanojuncetea*

Habitat consists of a community of *Sparganium angustifolium* or *Marsilea quadrifolia*, associated to a coastal line of water areas (oxbows, lakes, ponds) or communities on exposed water beds.

Number of PMLs: 25

PML average area size: 1.7 ha

Number of involved experts: 6

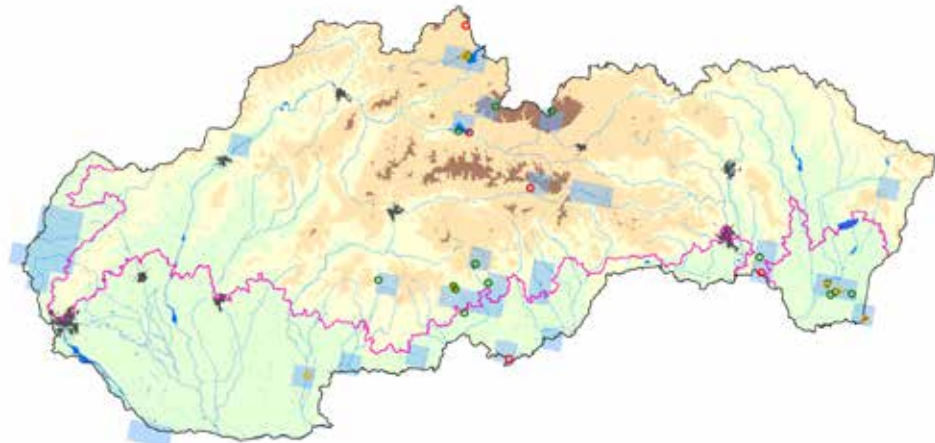
Number of PML field visits: 45

Average taxon count on record: 10

Typical species found in the PMLs: *Eleocharis acicularis*, *Eleocharis palustris*, *Cyperus fuscus*, *C. miche-lianus*, *Lindernia procumbens*, *Carex bohémica*, *Limosella aquatica*, *Gnaphalium uliginosum*, *Sparganium angustifolium*, *Marsilea quadrifolia*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale in a period of water drop. The coverage of the vegetation levels and impacts on the habitat were also assessed. Under natural conditions, the period of water drop generally occurs at the end of summer and autumn (September to November).

Habitat distribution and localization of PMLs: Habitat is scattered across the area of Slovakia with majority of sites in the alluvium of Latorica River, in central Slovakia, Orava region and Tatras' mountain lakes.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN: 0

Habitat quality in PMLs:

ALP: 46.2 15.4 38.4

PAN: 66.7 33.3

Overall habitat quality:

ALP: U1

PAN: U1

Habitat management in PMLs:

ALP: 61.2 38.8

PAN: 70.7 29.3

Habitat prospects in PMLs:

ALP: 50 38.5 11.5

PAN: 44.4 44.4 11.2

Overall prospects of habitat:

ALP: U1

PAN: U1

Pressures and threats: The most important negative pressures in the Alpine Bioregion include abiotic natural processes (31 %), human-induced changes in hydrological conditions (24 %), transport networks with the pollution of ground waters (both 14 %) and biological processes (7 %). In the Pannonian Region, they include human-induced changes in hydrological conditions and biological processes (both 33 %), abiotic natural processes (22 %) and changes in biotic conditions (11 %).



© Miloš Balla

Assessment and notes on the monitoring results: The results showed an unfavourable status of the habitat in both bioregions with a worse situation in the Alpine Bioregion. The fact, that formation of the habitat depends on low water level, needs to be accounted for when assessing the status of habitat. Low water level will not be sustained due to high rainfall, and the habitat will not form during the vegetation season or it will reach only a small vegetation cover. It is therefore important to assess the overall status of the site. The habitat is threatened by long-term periods of lack of water, when it is overgrown by perennial species. Annual species on exposed water bottoms can survive in the seed banks for decades, but in dense vegetation cover they can only grow on disturbed ground. Long periods of high water level are also not desirable, because these species cannot germinate. Another major threat comes from eutrophication of water and ruderalization of the site, which transforms the habitat to a habitat of

ruderal muddy banks and species such as *Bidens* spp., *Chenopodium* spp., *Persicaria* spp. are established. Species *Sparganium angustifolium* creates its own community and is found only in two Tatras' mountain lakes. The lakes are generally threatened by acidification but this process is slow and in the foreseeable future there will be no extinction of these species. The community with *Marsilea quadrifolia* occurs in borrow pits in Latorica alluvium, these are particularly vulnerable to water shortages, which accelerates the rate that the sites are overgrown by strong competitors.



© Blažena Sedláková

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN: U1

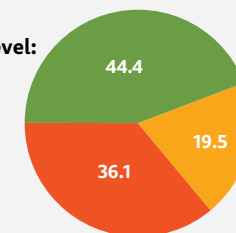
Conservation status in SCIs: U1

Overall conservation status on national level: U1

By bioregion:

ALP: 46.2 15.4 38.4

PAN: 44.4 22.2 33.4



3140 Hard oligo-mesotrophic waters with benthic vegetation of *Chara* formations

The habitat consists of macroscopic algae of genera *Chara*, *Nitella*, *Nitellopsis*, *Tolypella*, which are rooted in the bed.

Number of PMLs: 12 **PML average area size:** 8,000 m²

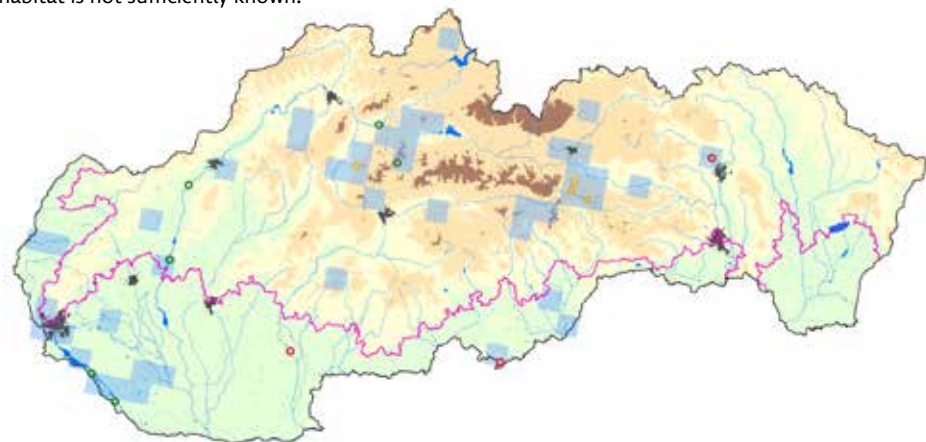
Number of involved experts: 4 **Number of PML field visits:** 16

Average taxon count on record: 4

Typical species found in the PMLs: *Chara fragilis*, *Ch. hispida*, *Ch. foetida*, *Ch. vulgaris*, *Alisma plantago-aquatica*, *Utricularia australis*, *Agrostis stolonifera*, *Equisetum fluviatile*, *Glyceria fluitans*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 10th of June to 30th of September in the Pannonian Bioregion and from 1st of July to 30th of September in the Alpine Bioregion.

Habitat distribution and localization of PMLs: The habitat is spread mainly in the plains scattered around the whole country with the majority of sites in the Alpine Bioregion. The distribution of the habitat is not sufficiently known.



Monitoring results:

Estimate of trend of habitat development: ALP: – PAN: –

Habitat quality in PMLs:

ALP: 63.6 27.3 9.1

PAN: 60 40

Overall habitat quality: ALP: U1 PAN: U1

Habitat management in PMLs:

ALP: 65 35

PAN: 80 20

Habitat prospects in PMLs:

ALP: 63.6 27.3 9.1

PAN: 80 20

Overall prospects of habitat: ALP: U1 PAN: U1

Pressures and threats: In the Alpine Bioregion the main negative pressures include biological processes (50 %), changes in biotic conditions and fish farming (both 25 %). In the Pannonian Bioregion these include biological processes (50 %), fish farming and natural abiotic processes (both 25 %).

Assessment and notes on the monitoring results:

Status of the habitat in both bioregions is unfavourable, with worse conditions in the Pannonian Bioregion. The occurrence of the habitat is currently not sufficiently explored in Slovakia, which is reflected by the small number of sites. The expected centre of occurrence is in the lowlands and in locations where the secondary stations are established through gravel mining. The greatest threats come from natural changes. Occurrence of the habitats on a site is temporary (subject to exceptions), as these are competitively weak species that are sensitive to changing environmental conditions. Together with *Chara* there is also occurrence of habitat 3150 Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* – type vegetation on these sites and which remains present after the retreat of the *Chara*. Therefore, the disappearance of *Chara* does not necessarily mean a decline in the sites value. Another major negative impact comes from fish farming and related activities, since these change the abiotic environmental conditions very quickly. This is the case with a small lake in Blatnica or Tachty pond. Site management should aim at water eutrophication reduction and the maintenance of an appropriate water regime. A good example can be found at PML Veľký Háj – a revitalized dead river arm, flow of which is enabled through man-made channels. The threat of water shortages is thus eliminated and a process of eutrophication is slowed down by removal of nutrients. Prospects for the habitat in both bioregions are unfavourable. Status of the sites in the future will depend on how quickly the environmental changes discussed above are materialized.



© Jaroslav Košťál



© Kateřina Bubíková

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN: U1

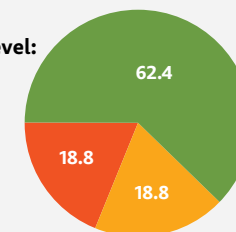
Conservation status in SCIs: U1 U1

Overall conservation status on national level:

By bioregion:

ALP: 63.6 27.3 9.1

PAN: 60 40



3150 Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* – type vegetation

The habitat consists of formations of submerged and surface floating aquatic plants.

Number of PMLs: 90

PML average area size: 1.5 ha

Number of involved experts: 7

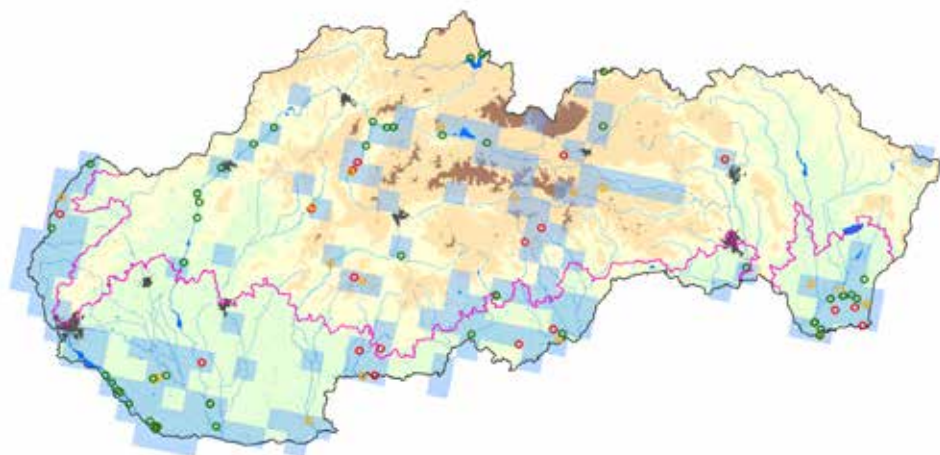
Number of PML field visits: 153

Average taxon count on record: 5

Typical species found in the PMLs: *Lemna minor*, *Myriophyllum spicatum*, *Ceratophyllum demersum*, *Spirodela polyrrhiza*, *Hydrocharis morsus-ranae*, *Nuphar lutea*, *Nymphaea alba*, *Trapa natans*, *Potamogeton pectinatus*, *Salvinia natans*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 10th of June to 30th of September in the Pannonian Bioregion and from 1st of July to 30th of September in the Alpine Bioregion.

Habitat distribution and localization of PMLs: The habitat is widespread across Slovakia, mainly in the alluviums of the rivers in Podunajská and Východoslovenská nížina Lowlands.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN: 0

Habitat quality in PMLs:

ALP: 70.6 17.6 11.8

PAN: 70.6 16.5 12.9

Overall habitat quality:

ALP: U1

PAN: U1

Habitat management in PMLs:

ALP: 76.7 23.3

PAN: 77.8 22.2

Habitat prospects in PMLs:

ALP: 69.1 16.2 14.7

PAN: 71.8 15.3 12.9

Overall prospects of habitat:

ALP: U1

PAN: U1

Pressures and threats: In the Alpine Bioregion the negative pressures include biological processes (46 %), abiotic natural processes (31 %), changes in biotic conditions (10 %), activities associated with fish farming and catching (8 %), human-induced changes in hydrological conditions and changes in abiotic conditions (both 3 %). In the Pannonian Bioregion the negative pressures include biological processes (46 %), abiotic natural processes (22 %), activities associated with fish farming and catching (22 %), human-induced changes in hydrological conditions (6 %) and changes in abiotic and biotic conditions (both 3 %).



© Katerina Bubíková

Assessment and notes on the monitoring results: On most sites in both bioregions the habitat quality is favourable. The overall negative assessment of the status of the habitat is affected by improper pre-selection of sites for PML. Certain PMLs were established at artificial water reservoirs which are also used for fish farming. Due to area utilization there are changes in water quality (eutrophication, algae, turbidity, silting) happening much faster than under natural conditions, which will in turn negatively affect aquatic vegetation. Other sites, assessed as unfavourable, are in an advanced stage of being overgrown due to lack of management or there was a long-term shortage of water. The vegetation of reeds and high sedges can quickly grow at low water levels forcing out the competitively weak formations of aquatic macrophytes and accelerating the coverage of the area by soil. It is therefore appropriate to select sites after an actual assessment of the status of the site. A big issue also arises from eutrophication caused

by flush and natural decomposition of biomass. The management should include provision of appropriate water regime, extensive pond management and disposal of expanding coastal vegetation. Because of these pressures the habitat status will deteriorate in the future (subject to exceptions), which is also suggested by negative assessment of the prospects of habitat in both bioregions.

Locations with suitable conditions and quality of habitat include those that are regularly supplied with running water (Veľký Háj, Trhové Mýto), located in the floodplains of large rivers (arms and ponds in the Danube Wetlands, material pits and arms of Latorica), with suitable fish pond management (Zelené Pond).



© Viera Šefferová Stanová

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN: U1

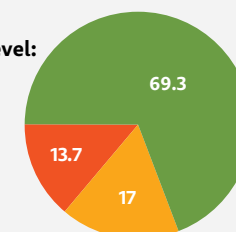
Conservation status in SCIs: U1

Overall conservation status on national level: U1

By bioregion:

ALP: 67.6 17.6 14.8

PAN: 70.6 16.5 12.9



3160 Natural dystrophic lakes and ponds

Habitat consists of open communities of oligotrophic or dystrophic waters with occurrence of floating species of *Utricularia* and bryophytes.

Number of PMLs: 14 PML average area size: 1.7 ha

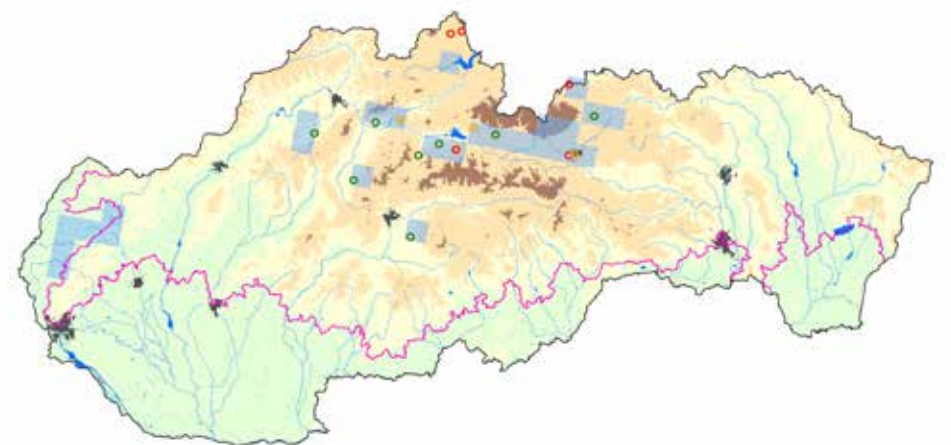
Number of involved experts: 8 Number of PML field visits: 14

Average taxon count on record: 18

Typical species found in the PMLs: *Utricularia minor*, *Carex rostrata*, *Campylium stellatum*, *Carex panicea*, *Eleocharis quinqueflora*, *Juncus articulatus*, *Triglochin palustre*, *Bryum pseudotriquetrum*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of September.

Habitat distribution and localization of PMLs: In the Alpine Bioregion the habitat can be found rarely. It is scattered inside the Carpathian Basins of northern Slovakia. In the Pannonian Bioregion it can be found in Borská nížina Lowland.



Monitoring results:

Estimate of trend of habitat development: ALP: – PAN:

Habitat quality in PMLs:



Overall habitat quality: ALP: U1 PAN:

Habitat management in PMLs:



Habitat prospects in PMLs:



Overall prospects of habitat: ALP: U1 PAN:

Pressures and threats: The most common negative pressures come from biological processes (30 % of the sites) and human-conditioned hydrological changes (23 %).

Assessment and notes on the monitoring results: The overall status of the habitat is unfavourable. The habitat particularly needs a balanced water regime with a permanently high level of groundwater, which rises above the surface for a whole year. Stabilization or conservation of the water regime is therefore the most important factor for maintaining the habitat. Dystrophic waters can be found mostly in the central, most flooded parts of low mires (for example: Šujské rašelinisko mire, Rojkovské rašelinisko mire, Jelšovec, Belianske lúky, Chraste, Poš). Providing the site is in favourable condition, there is no need for any management. However, such situation is currently very rare as fens are damaged to varying degrees. It is therefore necessary to ensure mowing on annual basis, even though this may have only a marginal effect on the dystrophic waters of bog hollows. Given the sensitivity to the water regime, this is a much endangered habitat and future prospects are not favourable. Several rare plant species can be found in this habitat, primarily *Utricularia minor*, but also other kinds of competitively weak alkaline fen plants. The site of Borská nížina Lowland (Plavecký Peter, Hanšpíľje) is the only known site for *Utricularia bremii* in Slovakia.



© Viera Šefferová Stanová



© Viera Šefferová Stanová

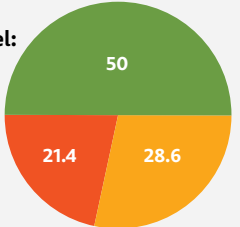
Overall assessment of the conservation status of habitat

Conservation status on national level:

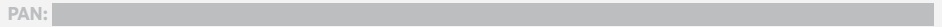
Overall habitat status: ALP: U1 PAN:

Conservation status in SCIs: U1

Overall conservation status on national level:



By bioregion:



3220 Alpine rivers and the herbaceous vegetation along their banks

The habitat consists of grass communities, two – to three-layered, on gravelly-rocky islands and exposed banks of fast flowing rivers on flysch bedrock.

Number of PMLs: 16 PML average area size: 4,000 m²

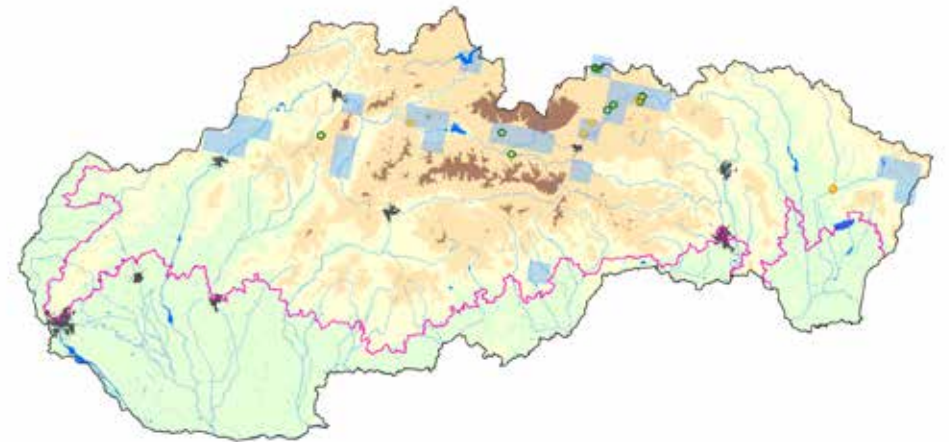
Number of involved experts: 3 Number of PML field visits: 16

Average taxon count on record: 53

Typical species found in the PMLs: *Calamagrostis pseudophragmites*, *Epilobium roseum*, *Myosoton aquaticum*, *Myosotis scorpioides*, *Myricaria germanica*, *Phalaroides arundinacea*, *Poa palustris*, *Rumex conglomeratus*, *Salix elaeagnos* juv.

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of September.

Habitat distribution and localization of PMLs: The habitat is widespread in the Alpine Bioregion, but does not occur in the Pannonian Bioregion. It is often in contact with habitat 3230 with dominant species *Myricaria germanica* and habitat 3240 with dominant species *Salix elaeagnos*.



Monitoring results:

Estimate of trend of habitat development: ALP: + PAN:

Habitat quality in PMLs:



Overall habitat quality: ALP: FV PAN:

Habitat management in PMLs:



Habitat prospects in PMLs:



Overall prospects of habitat: ALP: U1 PAN:

Pressures and threats: The most important ecological factor, of medium to high intensity, include flooding (92 %). The negative pressures, of low intensity, include abiotic (28 %) and biologic (20 %) processes and invasion (17 %). Other positive and negative pressures are negligible.

Assessment and notes on the monitoring results: While the quality of the habitat is favourable (84 %), the habitat is generally in an unfavourable condition (62 %). The habitat is dependent solely on hydrological conditions which affect the time and length of exposure of gravelly-stony sediments in riverbeds of fast flowing rivers in flysch regions of Slovakia. Permanent part of the habitat includes species of *Myricaria germanica* and juveniles of *Salix elaeagnos* which means that the habitat has similar environmental requirements and occurs at similar locations as habitats 3230 and 3240. It often forms the first line near the surface of the river. Well developed formations were found on Jakubianka, Kolačkovský potok stream, Belá, Biela, on Kežmarská Biela voda River, on the upper part of Poprad River, on Studený potok stream and on the Čierny Váh River. The habitat is more widespread on these streams than it the past. In the future it will be necessary to check some of the streams in Kysuce and Orava regions. Management in the form of floods, of medium and low intensity, keeps the habitat in good condition. Torrential rains have destructive effects. The invasive species *Impatiens glandulifera* and *I. parviflora*, were sporadically recorded in the habitat, as well as an endangered species *Pseudorchis albida*.



© Marica Zaliberová



© Marica Zaliberová

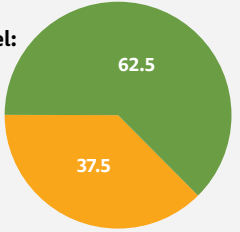
Overall assessment of the conservation status of habitat

Conservation status on national level:

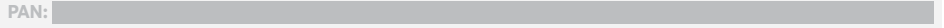
Overall habitat status: ALP: U1 PAN:

Conservation status in SCIs: U1

Overall conservation status on national level:



By bioregion:



3230 Alpine rivers and their ligneous vegetation with *Myricaria germanica*

The habitat consists of herbaceous or shrub communities on the exposed gravelly-stony alluvium beds in fast flowing rivers, particularly in the flysch area.

Number of PMLs: 15

PML average area size: 7 ha

Number of involved experts: 7

Number of PML field visits: 15

Average taxon count on record: 54

Typical species found in the PMLs: *Myricaria germanica*, *Alnus incana* juv., *Acetosa scutata*, *Chamerion angustifolium*, *Herniaria glabra*, *Melilotus albus*, *Mentha longifolia*, *Petasites hybridus*, *Salix elaeagnos* juv., *Silene dioica*, *Thesium alpinum*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of September.

Habitat distribution and localization of PMLs: Habitat is widespread only in the Alpine Bioregion, particularly in the north-east of Slovakia, but does not occur in the Pannonian Bioregion. It is usually located on the alluvium directly in the river beds.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN:

Habitat quality in PMLs:

ALP: 53.3 6.7 40

PAN:

Overall habitat quality:

ALP: U1

PAN:

Habitat management in PMLs:

ALP: 63.3 36.7

PAN:

Habitat prospects in PMLs:

ALP: 40 20 40

PAN:

Overall prospects of habitat:

ALP: U1

PAN:

Pressures and threats: The most common negative effects come from unexpected torrential flooding or so-called century floods of medium to low intensity (25 %), while periodic flooding has a positive effect on the habitat (85 %). Negative effects, of low intensity, include some human activities such as dredging, gravel mining (25 %), biotic processes such as erosion and succession (18 %) and invasion (12 %).

Assessment and notes on the monitoring results: Although the overall quality of the habitat is favourable in most of the sites (53 %), generally it is in an unfavourable condition. Everything depends on the species of *Myricaria germanica* which has a short life span (10 years), despite it being a tree species. On the other hand, it has an excellent ability to germinate and grow rapidly. Although, based on the results of the monitoring, the overall status of habitat seems unfavorable and the overall prospects of the habitat on the PML reach favourable status only at 40 %, the rivers such as Belá, Jakubianka, Kolačkovský potok stream, Torysa, Šambronka and Poprad are sites where the habitat is likely to keep occurring at irregular intervals. This conclusion is based on long term observations. Unlike in the past, occurrence of the habitat was not confirmed in Kysuce and Orava regions. *Myricaria* formations were found in Dubnické Štrkoviská gravel deposit in the middle area of the River Váh, they were probably washed down from the northern parts of Slovakia, but now they are being pushed out by willows. Management of the habitat cannot be influenced by human activity; it is entirely dependent on hydrological conditions and only partly on climatic conditions. Potential threats come from the regulation of current and sediment being overgrown by shrub willows that cause shading. Invasive species are present with low intensity (12 %), most often found invasive species are *Impatiens glandulifera*, *I. parviflora* and *Solidago gigantea*. *Aster lanceolatus*, *Lupinus polyphyllus* and *Stenactis annua* are not so common.



© Marica Zálberová



© Marica Zálberová

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN:

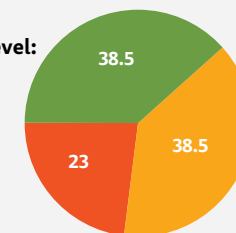
Conservation status in SCIs: U1

Overall conservation status on national level: U1

By bioregion:

ALP: 38.5 38.5 23

PAN:



3240 Alpine rivers and their ligneous vegetation with *Salix elaeagnos*

The habitat consists of pioneering 5-7 meters high shrubs and on rare occurrences of trees along fast-flowing mountain rivers.

Number of PMLs: 46 **PML average area size:** 2.5 ha

Number of involved experts: 6 **Number of PML field visits:** 46

Average taxon count on record: 51

Typical species found in the PMLs: *Salix elaeagnos*, *Alnus incana*, *Acer pseudoplatanus*, *Fraxinus excelsior*, *Picea abies*, *Salix fragilis*, *S. caprea*, *S. purpurea*, *Aegopodium podagraria*, *Asarum europaeum*, *Astrantia major*, *Brachypodium sylvaticum*, *Lonicera xylosteum*, *Mentha longifolia*, *Petasites hybridus*, *Silene dioica*, *Stachys sylvatica*, *Swida sanguinea*, *Urtica dioica*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of September.

Habitat distribution and localization of PMLs: Habitat is widespread only in the Alpine Bioregion, particularly in the north-east of Slovakia, but does not occur in the Pannonian Bioregion. It often follows the habitats with *Myricaria germanica* or *Calamagrostis pseudophragmites* in a succession.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN:

Habitat quality in PMLs:

ALP: 47.8 **30.4** **21.8**

PAN:

Overall habitat quality:

ALP: U1

PAN:

Habitat management in PMLs:

ALP: 80.8 **19.2**

PAN:

Habitat prospects in PMLs:

ALP: 39.1 **32.6** **28.3**

PAN:

Overall prospects of habitat:

ALP: U1

PAN:

Pressures and threats: The most important ecological factor, of medium to high intensity, is flooding (51 %). Negative pressures are related to flooding in some cases, for example when it causes excessive erosion (42 %), or when it comes in form of torrential waters and causes destruction of tree stands. Other negative pressures are negligible (1 – 3 %). Positive pressures (24 %) mostly of medium intensity come from abiotic and biologic processes (succession, accumulation).

Assessment and notes on the monitoring results: There is favourable quality of habitat in less than 50 % of sites, which means that the habitat is generally in unfavourable condition, even though the management of individual sites is done well (80 %). The most likely explanation for this are changes in hydrological regime, which has resulted in repeated catastrophic flooding in recent years. These significantly disrupted not just the shrub formations but also trees of *Salix elaeagnos*, for example in some parts of Suchý potok stream and Belá River. The future prospects of the habitat have also achieved favourable score of 39 %. Regeneration of formations is more demanding and requires longer period of time than regeneration of formations with *Myricaria germanica*. The best developed formations were recorded on the



© Marica Zaliberová



© Marica Zaliberová

the rivers Belá and Biela, Studený potok stream, Suchý potok stream, Tichý potok stream, Prosiečanka and Rieka streams. The lowest recorded formations were found in Kameničanský luh. Habitat is not found in Pannonian Bioregion. Although *Salix elaeagnos* is washed down to Pannonian Region, it only creates a part of other willow communities. Invasive species are currently present in an insignificant amount (7 %); the most common of those present are *Impatiens glandulifera*, *I. parviflora*, *Solidago canadensis*, *S. gigantea*. Endangered species are rare in this habitat, for example *Listera ovata*, *Matteuccia struthiopteris*, *Pseudorchis albida*.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN:

Conservation status in SCIs:

Overall conservation status on national level:

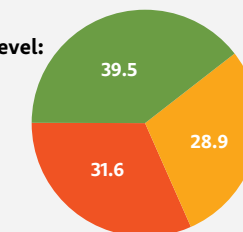
U1

U1

By bioregion:

ALP: 37 **34.8** **28.2**

PAN:



3260 Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation

Species-poor communities of aquatic macrophytes, colonizing riverbeds of flowing waters or periodic flow streams.

Number of PMLs: 26

PML average area size: 1 ha

Number of involved experts: 4

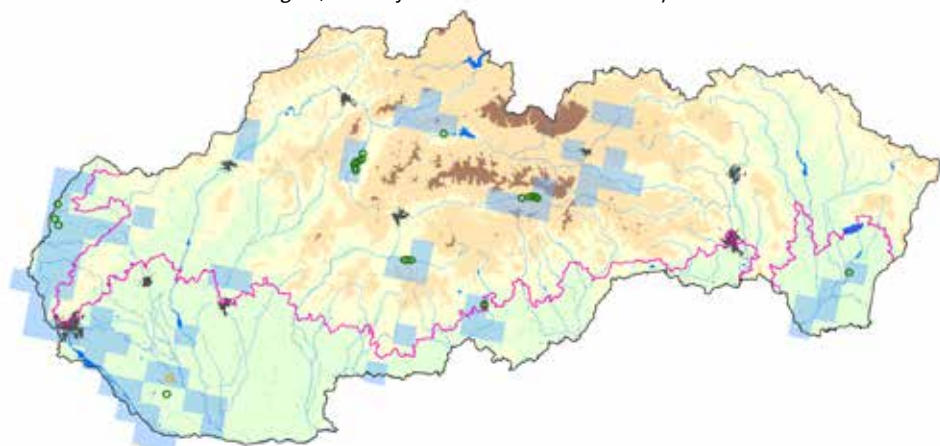
Number of PML field visits: 48

Average taxon count on record: 4

Typical species found in the PMLs: *Fontinalis antipyretica*, *Sparganium emersum*, *Rhynchosstegium riparioides*, *Butomus umbellatus*, *Batrachium aquatile*, *Potamogeton crispus*, *Elodea canadensis*, *Sagittaria sagittifolia*, *Potamogeton nodosus*, *Batrachium penicillatum*

Monitoring method: Plant species record with the coverage estimated according to the Kohler scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 10th of June to 30th of September in the Pannonian Bioregion and from 1st of July to 30th of September in the Alpine Bioregion.

Habitat distribution and localization of PMLs: Scattered throughout the territory with a centre of distribution in the Alpine Bioregion on the upper and middle parts of rivers of Turiec, Hron, Ipel and at several locations in Záhorie region, Podunajská nížina Lowland and the Východoslovenská nížina Lowland.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN: –

Habitat quality in PMLs:

ALP: 100

PAN: 85.7

Overall habitat quality:

ALP: FV

PAN: FV

Habitat management in PMLs:

ALP: 98.1

PAN: 87.1

Habitat prospects in PMLs:

ALP: 100

PAN: 85.7

Overall prospects of habitat:

ALP: FV

PAN: FV

Pressures and threats: In the Alpine Bioregion the most important sources of threats include biological processes (36 %), fishing (36 %) and pollution by solid waste (27 %). In the Pannonian Bioregion these also include biological processes (82 %) and fishing (18 %).

Assessment and notes on the monitoring results:

The habitat has its optimum on the upper and middle parts of the river. The water is very quick in these parts, is cold with a high oxygen content and the substrate is coarse. Thanks to these conditions, there is virtually no succession other than the characteristic species (eg.

Phragmites australis, *Carex* spp.) and no threat of the habitat being overgrown. Long-term observation from the Turiec region shows that the vegetation species composition has not changed significantly. The community of *Callitriche-Batrachion* units are best developed in three streams: Turiec, Hron, Slatina and also in the tributaries of these streams (e.g. Dolinka). The overall distribution of these habitats is not known. In the Pannonian Bioregion the water flows more slowly, is warmer and contains less oxygen in the lower parts of rivers. Bedrock substrate is usually fine-grained. It is not appropriate to map the habitat in these locations, as in terms of species composition and ecology this habitat virtually represents habitat 3150 Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* – type vegetation, which also usually occur in these sites and often dominates them. The habitat is threatened mainly by eutrophication, pollution and constructioned modifications of water channel. Its protection therefore includes building of sewage treatment plants and provision of sensitive or none regulation of water flows. Prospects for the habitat in both bioregions are favourable. Due to reasons stated above the conditions are somewhat worse for the Pannonian Bioregion.



© Kateřina Bubíková



© Kateřina Bubíková

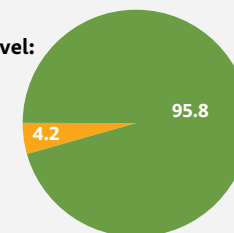
Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: FV PAN: FV

Conservation status in SCIs: FV

Overall conservation status on national level: FV



By bioregion:

ALP: 100

PAN: 85.7

3270 Rivers with muddy banks with *Chenopodium rubri* p.p. and *Bidenton* p.p. vegetation

The habitat consists of annual communities on exposed banks and islands of meandering rivers and streams.

Number of PMLs: 27 PML average area size: 6,851 m²

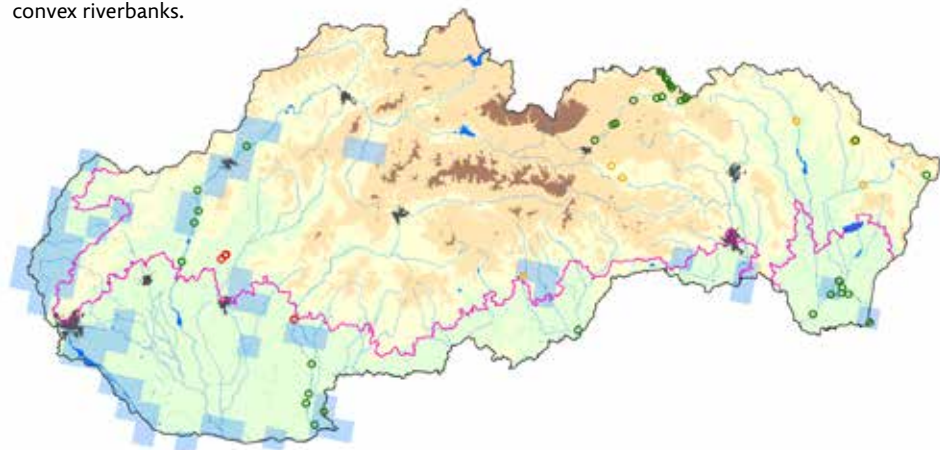
Number of involved experts: 8 Number of PML field visits: 29

Average taxon count on record: 30

Typical species found in the PMLs: *Barbarea vulgaris*, *Bidens tripartita*, *Chenopodium glaucum*, *Ch. polyspermum*, *Ch. rubrum*, *Echinochloa crus-galli*, *Lycopus europaeus*, *Myosoton aquaticum*, *Myosotis scorpioides*, *Persicaria dubia*, *P. hydropiper*, *P. lapathifolia* subsp. *lapathifolia*, *P. lapathifolia* subsp. *brittingeri*, *Plantago major*, *Ranunculus repens*, *Rumex obtusifolius*, *Veronica anagallis-aquatica*, *V. beccabunga*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of September.

Habitat distribution and localization of PMLs: The current distribution of the habitat is more or less even in the Alpine and Pannonian Bioregions. It is most often located on muddy, sandy and gravel-sand convex riverbanks.



Monitoring results:

Estimate of trend of habitat development: ALP: 0 PAN: 0

Habitat quality in PMLs:

ALP: 55.6 3.7 40.7

PAN: 50 50

Overall habitat quality: ALP: U1 PAN: U2

Habitat management in PMLs:

ALP: 83.3 16.7

PAN: 50 50

Habitat prospects in PMLs:

ALP: 48.1 11.1 40.8

PAN: 50 50

Overall prospects of habitat: ALP: U1 PAN: U2

Pressures and threats: The most significant positive influences include flooding, of medium to low intensity (72 %), and biological processes (succession, accumulation) of high and moderate intensity. The most common negative pressures include biological processes (40 %) and invasions (20 %). The prospects of the habitat in the Pannonian Bioregion are favourable. Habitat prospects in the Alpine Bioregion are unfavourable, however, they are still borderline (48 %).

Assessment and notes on the monitoring results:

In the Alpine Bioregion the habitat quality in most of the sites is favourable (55 %), nevertheless the habitat is generally in unfavourable-inadequate condition. In the Pannonian Bioregion it is 50/50. Inadequate condition most likely results from under-developed formations, this piece of information is not recorded in the terrain monitoring forms. Since these communities are formed by annual species and have usually only a limited time to develop due the restricted period of exposure of sediments. Because of this the sampling date is very important. Floods generally have a positive influence on the habitat, however if they are of high, prolonged or repeated in intensity they have a negative effect on the habitat, which was shown in the year 2013 and 2014. Year 2015 was more favourable for the development of these communities. This applies to both bioregions. The management of the habitat is suitable in both bioregions (83 % and 50 %). In order to maintain the good condition of the habitat it is necessary to maintain suitable dynamics of the river, depending on



© Marica Zališerová



© Mário Duchón

hydrological and climatic conditions. Considering the river network in Slovakia, the number of PMLs needs to be supplemented. This habitat is threatened by alien and invasive species, e.g. *Aster lanceolatus*, *Amaranthus powellii*, *Ambrosia artemisiifolia*, *Bidens frondosa*, *Helianthus tuberosus*, *Stenactis annua*. Some rare species were also recorded, e.g. *Lindernia procumbens*, *Heleochoa alopecuroides*, *Dichostylis micheliana*.

Overall assessment of the conservation status of habitat

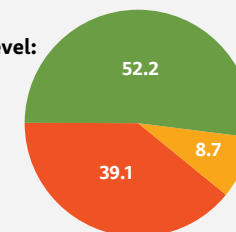
Conservation status on national level:

Overall habitat status: ALP: U1 PAN: U2

Conservation status in SCIs: U1

Overall conservation status on national level: U1

By bioregion:



4030 European dry heaths

The habitat dominated by formations of *Calluna vulgaris* on acidic, sandy and rocky soils from lowlands to mountain areas.

Number of PMLs: 23 **PML average area size:** 26.2 ha

Number of involved experts: 8 **Number of PML field visits:** 23

Average taxon count on record: 28

Typical species found in the PMLs: *Calluna vulgaris*, *Avenella flexuosa*, *Solidago virgaurea*, *Jasione montana*, *Genista pilosa*, *Nardus stricta*, *Pilosella officinarum*, *Vaccinium myrtillus*, on sandy soils *Corynephorus canescens*, *Sarothamnus scoparius*, *Festuca vaginata* and other.

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of August.

Habitat distribution and localization of PMLs: Distribution of this habitat in Slovakia is concentrated mainly in areas of Borská nížina Lowland, Tribeč Mountain and Volovské vrchy Hills, Laborecká vrchovina Highlands. Occasionally it also occurs in other locations with suitable geological substrate.



Monitoring results:

Estimate of trend of habitat development: ALP: +

PAN: +

Habitat quality in PMLs:

ALP: 73.3 26.7

PAN: 62.5 37.5

Overall habitat quality: ALP: FV

PAN: U1

Habitat management in PMLs:

ALP: 68.8 31.2

PAN: 83.1 16.9

Habitat prospects in PMLs:

ALP: 80 20

PAN: 75 25

Overall prospects of habitat: ALP: FV

PAN: FV

Pressures and threats: The negative pressures in the monitored sites of the Alpine Bioregion most commonly include succession, planting of trees and transport networks. In Pannonian Bioregion this includes fires and fire suppression. The positive effects most commonly include grazing for the Alpine Bioregion and military use in the Pannonian Bioregion.

Assessment and notes on the monitoring results:

In the Alpine Bioregion the habitat quality in most of the sites is favourable (73 %) and its status is favourable, however, in the Pannonian Bioregion, the number of unfavourable sites reached 37 % and the overall status is assessed as unfavourable. Prospects of the habitat for both bioregions are good, the estimate of the trend is therefore increasing, that means the current status at the national level is not worsening. In sites of Borská nížina Lowland the habitat is found together with communities of inland sand dunes, where quality of habitat and species composition is influenced by the amount of rainfall in a given year.

The management of monitored sites is assessed mostly positively. Suitable habitat management includes removal of self-seeding tree species, grazing of livestock and activities leading to disturbance



© Jaroslav Košťál



© Jaroslav Košťál

of vegetation cover as well as prevention of competitively stronger species spreading, especially grasses. The localities in the Borská nížina Lowland show a positive effect from military use of the monitored sites, which are mechanically disturbed by heavy machinery use. At several locations, mainly in northern part of Slovakia, management is carried by grazing.

During monitoring of various sites, we identified several rare species of plants, such as *Alyssum desertorum*, *Dianthus serotinus*, *Gypsophila fastigiata*, *Teesdalia nudicaulis* and other.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: FV PAN: U1

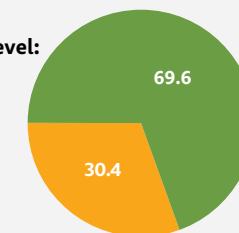
Conservation status in SCIs: FV

Overall conservation status on national level: U1

By bioregion:

ALP: 73.3 26.7

PAN: 62.5 37.5



4060 Alpine and boreal heaths

The habitat consists of acidophilous (sub) alpine communities of low shrubs mainly on silicate substrate.

Number of PMLs: 35 **PML average area size:** 2.5 ha

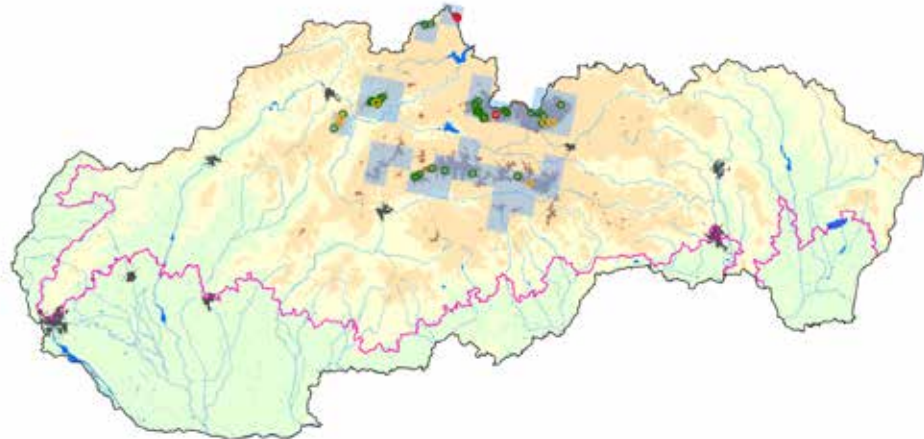
Number of involved experts: 9 **Number of PML field visits:** 43

Average taxon count on record: 28

Typical species found in the PMLs: *Vaccinium myrtillus*, *Vaccinium vitis-idaea*, *Juncus trifidus*, *Vaccinium gaultherioides*, *Empetrum hermaphroditum*, *Calluna vulgaris*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of July to 30th of August.

Habitat distribution and localization of PMLs: The centre of the current distribution is in the Alpine Bioregion; in the Pannonian Bioregion the habitat does not occur. It is particularly widespread in (sub) alpine belt of Nízke Tatry Mountains, Vysoké Tatry Mountains and Západné Tatry Mountains also in the Malá Fatra and Veľká Fatra Mountains and Oravské Beskydy Mountains, where it forms a mosaic with other alpine, mainly acidophilous communities.



Monitoring results:

Estimate of trend of habitat development: ALP: –

PAN:

Habitat quality in PMLs:

ALP: 91.7 **8.3**

PAN:

Overall habitat quality:

ALP: **FV**

PAN:

Habitat management in PMLs:

ALP: 79.2 **20.8**

PAN:

Habitat prospects in PMLs:

ALP: 75 **16.7** **8.3**

PAN:

Overall prospects of habitat:

ALP: **U1**

PAN:

Pressures and threats: The most frequent negative pressures, of medium to high intensity, include the collection and removal of plants in general (34 %), outdoor sport and leisure activities (30 %), biological processes (21 %), grazing (4 %), transport networks (4 %) and other human pressures (4 %).

Assessment and notes on the monitoring results: Habitat quality is mostly in favourable conservation status (91%), with 8 % of the sites in unfavourable-inadequate condition. The good quality results mainly from the relative inaccessibility of most of the sites. Sites which are in the vicinity of tourist or recreational facilities and tourist trails are in unfavourable condition. This is because of the change in species composition due to excessive erosion, disturbance, changes in soil properties and direct destruction of formations. Negative pressure results from mechanical damage of shrubs due to collection of forest fruits – blueberries and cranberries. Habitat management is based primarily on non-intervention; in selected cases it is necessary to prevent the entry of tourists, ski alpinists and skiers at selected sites for forest regeneration. This active management concerns only those parts of habitats which are in unfavourable condition. In order to maintain good condition of the habitat, it is necessary to ensure a non-interference regime, strict compliance with the laws on nature protection and no extension of existing recreation centres and outdoor activities in the region. In the current state the prospects of the development trend are declining. In sites with unfavourable condition it is strictly necessary to prevent



© Mário Duchoň



© Jozef Šibík

entry due to mechanical destruction of formations. The habitat occurs in a complex with other alpine communities, depending on the geological substrate on which it is located. Small-scaled phytocoenosis are mapped due to their natural mosaic or small-scale occurrence. Rare habitat types are also monitored in areas where other shrub habitats were identified, so that the overall variability and quality is recorded. Such is for example habitat with dominating species *Calluna vulgaris*, which was due to traditional grazing more common in the past. It is important to record the natural dynamics between habitats of heaths (4060) and (sub) alpine *Salix* spp. scrubs (4080) and species-rich *Nardus* grasslands (habitat 6230*), which form the original vegetation in many locations, but are now changing due to changes in land utilization.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: **U1** PAN:

Conservation status in SCIs:

Overall conservation status on national level:

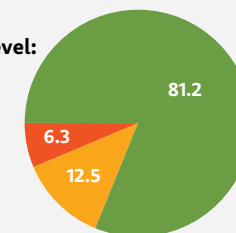
U1

U1

By bioregion:

ALP: 75 **16.7** **8.3**

PAN:



4070* Bushes with *Pinus mugo* and *Rhododendron hirsutum* (*Mugo-Rhododendretum hirsuti*)

The habitat consists of natural, mainly zonal communities of dwarf pine scrub.

Number of PMLs: 38 **PML average area size:** 26.1 ha

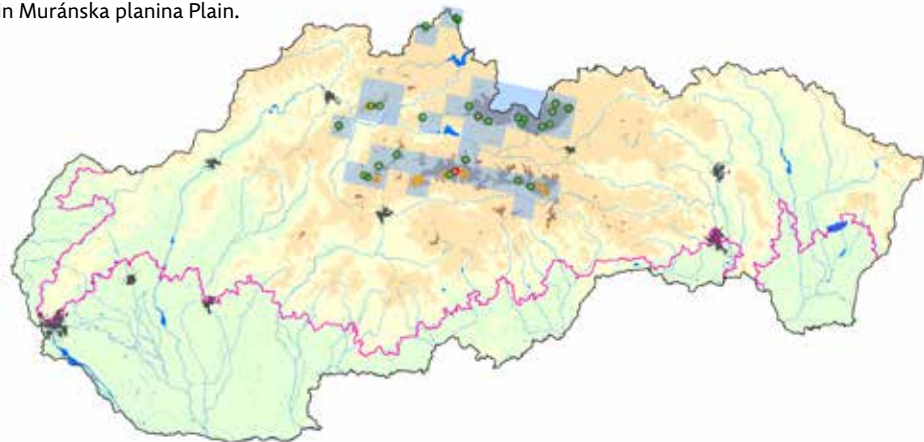
Number of involved experts: 7 **Number of PML field visits:** 38

Average taxon count on record: 49

Typical species found in the PMLs: *Pinus mugo*, *Vaccinium myrtillus*, *Homogyne alpina*, *Gentiana asclepiadea*, *Huperzia selago*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of July to 30th of August.

Habitat distribution and localization of PMLs: The centre of current distribution is in the Alpine Bioregion; in the Pannonian Bioregion the habitat does not occur. The habitat is widespread in the subalpine belt of Nízke Tatry, Vysoké Tatry, Západné Tatry and Belianske Tatry Mountains, also in the Malá Fatra and Veľká Fatra Mountains, Chočské vrchy Mountains and Oravské Beskydy Mountains where it creates more or less compact vegetation zone. There is a rare extrazonal occurrence of the habitat in Muránska planina Plain.



Monitoring results:

Estimate of trend of habitat development: ALP: –

PAN:

Habitat quality in PMLs:

ALP: 67.7 32.3

PAN:

Overall habitat quality:

ALP: U1

PAN:

Habitat management in PMLs:

ALP: 89.5 10.5

PAN:

Habitat prospects in PMLs:

ALP: 74.2 22.6 3.2

PAN:

Overall prospects of habitat:

ALP: U1

PAN:

Pressures and threats: The most frequent negative pressures, of medium to high intensity, include outdoor, sport and recreational activities 64 %, collection and removal of plants in general 17 %, sport and recreation structures 5 %, grazing 2 %, improved access to the site 2 %, other man-induced changes to hydrological conditions 2 %, abiotic (slow) natural processes 2 %, and avalanches 2 %.

Assessment and notes on the monitoring results: The habitat quality is affected in particular by its low attraction from economic point of view and its relative inaccessibility. Sites which are close to hiking trails and recreational facilities are in unfavourable-bad condition. The habitat is directly threatened by the destruction of formations due to buildings, the construction of roads and pavements, creation of skiing tracks and air pollution that adversely affects the physiological state of the scrub. Another considerable negative pressure comes from invertebrates (insects) pests and various fungal diseases. Subsequently there are changes in species composition, soil properties and water regime in the habitat. Just like with other natural mountain and alpine formations, the habitat management consists of non-intervention. In certain cases it is necessary to prevent the entry of tourists, ski alpinists and skiers at selected sites for their recovery. This active management concerns particularly those parts of habitats which are in inadequate condition. In order to maintain good condition of the habitat it is necessary to ensure such protection regimes that prevent further destruction of formations. This requires strict compliance with the laws on nature protection and non-extension of existing recreational



© Jozef Šibík



© Jozef Šibík

centres and outdoor activities in the region. In the current state the prospects of the development trend are declining. In selected sites such as Malá Fatra Mountains, Veľká Fatra Mountains and Nízke Tatry Mountains the habitat hosts endemic taxons such as *Sorbus margittaiana*, *S. montisalpae*, *S. salatinii* and similar. Natural formations are monitored, the borders of which are determined by distinct forms of relief or occurrence of other habitats (e.g. mountain spruce forests at lower elevations). The habitat often forms complex small-scale communities of tall herb plains and tall grass grasslands that may occur in a mosaic of otherwise dense formations of scrub and are maintained by wildlife and natural dynamics.

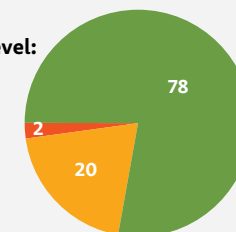
Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN:

Conservation status in SCIs: U1

Overall conservation status on national level: U1



By bioregion:

ALP: 67.7 29 3.3

PAN:

4080 Sub-Arctic *Salix* spp. scrub

The habitat consists of communities of sub-alpine deciduous shrubs, mainly dominated by species of genus *Salix*.

Number of PMLs: 13 **PML average area size:** 4.1 ha

Number of involved experts: 9 **Number of PML field visits:** 13

Average taxon count on record: 53

Typical species found in the PMLs: *Salix silesiaca*, *Salix helvetica*, *Salix kitaibeliana*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of July to 30th of August.

Habitat distribution and localization of PMLs: The centre of the current distribution is in the Alpine Bioregion; in the Pannonian Bioregion the habitat does not occur. Habitat is particularly widespread in the subalpine level of Malá Fatra Mountains and Veľká Fatra Mountains (formations with dominant species of *Salix silesiaca*) and in the Západné Tatry a Vysoké Tatry Mountains (formations with *Salix helvetica* and *S. phylicifolia*). These communities form a mosaic with tallherb and tallgrass communities.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN:

Habitat quality in PMLs:

ALP: 92.3 **7.7**

PAN:

Overall habitat quality:

ALP: **FV**

PAN:

Habitat management in PMLs:

ALP: 88.9 **11.1**

PAN:

Habitat prospects in PMLs:

ALP: 92.3 **7.7**

PAN:

Overall prospects of habitat:

ALP: **FV**

PAN:

Pressures and threats: The most frequent negative pressures, of medium to high intensity, include planting of trees 40 %, abiotic (slow) natural processes 20 %, biological processes 20 % and avalanches 20 %. With the exception of any direct mechanical destruction of formations, the habitat should not be seriously threatened in the future.

Assessment and notes on the monitoring results: Inaccessibility and isolation of most sites make the conservation status of the habitat favourable. Only sites situated close to tourist attractions and footpaths are in inadequate condition. The small scale and fragmentation of habitat reflects negatively in the quality of some PMLs. This is because of the changes in species composition due to natural processes, tree planting (with the aim of so-called recovery of upper forest level) and direct destruction of formations (e.g. in the vicinity of mountain lakes in touristic sites). Habitat is not dependent on active management and relies mainly of non-intervention. In certain cases it is necessary to prevent entry of tourists, ski alpinists and skiers to selected sites to allow shrubs regeneration. This applies only to those parts of the habitat which are in unfavourable condition.

It is essential to prevent the planting of dwarf pine and spruce in the Malá Fatra and Veľká Fatra Mountains. To maintain favourable condition of the habitat it is necessary to ensure non-interference regimes and control of outdoor activities in the region. In the current state, the prospects of the development



© Mário Duchoň



© Jozef Šibík

trend are stable, no changes in the quality or quantity are expected providing the above mentioned pressures and threats do not change significantly. Any stable formation with species *Salix helvetica* and *S. phylicifolia* is monitored due to their relict character and rarity. Successional stages of formations with *Salix silesiaca* are also recorded in places which were previously deforested. Their species composition is identical with the original formations and they represent an important landscape element and centres of biodiversity.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: **FV** PAN:

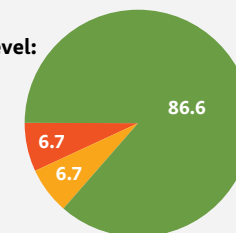
Conservation status in SCIs: **FV**

Overall conservation status on national level: **FV**

By bioregion:

ALP: 92.3 **7.7**

PAN:



40A0* Subcontinental peri-Pannonic scrub

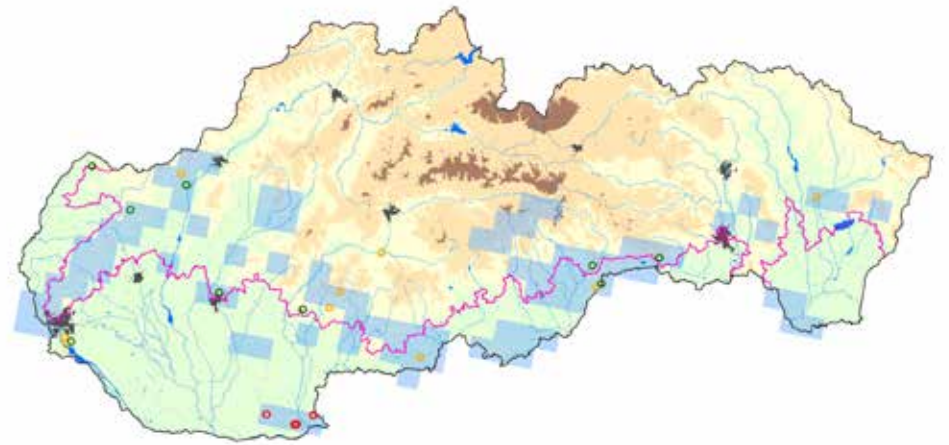
Habitat consists of dense formations of several thermophilic scrubs with rich abundance of herbaceous undergrowth.

Number of PMLs: 18 PML average area size: 1.5 ha
Number of involved experts: 8 Number of PML field visits: 18
Average taxon count on record: 59

Typical species found in the PMLs: *Cornus mas*, *Ligustrum vulgare*, *Prunus spinosa*, *Rosa* sp., *Crataegus monogyna*, *Cerasus mahaleb*, *Spiraea media*, *Viburnum lantana*, *Teucrium chamaedrys*, *Fragaria viridis*, *Tithymalus cyparissias*, *Vincetoxicum hirundinaria*, *Potentilla arenaria*, *Geranium sanguineum*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of May to 30th of September.

Habitat distribution and localization of PMLs: Distribution is concentrated mainly in southern parts of Slovakia, where it occurs on south facing, steep and more heated slopes. It often occurs in combination with thermophilic grassland communities.



Monitoring results:

Estimate of trend of habitat development: ALP: + PAN: 0

Habitat quality in PMLs:



Overall habitat quality: ALP: FV PAN: U1

Habitat management in PMLs:



Habitat prospects in PMLs:



Overall prospects of habitat: ALP: U1 PAN: U1

Pressures and threats: The most commonly reported negative pressures in the Alpine Bioregion include succession, outdoor, sport and recreational activities and species invasions. The Pannonian Bioregion includes negative pressures of succession, grazing and damage caused by wild animals. Positive influences affecting the monitored sites for this habitat most frequently include succession in both the Alpine and the Pannonian Bioregion.

Assessment and notes on the monitoring results: The habitat status in the Alpine Bioregion is unfavourable, despite the fact that the majority of sites (75 %) are assessed as favourable. The overall condition of the habitat in the Pannonian Bioregion is assessed as favourable-bad in 40 % of sites. This situation causes considerable negative prospects for the habitat in this bioregion, which is reflected in the overall assessment. In contrast, the prospects for the habitat in the Alpine Bioregion are favourable in 62 % of the sites. The estimate of the prospects for this habitat is thus increasing for the Alpine Bioregion and stable in the Pannonian Bioregion. The most appropriate management is to keep the formations developing on their own without any substantial human intervention in the form of cutting or grazing by livestock. Succession is thus assessed in the early stages as a positive impact and particularly on steep rocky slopes poses no risk even with well developed formations as the average value of the tree layer in the PMLs is only 8 %.



© Viera ŠeffEROVÁ StanOVÁ

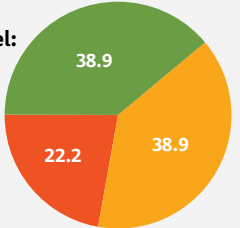


© Viera ŠeffEROVÁ StanOVÁ

The risk to these formations may come from non-indigenous species of herbaceous plants and trees. The habitat often occurs in complex with dry grasslands communities, so it happens that there are different requirements on suitable management. Hence, in conservation management plans for these areas, it will be important to select a differentiated approach to conservation of these two types of communities. During the monitoring several rare species of plants were recorded, e.g. *Amygdalus nana*, *Crambe tataria*, *Crupina vulgaris*, *Linaria palidiflora*, *Himantoglossum adriaticum*, *Himantoglossum caprinum*, *Ophrys holubyana*, or *Ophrys sphecodes*.

Overall assessment of the conservation status of habitat

Conservation status on national level:
Overall habitat status: ALP: U1 PAN: U1
Conservation status in SCIs: U1
Overall conservation status on national level: U1



By bioregion:



5130 *Juniperus communis* formations on heaths or calcareous grasslands

Medium to dense formations of common juniper, which formed on abandoned pastures or extensive grazing areas.

Number of PMLs: 56 **PML average area size:** 2.6 ha

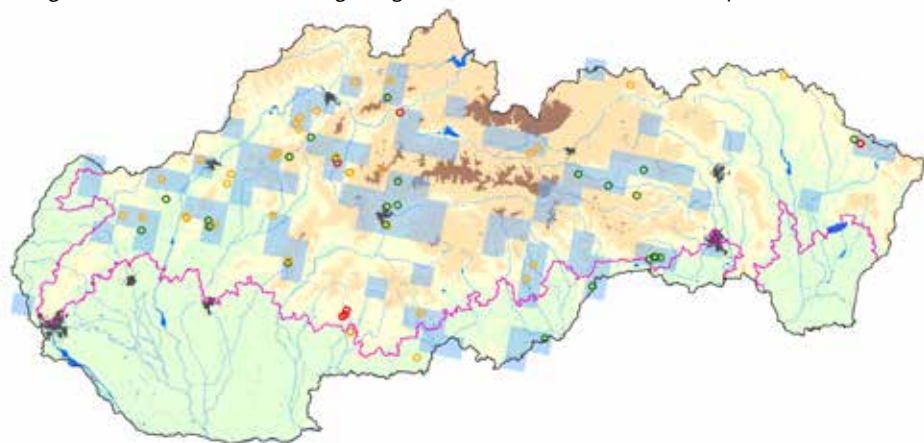
Number of involved experts: 17 **Number of PML field visits:** 56

Average taxon count on record: 67

Typical species found in the PMLs: *Juniperus communis*, *Rosa* sp., *Ligustrum vulgare*, *Prunus spinosa*, *Brachypodium pinnatum*, *Briza media*, *Arrhenatherum elatius*, *Teucrium chamaedrys*, *Agrimonia eupatoria*, *Fragaria viridis*, *Sanguisorba minor*, *Achillea millefolium*, *Anthyllis vulneraria*, *Galium verum*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of August.

Habitat distribution and localization of PMLs: The habitat is scattered in hilly and mountainous areas throughout Slovakia, in areas where grazing of livestock was carried out in the past.



Monitoring results:

Estimate of trend of habitat development: ALP: 0 PAN: +

Habitat quality in PMLs:

ALP: 60.4 **35.8** **3.8**

PAN: 66.7 **33.3**

Overall habitat quality: ALP: **U1** PAN: **U1**

Habitat management in PMLs:

ALP: 45.2 **54.8**

PAN: 70 **30**

Habitat prospects in PMLs:

ALP: 47.2 **45.3** **7.5**

PAN: 66.7 **33.3**

Overall prospects of habitat: ALP: **U1** PAN: **U1**

Pressures and threats: The most common negative events recorded for monitored sites include succession and lack of grazing. The positive pressures also include succession and non-intensive grazing. Succession thus represents positive pressure in the early stages of development of the habitat and gradual increase of coverage by *Juniperus communis*. However, negative pressure of development of tree layer and decrease of species diversity of herbal undergrowth begins to dominate in heavily involved formations. Similarly the habitat is threatened by areal clearance of trees and shrubs on pastures, motivated by inappropriate mechanism of agricultural subsidies.

Assessment and notes on the monitoring results: In the Alpine and Pannonian Bioregion there is prevalence of favourable quality habitats (both over 60 %), but the prospects for habitat in PMLs in the Alpine Bioregion are mostly unfavourable. On the other hand, the prospects in the Pannonian Bioregion are mostly favourable. Estimations for the prospects of this habitat are thus stable for the Alpine Bioregion and increasing in the Pannonian Bioregion. Successional processes play important role in maintaining the favourable quality of the habitat. Its effect is positive in early stages of habitat development; however, in dense well developed formations they start to have mainly negative impacts. In order to maintain good condition of the habitat it is necessary to ensure regular maintenance by grazing mainly. This is to secure the stability of juniper formation coverage in



© Jaroslav Košťál



© Jaroslav Košťál

the range of 50-70 %. This ratio ensures sufficient a quality of *Juniperus communis* formations itself leaves also space for maintenance of species-rich herbal undergrowth. Formations of *Juniperus communis* create favourable conditions for many rare species of plants, from which the following were recorded during the monitoring: *Aconitum firmum* subsp. *moravicum*, *Astragalus vesicarius* subsp. *albidus*, *Linaria pallidiflora*, *Onosma visianii*, *Thlaspi jankae*, *Viola ambigua*. Formations are characterized by frequent occurrence of representatives of orchid families: *Anacamptis pyramidalis*, *Gymnadenia densiflora*, *Ophrys apifera*, *Ophrys holubyana*, *Orchis tridentata*, *Orchis ustulata* etc.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: **U1** PAN: **U1**

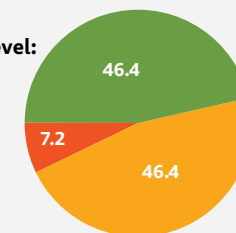
Conservation status in SCIs: **U1**

Overall conservation status on national level: **U1**

By bioregion:

ALP: 45.3 **47.2** **7.5**

PAN: 66.7 **33.3**



6110* Rupicolous calcareous or basophilic grasslands of the *Alyso-Sedion albi*

Pioneer, mostly small and sparse community with a prevalence of succulent and annual species on shallow, carbonate and basic soils, on rocks and rocky slopes in the lower and middle altitudes.

Number of PMLs: 89 **PML average area size:** 1,900 m²

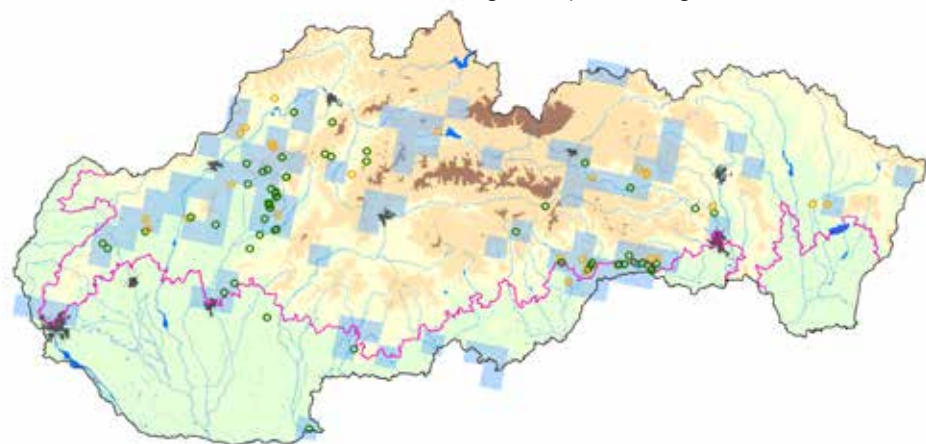
Number of involved experts: 12 **Number of PML field visits:** 89

Average taxon count on record: 32

Typical species found in the PMLs: *Sedum album*, *Sedum acre*, *Sedum sexangulare*, *Jovibarba globifera*, *Acinos arvensis*, *Arenaria serpyllifolia*, *Festuca pallens*, *Poa badensis*, *Teucrium chamaedrys*, *Tithymalus cyparissias*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of May to 30th of July.

Habitat distribution and localization of PMLs: Habitat can be found scattered throughout Slovakia in areas of carbonate and neo-volcanic mountain ranges, except for the highest elevations.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN: 0

Habitat quality in PMLs:

ALP: 81.4 **18.6**

PAN: 100

Overall habitat quality: ALP: **FV**

PAN: **FV**

Habitat management in PMLs:

ALP: 64.4 **35.6**

PAN: 10 **90**

Habitat prospects in PMLs:

ALP: 68.6 **31.4**

PAN: 94.7 **5.3**

Overall prospects of habitat: ALP: **U1**

PAN: **FV**

Pressures and threats: The most commonly reported negative influences include succession and lack of grazing. Positive influences observed during the monitoring include intensive mowing and grazing.

Assessment and notes on the monitoring results: Monitoring identified generally favourable status in the Pannonian Region and unfavourable-bad status in the Alpine Bioregion. The main reason is the negative assessment of habitat prospects in PMLs, which is related to frequent occurrence of negative influence of succession and anticipation the site being overgrown. Regular disturbance of vegetation cover on overgrown areas with non-intensive grazing of livestock would be suitable for the habitat. Inappropriate management was identified on up to 90 % of the sites in the Pannonian Bioregion. This includes the abandonment of land, grazing and under-utilization. Steep rocky slopes, where the habitat is most often distributed, were mainly used for goats and sheep grazing in the past. This use of dry and heating rocky hillsides has almost completely disappeared.

In order to maintain the favourable conservation status of the habitat it is necessary to ensure activities that limit successional processes, lead to vegetation cover disturbance and prevent spreading of



© Mário Duchon



© Mário Duchon

competitively stronger species of grass. Within this habitat there are also formations that do not require any management as lack of the soil limits the course of their succession.

Many rare plant species were recorded during monitoring such as *Alyssum tortuosum* subsp. *heterophyllum*, *Aethionema saxatile*, *Asplenium adiantum-nigrum*, *Astragalus vesicarius* subsp. *albidus*, *Convolvulus cantabrica*, *Daphne arbuscula*, *Erodium ciconium*, *Linaria pallidiflora*, as well as all species of *Onosma* genus occurring in Slovakia (*Onosma arenaria*, *Onosma tornensis*, *Onosma pseudoarenaria*, *Onosma visianii*).

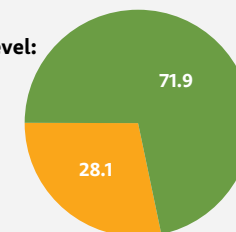
Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: **U1** PAN: **FV**

Conservation status in SCIs: **FV**

Overall conservation status on national level: **FV**



By bioregion:

ALP: 65.7 **34.3**

PAN: 94.7 **5.3**

6120* Xeric sand calcareous grasslands

Pioneer, structurally simple and species-poor communities on sand dunes.

Number of PMLs: 19 PML average area size: 3.6 ha

Number of involved experts: 2 Number of PML field visits: 26

Average taxon count on record: 45

Typical species found in the PMLs: *Bromus tectorum*, *Poa bulbosa*, *Alyssum alyssoides*, *Silene conica*, *Koeleria glauca*, *Cerastium semidecandrum*, *Syrenia cana*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of May to 30th of August.

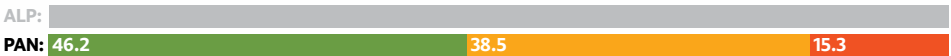
Habitat distribution and localization of PMLs: The habitat can be found only in Pannonian Bioregion. It is usually found in mosaic pattern together with communities of habitat 6260* Pannonic sand steppes.



Monitoring results:

Estimate of trend of habitat development: ALP: PAN: –

Habitat quality in PMLs:

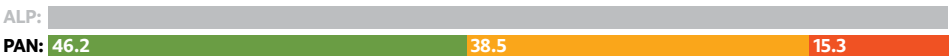


Overall habitat quality: ALP: PAN: U1

Habitat management in PMLs:



Habitat prospects in PMLs:



Overall prospects of habitat: ALP: PAN: U1

Pressures and threats: The main threats are the spread of invasive species (35 %), succession (23 %) and problem indigenous species (12 %). The habitat is also directly threatened by illegal mining of sand (8 %).

Assessment and notes on the monitoring results: The reason for unfavourable status of the habitat is the succession and the associated spread of invasive species due to lack of appropriate management. Illegal mining of sand is a specific problem of the habitat, which may lead to irreversible extinction of some sites. Habitat prospects for the future are unfavourable, 38 % of it is in unfavourable-inadequate condition and 15% in unfavourable-bad condition. In order to maintain favourable condition of the habitat it is necessary to first ensure regular maintenance – mowing, grazing and periodic disturbance of surface which will allow the survival of the competitively weak pioneer species. It is necessary to restore regular management of the sites in unfavourable condition, eliminate the issue of problematic indigenous and invasive species and ensure the presence of vegetation-free areas. Vegetation cover disturbance had good results on number of sites in the past, e.g. riding horses, off-road motorcycles and ATVs. Vegetation cover removal on large areas must be carried out with consideration, because application of such management usually leads to intensive onset of ruderal and invasive species. The only site where the habitat is preserved in its original form (wind moved sand dunes with the initial stage of psamophyte vegetation) is in the Východoslovenská nžina Lowland near the village of Věč. The other sites represent more advanced stage of succession, which leads



© Pavol Eliáš

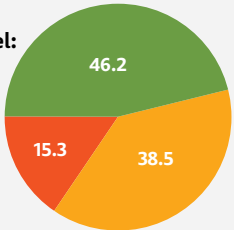


© Pavol Eliáš

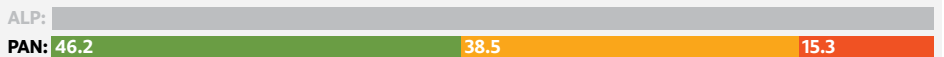
to formations of habitat 6260*. These successional processes are usually blocked by anthropogenic activities – sand mining (site of Bašov kopec hill near Virta, Abov, Imeľ) or by targeted management of protected areas (Liščie diery, Marcelovské piesky), allowing the survival of competitively weak rare psamophytes such as *Bassia laniflora*, *Corispermum nitidum*, *Polygonum arenarium* and *Syrenia cana*.

Overall assessment of the conservation status of habitat

Conservation status on national level:
Overall habitat status: ALP: PAN: U1
Conservation status in SCIs: U1
Overall conservation status on national level: U1



By bioregion:



6150 Siliceous alpine and boreal grasslands

The habitat consists of heliophilous communities of acidophilous, species-poor alpine grass herb formations and snow patches on silicate substrate.

Number of PMLs: 61 **PML average area size:** 16.6 ha

Number of involved experts: 6 **Number of PML field visits:** 61

Average taxon count on record: 36

Typical species found in the PMLs: *Festuca supina*, *Juncus trifidus*, *Salix herbacea*, *Carex atrata*, *Festuca versicolor*, *Saxifraga retusa*, *Carex bigelowii*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of July to 30th of August.

Habitat distribution and localization of PMLs: The centre of the current distribution is in the Alpine Bioregion; in the Pannonian Bioregion the habitat does not occur. It is particularly widespread in (sub) alpine level of Nízke Tatry, Vysoké Tatry and Západné Tatry Mountains, where it forms a mosaic with other alpine acidophilous communities, depending on the topography, soil, duration of snow cover, etc.



Monitoring results:

Estimate of trend of habitat development: ALP: 0 až –

PAN:

Habitat quality in PMLs:

ALP: 97.7 **2.3**

PAN:

Overall habitat quality:

ALP: **FV**

PAN:

Habitat management in PMLs:

ALP: 99.2 **0.8**

PAN:

Habitat prospects in PMLs:

ALP: 95.5 **4.5**

PAN:

Overall prospects of habitat:

ALP: **FV**

PAN:

Pressures and threats: The most common negative pressures, of medium to high intensity, include outdoor, sport and recreational activities (77 %), other human pressures (9 %), transport networks (4 %), air pollution (4 %) and change of biotic conditions (4 %).

Assessment and notes on the monitoring results:

On most sites the habitat quality is favourable (98 %) with unfavourable condition only in 2 % of monitored sites. Inaccessibility of most sites and their remoteness has significant influence on favourable condition of the habitat. The sites in unfavourable condition are in the vicinity of tourist or recreational facilities and trails. The reason for this is direct damage, which causes changes in species composition. Negative impact comes from excessive erosion, trampling and changes in soil properties. Rarely the negative pressures are caused by air pollution that affects selected types of alpine vegetation, especially on mylonitic substrate. Non-intervention habitat management regimes are preferred. Active management is only necessary in selected cases and concerns those parts of habitats which are in unfavourable condition. It focuses on prevention of access to damaged habitat, non-intervention regime and prevention of outdoor and development activities in the region. This determines whether habitat prospects remain good or worsen. Restoration of eroded sections of hiking trails and strict prevention of entry to selected sites due to mechanical destruction of formations is necessary at sites in unfavourable condition. It is recommended



© Mário Duchon



© Jozef Šibík

to monitor changes in species composition and distribution of the habitat more often at sites which are situated in the vicinity of tourist huts and holiday resorts. The formations situated in more remote areas are stable and depend only on natural conditions and competition between species. PMLs also included other important species: *Carex rupestris*, *Kobresia myosuroides*, *Saxifraga retusa*.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: **FV** PAN:

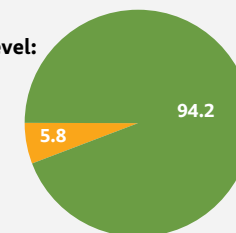
Conservation status in SCIs: **FV**

Overall conservation status on national level: **FV**

By bioregion:

ALP: 95.5 **4.5**

PAN:



6170 Alpine and subalpine calcareous grasslands

The habitat consists of light-demanding communities of short stems, usually (sub) alpine grasslands on alkaline substrate.

Number of PMLs: 79 **PML average area size:** 3.3 ha

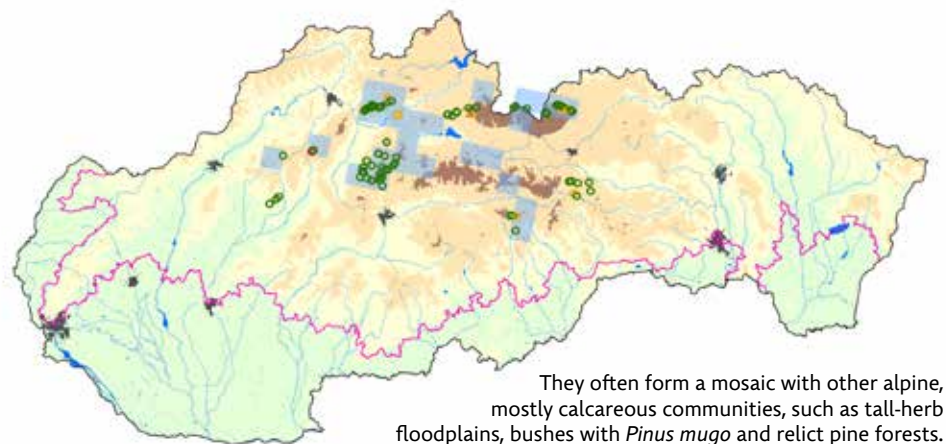
Number of involved experts: 10 **Number of PML field visits:** 79

Average taxon count on record: 76

Typical species found in the PMLs: *Scabiosa lucida*, *Sesleria albicans*, *Trisetum alpestre*, *Carex firma*, *Sesleria tatrae*, *Carex sempervirens*, *Aster alpinus*, *Festuca tatrae*, *Salix reticulata*, *Salix retusa*, *Dianthus praecox* subsp. *praecox*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of August.

Habitat distribution and localization of PMLs: The centre of current distribution is in the Alpine Bioregion; in the Pannonian Bioregion the habitat does not occur. It is particularly widespread in supra-montane to alpine belts of the central mountains of Western Carpathians on limestone foundation of Nízke Tatry Mountains, Vysoké Tatry Mountains and Západné Tatry Mountains, Malá Fatra and Veľká Fatra Mountains, Strážovské and Chočské vrchy Mountains, also Muránska planina Plain and Slovenský raj Mountains.



Monitoring results:

Estimate of trend of habitat development: ALP: –

PAN:

Habitat quality in PMLs:

ALP: 91.1 **8.9**

PAN:

Overall habitat quality:

ALP: **FV**

PAN:

Habitat management in PMLs:

ALP: 97 **3**

PAN:

Habitat prospects in PMLs:

ALP: 82.1 **16.1** **1.8**

PAN:

Overall prospects of habitat:

ALP: **U1**

PAN:

Pressures and threats: The most common negative pressures, of medium to high intensity, include outdoor, sporting and recreational activities 55 %, biological processes 12 %, other human pressures 10 % abiotic (slow) natural processes 8 %, tree planting 4 %, avalanches 4% and transport networks 4%.

Assessment and notes on the monitoring results: Favourable quality of the habitat is secured by natural inaccessibility of many sites. The proximity of tourist, recreational and sports facilities and trails directly affect the number of sites in a bad condition that are directly affected by anthropic activities. Planting of dwarf pine, spruce or even of non-indigenous species such as *Alnus viridis* in order to restore the upper forest line also negatively affects the habitat. As a result there are changes in species composition and complete destruction of some formations, which manifest in excessive erosion, trampling and subsequent changes in soil properties overall. Significant negative pressure comes from mechanical damage of plants by tourists and ski alpinists (in places with a thin layer of snow cover). Habitat management is based primarily on non-intervention (passive management). In selected cases, when habitat is in unfavourable condition, it is necessary to prevent the entry of tourists and ski alpinists to selected sites to allow the regeneration of formations. Non-intervention regime, strengthened by strict adherence to nature protection legislation and prevention of expansion of existing recreational centres and outdoor activities in the region is essential and necessary to maintain the favourable condition of the habitat. Under current conditions, the estimate of the development trend is decreasing. Erosion increases due to increased tourism and subsequent trampling of formations. With increased standards of living, there is also increase of frequency of leisure



Pyrola carpatca © Jozef Šibík



© Jozef Šibík

activities. This means increased burden on alpine grassland formations. Status of habitat in Belianske Tatry Mountains illustrates the positive influence of tourist movement restrictions on regeneration of destroyed formations and increase of population of endangered and rare species. PMLs also included other important species such as *Androsace villosa*, *Carex rupestris*, *Dianthus nitidus*, *Juncus triglumis*, *Kobresia myosuroides*, *K. simpliciuscula*, *Saxifraga wahlenbergii*.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: **U1** PAN:

Conservation status in SCIs:

U1

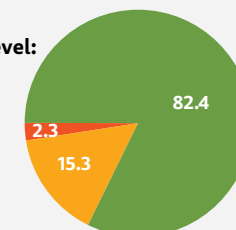
Overall conservation status on national level:

U1

By bioregion:

ALP: 82.1 **16.1** **1.8**

PAN:



6190 Rupicolous pannonic grasslands (*Stipo-Festucetalia pallentis*)

The open Pannonian dry grassland communities and dealpine *Sesleria*-grassland communities on shallow soils of carbonate rocks. Many of those represent primary communities of extreme habitats developed without human intervention.

Number of PMLs: 131 **PML average area size:** 9,000 m²

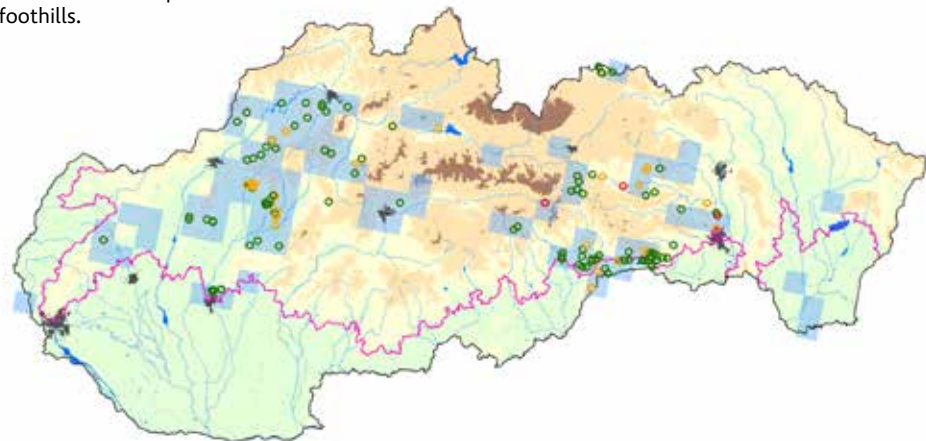
Number of involved experts: 17 **Number of PML field visits:** 131

Average taxon count on record: 55

Typical species found in the PMLs: *Carex humilis*, *Teucrium chamaedrys*, *Festuca pallens*, *Seseli osseum*, *Teucrium montanum*, *Potentilla arenaria*, *Sesleria albicans*, *Thymus praecox*, *Anthericum ramosum*, *Stachys recta*, *Inula ensifolia*, *Erysimum odoratum*, *Hippocrepis comosa*, *Allium flavum*, *Bupleurum falcatum*, *Leontodon incanus*, *Globularia punctata*, *Campanula xylocarpa*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of August.

Habitat distribution and localization of PMLs: Habitat distribution is centred in the Panónska nížina Lowland, in lower pericarpian mountains or in Carpathian basins at an altitude of 220 to 880 m.a.s.l. PMLs are located in warm regions of Slovakia with lower annual rainfall as well as in cooler and wetter areas of warm Carpathian foothills.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN: 0

Habitat quality in PMLs:

ALP: 89.4 **8.8** **1.8**

PAN: 94.4 **5.6**

Overall habitat quality: ALP: **U1**

PAN: **FV**

Habitat management in PMLs:

ALP: 54.3 **45.7**

PAN: 22.2 **77.8**

Habitat prospects in PMLs:

ALP: 77 **20.4** **2.6**

PAN: 77.8 **22.2**

Overall prospects of habitat: ALP: **U1**

PAN: **FV**

Pressures and threats: The most frequent negative pressures, of medium to high intensity, include biological processes (34 %), planting trees – non-indigenous species (22 %) and abandonment of grazing / insufficient grazing (18 %).

Assessment and notes on the monitoring results:

In most cases, the most serious threat to this habitat is represented by changes in land use associated with agricultural intensification, or oppositely by lack of management leading to the habitat being overgrown by trees. The remaining areas are mostly mosaic. Reduced populations of individual species are endangered by extinction or inbreeding depression due to disrruption of mutual ecological links between isolated populations. In terms of protection, the worst situation is in the Tatry National Park with unfavourable conservation status and in the Nízke Tatry National Park with unfavourable conservation status. Top rated PMLs are located in the Muránska planina National Park, Pieniny National Park, Malá Fatra National Park and Malé Karpaty Mountains with favourable conservation status overall. The prospects of the habitat are optimal in both bioregions. Without active management it is only possible to maintain the communities of dry grassland formations at extreme locations of primary open landscape. Currently, the most common procedure to protect these habitats is the maintenance management with regular mechanical removal of self-seeding tree species and non-indigenous species. It is also recommended that the sites are grazed every 2-5 years by goats or by mixed flocks of sheep and goats in the ratio of 5: 1. Given their relict character, dealpine grassland formations do not require maintenance management. The presence of many indicators of primary xerothermic vegetation, such as *Biscutella laevigata*, *Festuca pallens*, *Leontodon incanus* and *Saxifraga*

paniculata indicate that these formations were maintained in the form of primary open landscape for millennia without any human intervention. This was also the case during the overall changes of climax communities which have taken place after the last glacial period. However, the removal of self-seeding trees and shrubs is still necessary. Calciphilous xerothermic grassland communities represent the habitat with the highest number of endangered plant species. Monitored PMLs included also other important species such as *Aconitum anthora*, *Avenula praeusta*, *Campanula xylocarpa*, *Carex halleriana*, *Dianthus praecox* subsp. *lumnitzeri*, *D. praecox* subsp. *pseudopraecox*, *Draba lasiocarpa* subsp. *klasterskyi*, *Dracocephalum austriacum*, *Ferula sadleriana*, *Iris aphylla* subsp. *hungarica*, *Isatis praecox*, *Linaria pallidiflora*, *Onosma tornensis*, *Onosma visianii*, *Ophrys insectifera*, *Orchis militaris*, *Pulsatilla subslavica*, *P. grandis*, *Rosa pimpinellifolia*, *Stipa* sp., *Thlaspi jankae* and *T. montanum*.



© Mário Duchoň



© Mário Duchoň

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: **U1** PAN: **FV**

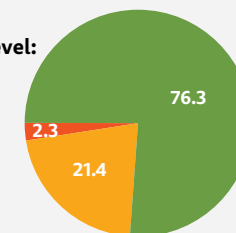
Conservation status in SCIs: **FV**

Overall conservation status on national level: **FV**

By bioregion:

ALP: 42.6 **54.4** **3**

PAN: 77.8 **22.2**



6210 Semi-natural dry grasslands and scrubland formations on calcareous substrates (*Festuco-Brometalia*)

Habitat includes species-rich sub-xerophile meadows and pastures in warmer regions of Slovakia with an abundance of broad-leaved flowering herbs and dominance of several grass species.

Number of PMLs: 286

PML average area size: 2.6 ha

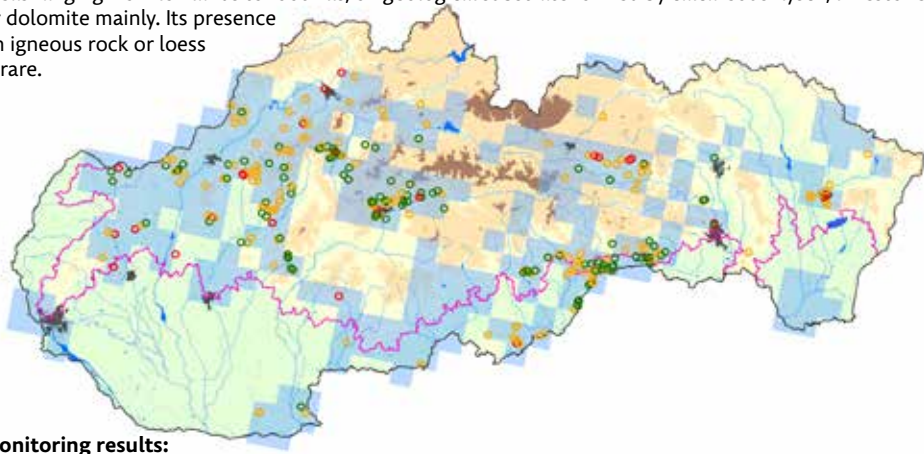
Number of involved experts: 32 **Number of PML field visits:** 456

Average taxon count on record: 77

Typical species found in the PMLs: *Brachypodium pinnatum*, *Festuca rupicola*, *Securigera varia*, *Bromus erectus*, *Trifolium montanum*, *Filipendula vulgaris*, *Inula ensifolia*, *Potentilla arenaria*, *Poa angustifolia*, *Carex michelii*, *Phleum phleoides*, *Festuca valesiaca*, *Carex humilis*, *Carex montana*, *Pulsatilla grandis*, *Cirsium pannonicum*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. Time period for data collection was between 15th of May to 30th of July. For sites which are not mowed or are mowed at a later stage it was until end of August.

Habitat distribution and localization of PMLs: The habitat is distributed in the Alpine Bioregion mainly. Only several sites are also located in the south of Slovakia in the Pannonian Bioregion. It can be found in areas ranging from lowlands to foothills, on geological substrate formed by calcareous flysch, limestone or dolomite mainly. Its presence on igneous rock or loess is rare.



Monitoring results:

Estimate of trend of habitat development: ALP: –

PAN: –

Habitat quality in PMLs:

ALP: 57.3 40.4 2.3

PAN: 60.5 35.5 4

Overall habitat quality:

ALP: U1

PAN: U1

Habitat management in PMLs:

ALP: 42.9 57.1

PAN: 14.2 85.8

Habitat prospects in PMLs:

ALP: 38.5 52.8 8.7

PAN: 43.4 52.6 4

Overall prospects of habitat:

ALP: U1

PAN: U1

Pressures and threats: The most common negative pressures, of medium to high intensity, include abandonment of mowing (12 %) and grazing (37 %) and subsequent succession that was recorded in up to 47 % of monitored sites. Other negative pressures are manifested by significant erosion (6 %) and plant invasion (6 %).

Assessment and notes on the monitoring results:

The habitat quality is favourable at most sites of both bioregions (Alpine 57 %, Pannonian 60 %). Considering the absence of appropriate management and the ongoing succession of the monitored sites the development trend of the habitat throughout Slovakia can be estimated as generally decreasing. Almost 86 % of the sites in the Pannonian Bioregion are without proper management. Successional changes, embodied in dominance of certain nutrient demanding grasses, in the loss of thermophilic and heliophilous species, as well as in increased number of self-seeding tree species, were recorded on 47 % of the sites. Since only 21 % of the monitored sites in Slovakia are partly mowed and 15 % is grazed, the habitat prospects are unfavourable in both bioregions. Considering the favourable quality of the habitat despite the lack of



© Viera Šefferová Stanová



© Anna Leskovjanská

management on many sites, the renewal of management may result in improvement of habitat status in short time. Ideal management is represented by elimination of self-seeding tree species and subsequent mowing at least every other year, or extensive grazing. Populations of several rare species of plants were recorded in the monitored sites: *Adonis vernalis*, *Epipactis atrorubens*, *Gentiana cruciata*, *Gladiolus imbricatus*, *Gymnadenia conopsea*, *Iris graminea*, *Linum flavum*, *Platanthera bifolia*, *Scorzonera purpurea*.

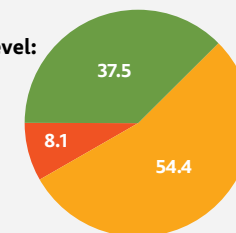
Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN: U1

Conservation status in SCIs: U1

Overall conservation status on national level: U1



By bioregion:

ALP: 36.4 54.6 9

PAN: 43.4 52.6 4

6210* Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) *important orchid sites

The habitat includes sub-xerophile meadows and pastures in warmer regions of Slovakia. Habitat 6210 is considered a priority * if the site contains several orchid species that are critically endangered and/or rare on national level or if the site includes a significant population of at least one species of orchid, which is critically endangered and/or rare on national level.

Number of PMLs: 81

PML average area size: 2.1 ha

Number of involved experts: 18

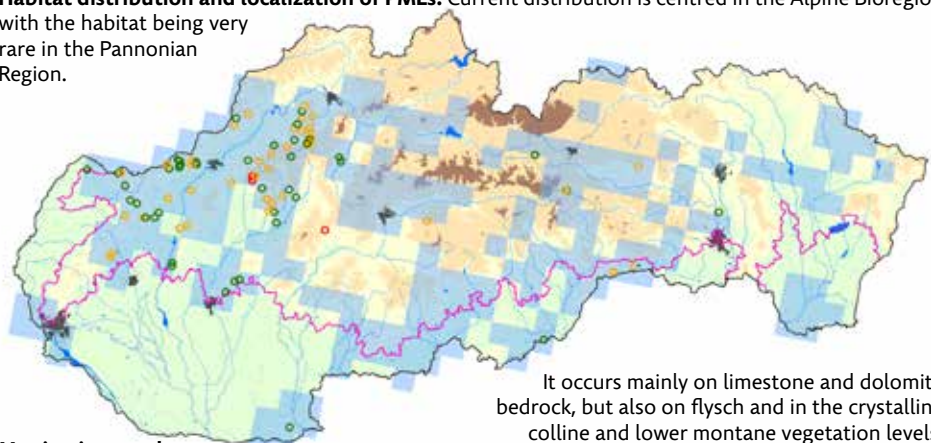
Number of PML field visits: 128

Average taxon count on record: 87

Typical species found in the PMLs: *Brachypodium pinnatum*, *Festuca rupicola*, *Trifolium montanum*, *Bromus erectus*, *Gymnadenia conopsea*, *Inula ensifolia*, *Securigera varia*, *Filipendula vulgaris*, *Carex montana*, *Carex michelii*, *Orchis militaris*, *Cirsium pannonicum*, *Carex humilis*, *Phleum phleoides*, *Festuca valesiaca*, *Poa angustifolia*, *Pulsatilla grandis*, *Orchis tridentata*, *Potentilla arenaria*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. Time period for data collection was between 15th of May to 30th of July, which means during of the flowering for *Orchidaceae* species.

Habitat distribution and localization of PMLs: Current distribution is centred in the Alpine Bioregion with the habitat being very rare in the Pannonian Region.



Monitoring results:

Estimate of trend of habitat development: ALP: –

PAN: –

Habitat quality in PMLs:

ALP: 67.5 30 2.5

PAN: 50 50

Overall habitat quality: ALP: U1

PAN: U1

Habitat management in PMLs:

ALP: 59.2 40.8

PAN: 47.5 52.5

Habitat prospects in PMLs:

ALP: 50 45.8 4.2

PAN: 50 50

Overall prospects of habitat: ALP: U1

PAN: U1

Pressures and threats: The most common negative pressures, of medium to high intensity, include land abandonment and lack of mowing and grazing (23 %), succession (28 %) or the low to medium intensity tree planting (6 %).

Assessment and notes on the monitoring results: The quality of the habitat in the Alpine Bioregion is favourable in most locations (67 %), in the Pannonian Bioregion where the habitat is very rare and the quality is only favourable for 50 % of the sites. However, the habitat is generally in unfavourable status in both regions. Lack of adequate management and ongoing succession (together 51 %) are among the most frequently noted pressures and threats. There is an accumulation of old biomass in these sites and a significant dominance by grasses and volunteer trees, which lead to the extinction of populations of rare orchid species, as well as the light-demanding and thermophilic species of herbs typical for this habitat. For the whole area of Slovakia only 20 % of the monitored sites are being mowed and only 3 % of these sites are being grazed. Although for prospects of the habitat in both bioregions are unfavourable, renewal of the management in several sites, especially in the Alpine Bioregion where the habitat is relatively widely distributed, could lead to the achievement of favourable conservation status. The ideal management measures consist of the elimination of self-seeding tree species and subsequent mowing at



Ophrys holubyana © Mário Duchoň



© Jaroslav Košťál

least every second year or extensive grazing. Population of the following rare species of the family *Orchidaceae* were recorded in the monitored sites: *Anacamptis pyramidalis*, *Coeloglossum viride*, *Dactylorhiza fuchsii* subsp. *sooiana*, *D. sambucina*, *Gymnadenia conopsea*, *Himantoglossum adriaticum*, *Ophrys apifera*, *O. holubyana*, *O. insectifera*, *O. sphegodes*, *Orchis coriophora*, *O. mascula* subsp. *signifera*, *O. militaris*, *O. morio*, *O. palens*, *O. purpurea*, *O. tridentata*, *O. ustulata*, *O. × dietrichiana*, *Platanthera bifolia*, *P. chlo-ranthera*, *Traunsteinera globosa*.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN: U1

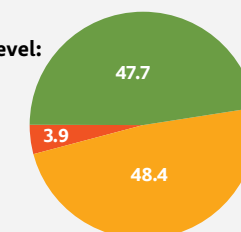
Conservation status in SCIs: U1

Overall conservation status on national level: U1

By bioregion:

ALP: 47.5 48.3 4.2

PAN: 50 50



6230* Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas

The habitat consists of acidophilous communities dominated by *Nardus stricta*.

Number of PMLs: 135

PML average area size: 6.2 ha

Number of involved experts: 25

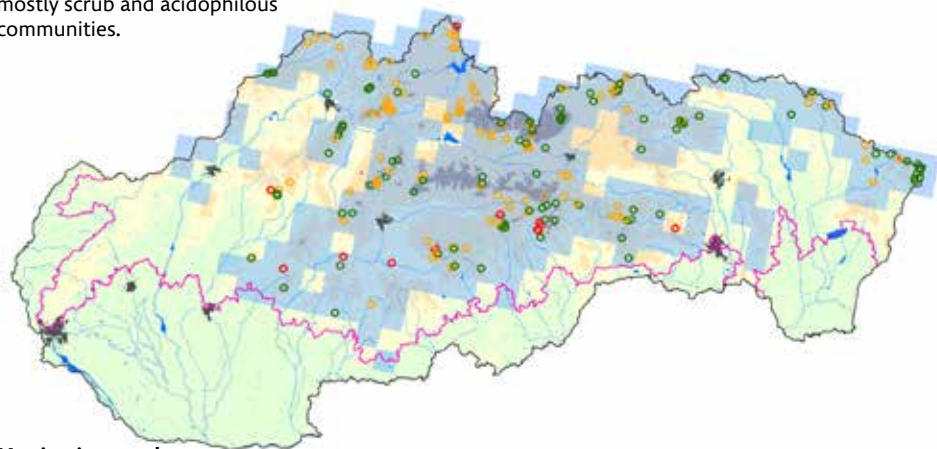
Number of PML field visits: 135

Average taxon count on record: 49

Typical species found in the PMLs: *Nardus stricta*, *Potentilla erecta*, *Veronica officinalis*, *Luzula campestris*, *Avenella flexuosa*, *Viola canina*, *Carex pallescens*, *Polygala vulgaris*, *Luzula luzuloides*, *Potentilla aurea*, *Hieracium lachenalii*, *Poa chaixii*, *Antennaria dioica*, *Danthonia decumbens*, *Carex pilulifera*, *Crepis conyzifolia*, *Trommsdorffia uniflora*, *Campanula alpina*, *Phleum rhaeticum*, *Avenula versicolor*, *Agrostis pyrenaica*, *Luzula sudetica*, *Viola lutea* subsp. *sudetica*, *Pilosella aurantiaca*, *Juncus squarrosus*, *Avenula planiculmis*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of August.

Habitat distribution and localization of PMLs: The centre of the current distribution is in the Alpine Bioregion; in the Pannonian Bioregion the habitat does not occur. Habitat is distributed particularly in the montane to alpine belt of Western Carpathian Mountains, where it forms a mosaic with other, mostly scrub and acidophilous communities.



Monitoring results:

Estimate of trend of habitat development: ALP: –

PAN:

Habitat quality in PMLs:

ALP: 57.8 37.1 5.1

PAN:

Overall habitat quality:

ALP: U1

PAN:

Habitat management in PMLs:

ALP: 53.2 46.8

PAN:

Habitat prospects in PMLs:

ALP: 50.9 40.5 8.6

PAN:

Overall prospects of habitat:

ALP: U1

PAN:

Pressures and threats: The most common negative pressures, of medium to high intensity, include absence of grazing 38 %, biological processes 30 %, outdoor, sport and recreational activities 15 %, mowing 5%, collection and removal of plants in general 3 %, land management changes 1%, transport network 1 %, agricultural activities not specified above 1 %, constructions, buildings in the area 1 %, hunting and wildlife trapping (terrestrial) 1 %.

Assessment and notes on the monitoring results: Most habitat sites show favourable quality (57 %). Unfavourable quality is registered at 37 % of PMLs. The sites are in unfavourable status due to absence of traditional ways of management, such as grazing, which directly affect the formation and maintenance of these types of communities. Subsequent changes in species composition due to natural succession and destruction of suitable habitats affect the quality and prospects of the habitat. Some sites, especially in the Tatry Mountains, are often kept by moderate trampling (tourists near lakes and hiking trails) and deer grazing in enclaves of dwarf pine formations. Habitat management is completely absent in most places. In order to preserve the habitat, it is essential to allow limited sheep grazing at selected sites. Active management of this kind should take place only in those parts of the habitat which show signs of unfavourable status and in places where a loss of the habitat would mean significant loss for the diversity of the community.



© Mário Duchoň



© Jozef Šibík

It is essential to prevent the destruction of formations near recreational areas due to road construction, building of facilities and tourist attractions. The prospects of development trend are, under current situation, declining. The habitat occurs in complex with other habitats, mostly with alpine communities on acid substrate. It shows significant decline at higher altitudes compared to formations recorded in the past. It is advised to monitor any preserved formations occurring in alpine and subalpine level with corresponding species composition, especially in areas where *Nardus stricta*, as species with weak competitive characteristics, is in the decline. An important species *Campanula serrata* was recorded on the PMLs.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN:

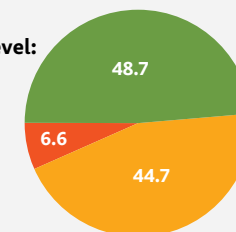
Conservation status in SCIs: U1

Overall conservation status on national level: U1

By bioregion:

ALP: 46.6 44.8 8.6

PAN:



6240* Sub-Pannonic steppic grasslands

Species-rich grasslands, which are dominated by tufted hemicryptophytes and species with rampant rhizome.

Number of PMLs: 93

PML average area size: 1.4 ha

Number of involved experts: 12 Number of PML field visits: 94

Average taxon count on record: 68

Typical species found in the PMLs: *Teucrium chamaedrys*, *Koeleria macrantha*, *Eryngium campestre*, *Echium russicum*, *Festuca valesiaca*, *F. rupicola*, *F. pseudodalmatica*, *Stipa capillata*, *S. joannis*, *S. tirsia*, *Cruciata pedemontana*, *Poa pannonica*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 15th of May to 30th of June.

Habitat distribution and localization of PMLs: Habitat is widespread in the Pannonian and the Alpine Bioregion in the hottest and driest parts of Slovakia. It is usually found in mosaic together with other dry grassland communities.



Monitoring results:

Estimate of trend of habitat development: ALP: –

PAN: –

Habitat quality in PMLs:

ALP: 91.1 8.9

PAN: 76.3 23.7

Overall habitat quality:

ALP: FV

PAN: FV

Habitat management in PMLs:

ALP: 52.4 47.6

PAN: 33.1 66.9

Habitat prospects in PMLs:

ALP: 67.9 32.1

PAN: 55.3 44.7

Overall prospects of habitat:

ALP: U1

PAN: U1

Pressures and threats:

The main threat, with medium intensity, in the Alpine Bioregion is represented by succession (46 %). The second most serious threat factor is a lack of grazing (31 %). Similar situation exists in the Pannonian Bioregion, with the habitat threatened by succession (37 %), absence of management (34 %) and species invasion (11 %).

Assessment and notes on the monitoring results:

Although quality of the habitat in both bioregions is favourable (Alpine 91 %, Pannonian 76 %), the over-



all status of the habitat is unfavourable. The same principle applies in the Sites of Community Importance. Succession, as a result of missing appropriate management, is the reason for this in both bioregions. In the Pannonian Bioregion there is also a threat of species invasion. Habitat prospects for the future are negative for both bioregions. In order to maintain favourable conservation status of the habitat it is necessary to ensure regular management – mowing or grazing. In case of sites with unfavourable condition it is necessary to restore regular management, stop secondary succession (i.e. cutting of self-seeding tree species) and eliminate invasive species. The habitat was used for extensive sheep and goat grazing in the past, where the succession was blocked by grazing as well as by extremity of sites on steep rocky slopes and rocks with shallow soils. This habitat is both biosozologically and aesthetically very valuable with occurrence of many rare and endangered species such as *Alyssum tortuosum* subsp. *heterophyllum*, *Echium russicum*, *Onosma arenaria*, *O. pseudoarenaria* subsp. *tuberculata*, *O. viridis*, *O. visianii*, *Thlaspi jankae*.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN: U1

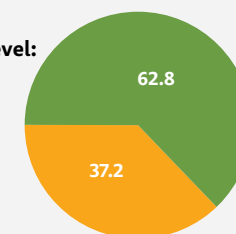
Conservation status in SCIs: U1 U1

Overall conservation status on national level:

By bioregion:

ALP: 67.9 32.1

PAN: 55.3 44.7



6250* Pannonic loess steppic grasslands

Xerotherm to semi-xerotherm, species-rich grassland communities on loess and loess soil in highlands and lowlands.

Number of PMLs: 20 **PML average area size:** 4.1 ha

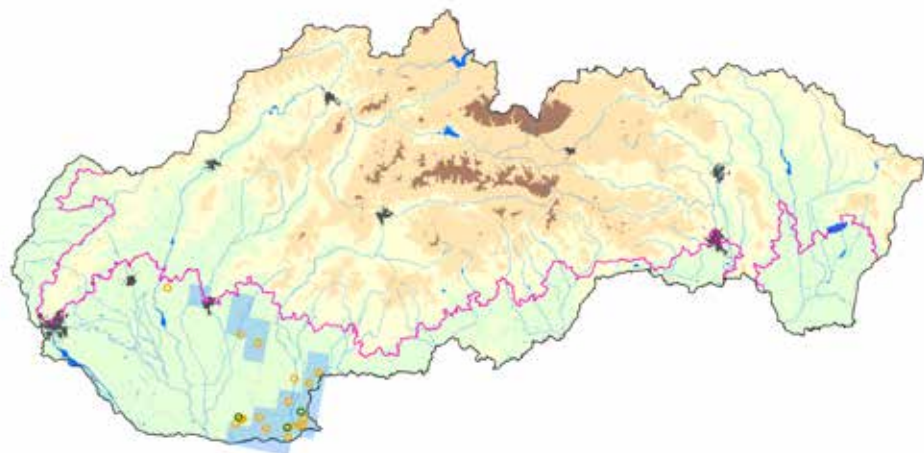
Number of involved experts: 2 **Number of PML field visits:** 20

Average taxon count on record: 77

Typical species found in the PMLs: *Agropyron pectinatum*, *Astragalus austriacus*, *A. exscapus*, *Crambe tataria*, *Festuca rupicola*, *F. valesiaca*, *Lotus borbasii*, *Salvia nemorosa*, *Bromus inermis*, *Stipa capillata*, *S. joannis*, *S. pulcherrima*, *Elytrigia intermedia*, *Taraxacum serotinum*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 15th of May to 30th of June.

Habitat distribution and localization of PMLs: Habitat occurs only in the Pannonian Bioregion, particularly in its south-western part.



Monitoring results:

Estimate of trend of habitat development: ALP:

PAN: –

Habitat quality in PMLs:

ALP:

PAN:

Overall habitat quality:

ALP:

PAN:

Habitat management in PMLs:

ALP:

PAN:

Habitat prospects in PMLs:

ALP:

PAN:

Overall prospects of habitat:

ALP:

PAN:

Pressures and threats: Negative pressures of medium intensity on the habitat include mainly successional processes (45 %), lack of grazing (29 %) and invasive species (20 %).

Assessment and notes on the monitoring results: The quality of the habitat is unfavourable in the vast majority of sites (78 %). The reason for this is the succession and the lack of appropriate management. Species-rich grasslands of xerophytic herbs and grasses were used in the past as extensive grasslands. During cooperative land utilization these were often converted to fields or to terraced vineyards (in the areas with steep slopes). Therefore, the habitat is preserved in relatively small fragments only, usually being unmanaged (91 %) and surrounded by intensely cultivated agricultural land. It is represented by abandoned terraced vineyards and nature reserves with best preserved sites near Modrany (Suchý vrch Hill), Gbelce (Drieňová hora Mountain), near Mužla (Jurský Chlm, Vřšok), Kamenica nad Hronom (Burdov Mountain) and near Salka (Sovie vinohrady Vineyards). In order to maintain the favourable condition of the habitat it is necessary to first ensure regular management – mowing or grazing. In sites in unfavourable condition it is necessary to restore regular management and eliminate problematic indigenous and invasive species. Habitat is colonized by many rare thermophilic species, occurrence of which represents their northernmost distribution, for example *Agropyron pectinatum*, *Allium paniculatum*, *Astragalus exscapus*, *Crambe tataria*, *Carex liparocarpus*, *Herniaria incana*, *Orchis purpurea*, *Orchis tridentata*, *Viola ambigua*.



Astragalus exscapus © Pavol Eliáš



© Pavol Eliáš

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP:

PAN:

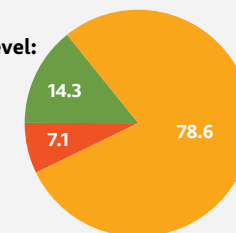
Conservation status in SCIs:

Overall conservation status on national level:

By bioregion:

ALP:

PAN:



6260* Pannonic sand steppes

Structurally and species-rich grassland communities on sand hills and dunes with a prevalence of perennial herbs and grasses.

Number of PMLs: 17 **PML average area size:** 2 ha

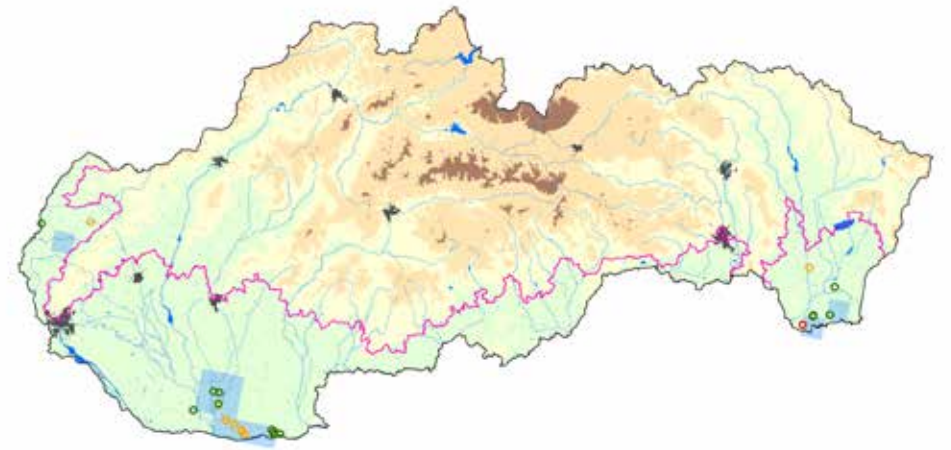
Number of involved experts: 5 **Number of PML field visits:** 17

Average taxon count on record: 47

Typical species found in the PMLs: *Cynodon dactylon*, *Festuca vaginata*, *Dianthus serotinus*, *Stipa borysthena*, *Fumana procumbens*, *Minuartia glaucina*, *Medicago monspeliaca*, *Gypsophila fastigiata*, *G. paniculata*, *Silene borysthena*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of September.

Habitat distribution and localization of PMLs: Habitat can be found in Pannonian Bioregion only. It is usually found in mosaic pattern together with communities of habitat 6120* Xeric sand calcareous grasslands.



Monitoring results:

Estimate of trend of habitat development: ALP: PAN: –

Habitat quality in PMLs:

ALP: PAN: 64.7 35.3

Overall habitat quality: ALP: PAN: U1

Habitat management in PMLs:

ALP: PAN: 51.9 48.1

Habitat prospects in PMLs:

ALP: PAN: 58.8 35.3 5.9

Overall prospects of habitat: ALP: PAN: U1

Pressures and threats: The main threats, of medium intensity, come equally from expansion of invasive species (28 %) and succession (28 %). The third most serious threat factor is lack of grazing (19 %).

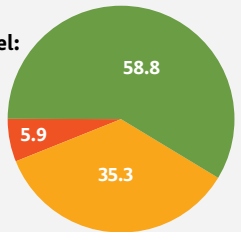
Assessment and notes on the monitoring results: The reason for habitat's unfavourable condition is similar to habitat 6120*, i.e. lack of suitable management and succession. Habitat prospects for the future are unfavourable as 35 % of the habitat is in inadequate status. In order to maintain good condition of the habitat it is necessary to first ensure regular management – extensive grazing. At sites in unfavourable status it is necessary to restore regular management, stop succession and eliminate problematic indigenous and invasive species. The most valuable and relatively well preserved formations of this habitat are concentrated in nature reserves around Čenkov (Čenkovská step steppe and Čenkovská lesostep forest steppe), with similarly valuable protected sites near Chotín (Chotínske piesky sands), Marcelová (Marcelovské piesky sands, Mašan) and near Nesvady (Líščie diery). Rarest species of psamphytes can be found there, such as *Alkana tinctoria*, *Colchicum*



arenarium and *Ephedra distachya*. For sites that do not belong to the network of protected areas, this type of habitat is best preserved near Nesvady, Imeľ and Kameničná (Balvany). In general, however, it can be concluded that these sites are under strong anthropogenic pressure represented by mainly illegal sand extraction (threatening the existence of the dune near Balvany), storage of municipal and construction waste (Abov, Imeľ), etc.

Overall assessment of the conservation status of habitat

Conservation status on national level:
Overall habitat status: ALP: PAN: U1
Conservation status in SCIs: U1
Overall conservation status on national level: U1



By bioregion:

ALP: PAN: 58.8 35.3 5.9

6410 *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)

Molinia meadows can be found on organogenic soils. They are adapted to significant fluctuations of groundwater levels, which decreases significantly in the summer months and thus the soil profile dries out strongly.

Number of PMLs: 42 **PML average area size:** 20.9 ha

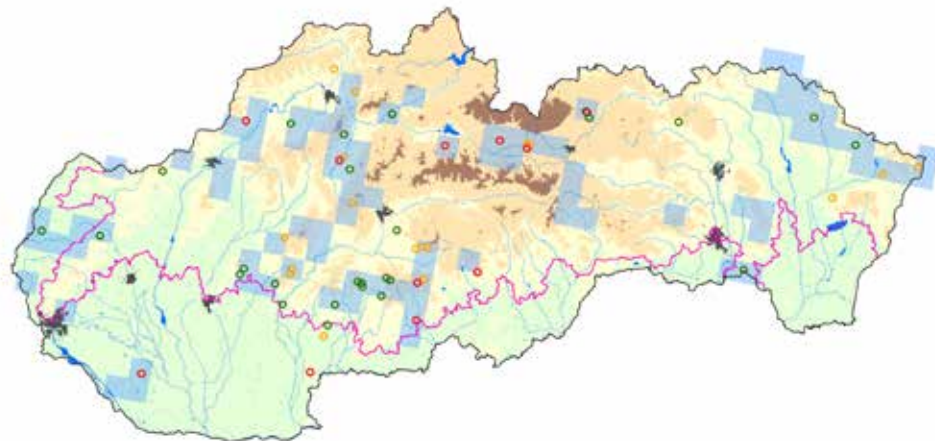
Number of involved experts: 18 **Number of PML field visits:** 47

Average taxon count on record: 59

Typical species found in the PMLs: *Achillea asplenifolia*, *Achillea ptarmica*, *Betonica officinalis*, *Carex panicea*, *Galium boreale*, *Gentiana pneumonanthe*, *Inula salicina*, *Iris sibirica*, *Molinia caerulea*, *Succisa pratensis*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of September.

Habitat distribution and localization of PMLs: Scattered and rare occurrence in the in the Borská and Podunajská nížina Lowlands and in the Carpathian Mountains, for example on Poľana Mountain, Pohronský Inovec Mountain, Štiavnické vrchy Mountains, Vtáčnik and in Liptovská and Popradská kotlina Basins.



Monitoring results:

Estimate of trend of habitat development: ALP: – PAN: –

Habitat quality in PMLs:

ALP: 54.5 29.5 16

PAN: 50 50

Overall habitat quality: ALP: U1 PAN: U1

Habitat management in PMLs:

ALP: 54.9 45.1

PAN: 33.3 66.7

Habitat prospects in PMLs:

ALP: 52.3 34.1 13.6

PAN: 50 50

Overall prospects of habitat: ALP: U1 PAN: U2

Pressures and threats: Negative pressures of medium intensity on the habitat in the Alpine Bioregion include mainly biological processes (48 %) and mowing (23 %). In the Pannonian Bioregion the most common negative pressures include inadequate mowing (66 %) and grazing (33 %).

Assessment and notes on the monitoring results: The quality of the habitat is favourable for half of the sites and unfavourable in the other half. Nevertheless the overall assessment is unfavourable. The inadequate management of sites causes this. In the Pannonian Bioregion the management is inadequate on 66 % of sites and in the Alpine Bioregion on 45 % of sites. The most serious problem is caused by abandonment of area management. Sites undergo relatively fast succession changes; overgrowth with self-seeding tree species and competitively strong species of grass. In order to maintain good condition of the habitat, regular management must be ensured. Mowing is the most suitable management for these meadows. It must be carried out in dry period, or with appropriate mechanisms for specialized waterlogged sites. It is not appropriate if the meadows are mown too early because they reach their optimal development level around June. If grazing takes place in these sites, it should be extensive and performed in drier



Gentiana pneumonanthe
© Viera Šefferová Stanová



© Viera Šefferová Stanová

periods. Restoration management is necessary at sites unfavourable condition– cutting of self-seeding tree species, elimination of accumulated biomass and subsequent restoration of regular management. Certain habitats were often wrongly interpreted during monitoring and thus certain succession fens with occurrence of *Molinia* genus were also classed within this habitat. However, without the presence of characteristic species of *Molinia* alliance, this is not a habitat of European importance. Some other important species were recorded on these sites such as *Dianthus superbus*, *Gentiana pneumonanthe*, *Scorzonera humilis*, *Iris sibirica*, *Carex hartmanii*, *C. hostiana*, and *Gladiolus palustris*.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN: U2

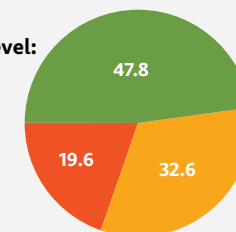
Conservation status in SCIs: U1

Overall conservation status on national level: U1

By bioregion:

ALP: 47.7 34.1 18.2

PAN: 50 50



6430 Hydrophilous tall-herb fringe communities of plains and of the montane to alpine levels

Habitat is defined more broadly, it includes four habitats: Lk5 Tall-herbaceous communities on wet meadows, Br7 Herbal fringe communities of lowland rivers, Br6 Bank formations of *Petasites* sp. and AL5 Tall-herbaceous communities of alpine levels.

Number of PMLs: 325

PML average area size: 1.7 ha

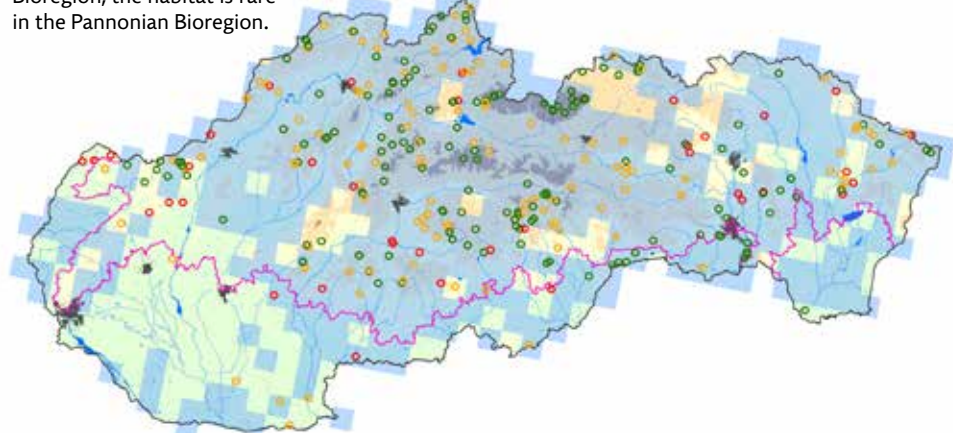
Number of involved experts: 38 Number of PML field visits: 325

Average taxon count on record: 42

Typical species found in the PMLs: *Aconitum firmum*, *Adenostyles alliariae*, *Aegopodium podagraria*, *Angelica sylvestris*, *Athyrium distentifolium*, *Caltha palustris*, *Calystegia sepium*, *Chaerophyllum hirsutum*, *Cicerbita alpina*, *Crepis paludosa*, *Cucubalus baccifer*, *Delphinium elatum*, *Doronicum austriacum*, *Epilobium hirsutum*, *Filipendula ulmaria*, *Geranium palustre*, *Geranium sylvaticum*, *Humulus lupulus*, *Lysimachia vulgaris*, *Petasites hybridus*, *Petasites kablikianus*, *Rubus caesius*, *Rumex alpinus*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of September.

Habitat distribution and localization of PMLs: The centre of current distribution is in the Alpine Bioregion, the habitat is rare in the Pannonian Bioregion.



Monitoring results:

Estimate of trend of habitat development: ALP: –

PAN: –

Habitat quality in PMLs:

ALP: 61.9 27.8 10.3

PAN: 52.2 30.4 17.4

Overall habitat quality: ALP: U1

PAN: U1

Habitat management in PMLs:

ALP: 60.9 39.1

PAN: 42.5 57.5

Habitat prospects in PMLs:

ALP: 49.7 36.8 13.5

PAN: 52.2 26.1 21.7

Overall prospects of habitat: ALP: U1

PAN: U1

Pressures and threats: Negative pressures of medium intensity on the habitat in the Alpine Bioregion include mainly biological processes (34 %), inappropriate management (31 %) in form of grazing, mowing or forestry activities and different human-induced changes (13 %) and species invasions (7 %). In the Pannonian Bioregion the most common negative pressures with medium intensity include improper management measures (42 %), problematic indigenous and non-indigenous species (26 %) and biological processes 21 %.

Assessment and notes on the monitoring results: In the Alpine Bioregion the quality of the habitat is favourable in the vast majority of sites (62 %), in the Pannonian Bioregion the quality is favourable in 52 % of sites. Nevertheless, the habitat is generally in unfavourable-inadequate condition. Unfavourable quality in the Alpine Bioregion is recorded for 10 % of sites, in the Pannonian Bioregion at up to 17 % of the sites. The reason for this is unsuitable or absent management. Bad quality of the habitat in lowlands is also caused by biological successional processes and invasions. Tall herbaceous communities of moist meadows are especially dependent on management. These are characterized by irregular management or its absence with subsequent accumulation of biomass on the soil surface. Long-term absence of management results in progressive succession towards shrub and forest formations. Bank formations of *Petasites* sp. may be threatened by construction activity and stream adjustments, as well as



© Mário Duchoň



© Mário Duchoň

by penetration of invasive or ruderal species as a consequence of disturbances. Tall herbaceous communities in the alpine level colonize locations influenced only by natural factors and are not at risk due to localization at high altitudes and in protected areas. Herb fringe communities of lowland rivers belong to unique habitats, with only a few sites which are monitored and which are usually attacked by invasive species. Prospects of habitats in both bioregions are assessed as unfavourable-inadequate.

Important species were recorded in this PML, such as Western-Carpathian paleo-endemic species *Delphinium oxysepalum* or Carpathian endemic species *Aconitum firmum* in tall-herbaceous communities of alpine level.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN: U1

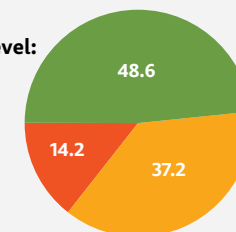
Conservation status in SCIs: U1

Overall conservation status on national level: U1

By bioregion:

ALP: 48.3 38.1 13.6

PAN: 52.2 26.1 21.7



6440 Alluvial meadows of river valleys of the *Cnidion venosi*

Habitat includes meadows of large lowland rivers, which are regularly flooded, but dry out in the summer due to the dry continental climate.

Number of PMLs: 48 **PML average area size:** 20.7 ha

Number of involved experts: 9 **Number of PML field visits:** 53

Average taxon count on record: 57

Typical species found in the PMLs: *Alopecurus pratensis*, *Carex praecox*, *Clematis integrifolia*, *Cnidium dubium*, *Galium boreale*, *Gratiola officinalis*, *Lychnis flos-cuculi*, *Poa pratensis*, *Ranunculus acris*, *Serratula tinctoria*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 15th of May to 30th of September.

Habitat distribution and localization of PMLs: The centre of distribution is in the Pannonian Bioregion, occurrence of the habitat in Slovakia is limited to Podunajská nížina, Východoslovenská and Borská nížina Lowlands.



Monitoring results:

Estimate of trend of habitat development: ALP: PAN: –

Habitat quality in PMLs:



Overall habitat quality: ALP: PAN: U1

Habitat management in PMLs:



Habitat prospects in PMLs:



Overall prospects of habitat: ALP: PAN: U1

Pressures and threats: The most significant negative pressures on the habitat include mainly agricultural activities, such as changes in management, which also includes intensification of formations in the past or very intensive grazing at present. Cumulatively, this represents up to 58 %. The spread of invasive species and problematic indigenous species represent negative pressure of medium intensity (21 %), the same as biological processes (21 %), which include succession in places that are permanently waterlogged and therefore unmanaged.

Assessment and notes on the monitoring results: Favourable conservation status of the habitat for more than half of the sites correlates with the fact that most sites are being used and that the management is provided on 87 % of the sites. Flooded meadows in the alluvium of rivers are characterized by high productivity and are usually mowed twice a year. Grazed sites are often mowed with subsequent grazing. Unfavourable habitat quality occurs at sites which were intensely used in the past or are not appropriately managed. Very important factor influencing the species composition and the occurrence of characteristic species is the timing and duration of floods, which vary



year to year. Species-rich alluvial meadows with the best quality are located in the floodplains of the rivers Morava, Dunaj, Nitra (its lower part), Ipeľ and Latorica. For sites that are flooded only occasionally, the habitat quality is low, often borderline with inclusion to this habitat type. Restoration of regular floods could lead to an increase in the quality of the habitat. This would have to be accompanied by large-area restoration of the hydrological regimes of lowland river systems, which is not very realistic at present. At sites in inadequate condition it is necessary to restore regular utilization which could eliminate the problematic indigenous and invasive species. Many rare species were recorded in the PMLs, such as *Allium angulosum*, *Clematis integrifolia*, *Cnidium dubium*, *Lythrum virgatum*, *Scutellaria hastifolia*, *Viola pumila*, *Oenanthe silaifolia*.

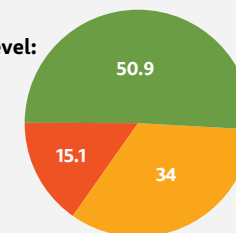
Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: PAN: U1

Conservation status in SCIs: U1

Overall conservation status on national level: U1



By bioregion:



6510 Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*)

Habitat includes mesophilic grasslands, which represent the most widespread type of semi-natural grasslands in Slovakia. These are mostly high to medium high grasslands with a prevalence of grasses and broadleaved herbs.

Number of PMLs: 630

PML average area size: 9.2 ha

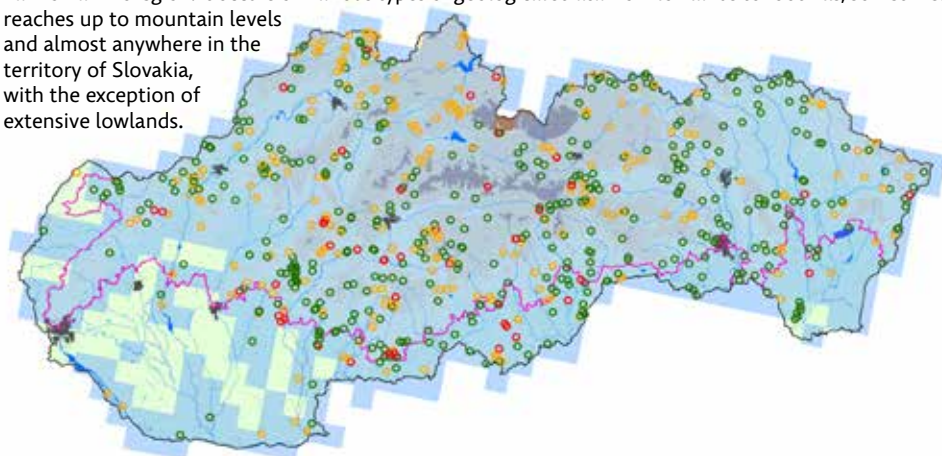
Number of involved experts: 43 Number of PML field visits: 631

Average taxon count on record: 65

Typical species found in the PMLs: *Dactylis glomerata*, *Arrhenatherum elatius*, *Plantago lanceolata*, *Trifolium pratense*, *Ranunculus acris*, *Campanula patula*, *Leucanthemum vulgare*, *Festuca rubra*, *Acetosa pratensis*, *Alopecurus pratensis*, *Festuca pratensis*, *Rhinanthus minor*, *Carum carvi*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. Time period for data collection was between 15th of May (in lower altitude) until 15th of July. Grasslands not mowed or mowed later could be monitored until end of August.

Habitat distribution and localization of PMLs: Habitat is widely distributed in both the Alpine and the Pannonian Bioregion. It occurs on various types of geological strata from lowlands to foothills, sometimes reaches up to mountain levels and almost anywhere in the territory of Slovakia, with the exception of extensive lowlands.



Monitoring results:

Estimate of trend of habitat development: ALP: –

PAN: –

Habitat quality in PMLs:

ALP: 67.1 29.3 3.6

PAN: 64 29 7

Overall habitat quality:

ALP: U1

PAN: U1

Habitat management in PMLs:

ALP: 73.8 26.2

PAN: 70 30

Habitat prospects in PMLs:

ALP: 63.3 30.6 6.1

PAN: 63 29 8

Overall prospects of habitat:

ALP: U1

PAN: U1

Pressures and threats: The most common negative pressures, of medium to high intensity, include succession (39 %), lack of grazing (28 %) and mowing (15 %) in the Alpine Bioregion. Similar negative pressures are also prevailing in the Pannonian Bioregion (succession 28 %, the absence of grazing 39 % and species invasion 16 %).

Assessment and notes on the monitoring results: Habitat quality of monitored sites in the Alpine and the Pannonian Bioregion is favourable in more than 60 % of sites and unfavourable in almost 30 % of the sites. The reason for the unfavourable status is mainly the lack of regular utilization and ruderalisation at some of these sites. In the Alpine Bioregion 80 % of the sites are at least partially mowed, 16 % are grazed. In the Pannonian Bioregion 87 % of the sites are mowed and 7 % are grazed. Lowland hay meadows are among the most productive grasslands and are therefore very often intensively exploited, especially in the areas of Slovakia where the prevalence of livestock production is increasing. At several sites, especially in the Pannonian Bioregion, the habitat is invaded by several ruderal species due to intensification and eutrophication. Disruption of formations and creation of conditions for distribution of ruderal species is also often caused by outdoor activities, construction of roads and by proximity to human settlements.



© Viera Šefferová Stanová



© Vladimír Klč

the other hand, especially in the Alpine Bioregion, there are numerous sites that are used poorly and where the habitat is subject to successional changes. The optimal management measures consist of regular annual mowing and biomass removal. High quality and optimally utilized formations are species-rich and several rare species can be found on them such as *Gymnadenia conopsea*, *Orchis mascula* subsp. *signifera*, *O. morio*, *Gladiolus imbricatus*, *Gentiana cruciata*, *Trautsteinera globosa*.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN: U1

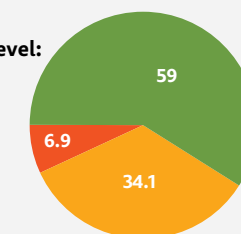
Conservation status in SCIs: U1

Overall conservation status on national level: U1

By bioregion:

ALP: 58.4 35.2 6.4

PAN: 62 29 9



6520 Mountain hay meadows

Habitat consists mostly of multi-layered, floristically medium-rich to rich mountain mesophilic meadows with prevalence of broad-leaved plants and grass species.

Number of PMLs: 66 **PML average area size:** 6.5 ha

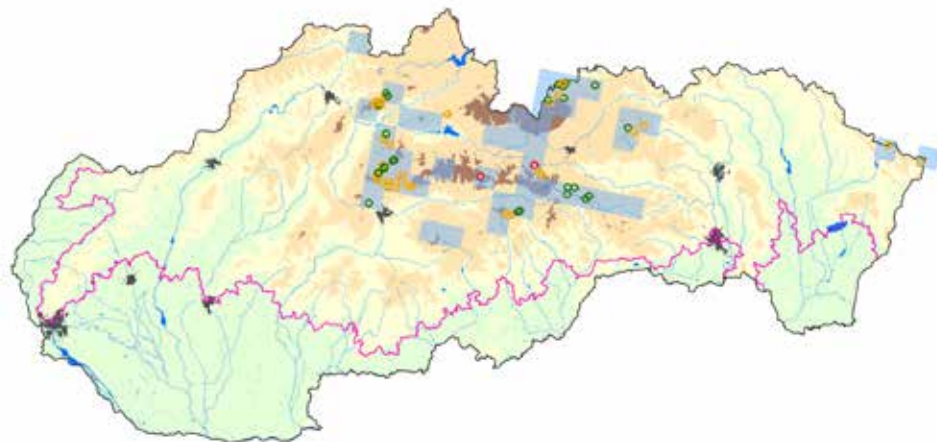
Number of involved experts: 13 **Number of PML field visits:** 66

Average taxon count on record: 63

Typical species found in the PMLs: *Geranium sylvaticum*, *Trisetum flavescens*, *Cardaminopsis halleri*, *Agrostis capillaris*, *Phyteuma spicatum*, *Crepis mollis*, *Campanula serrata*, *Pimpinella major*, *Trollius altissimus*, *Crocus discolor*, *Astrantia major*, *Knautia maxima*, *Lilium bulbiferum*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of September.

Habitat distribution and localization of PMLs: The habitat distribution is currently centred in the Alpine Bioregion. Due to the mosaic and small-scale distribution and also due to the occurrence of rare, threatened, legally protected and endemic taxa the habitat can be described as rare.



Monitoring results:

Estimate of trend of habitat development: ALP: –

PAN:

Habitat quality in PMLs:

ALP: 55.9 **41.2** **2.9**

PAN:

Overall habitat quality:

ALP: U1

PAN:

Habitat management in PMLs:

ALP: 52.1 **47.9**

PAN:

Habitat prospects in PMLs:

ALP: 47.1 **50** **2.9**

PAN:

Overall prospects of habitat:

ALP: U1

PAN:

Pressures and threats: The most common negative pressures, of medium to high intensity, include land abandonment and lack of mowing (37 %), biological processes (23 %) and abandonment of grazing / insufficient grazing (13 %).

Assessment and notes on the monitoring results: On most sites (56 %) the quality of the habitat is favourable, nevertheless the overall quality of habitat is assessed as unfavourable. This status is likely the result of land abandonment, lack of mowing or grazing of these sites and inadequate protection, which causes the sites to overgrow with trees and progress in overall succession. Due to the mosaic distribution of the habitat there is a disadvantage for small-scale sites or meadows near houses, which succumb to the successional pressure after abandonment of management as first. This is most evident in the National Parks Nízke Tatry and Poloniny. Top rated PMLs are in the National Park Slovenský raj with the conservation status being completely favourable. However the habitat prospects are not optimal and the overall assessment is unfavourable; up to 3% of PMLs have unfavourable-bad prospects. In order to preserve the habitat in good condition and prevent succession, it is necessary to choose a suitable management that improves the species composition of grassland formations. In the case of mountain hay meadows the species composition is influenced by the adherence to the traditional approach, which has, in some cases, been unchanged for centuries (e.g. village of Liptovská Teplička). Suitable management would in most cases consist of mowing one or twice a year with subsequent fertilization once every 3-10 years. Given that many PMLs are located in poorly accessible areas at higher altitudes, it is recommended to apply either a combination of mowing and grazing, or only grazing by small herds of cattle or flocks of sheep. It is also necessary to remove self-seeding tree species



© Katarína Hegedúšová



© Katarína Hegedúšová

and shrubs. Mountain hay meadows are among the habitats with high number of rare and endangered plant species. The monitored PMLs included the following species *Campanula serrata*, *Dactylorhiza fuchsii*, *Gladiolus imbricatus*, *Gymnadenia conopsea*, *Lilium bulbiferum*, *Listera ovata*, *Platanthera bifolia*, *Soldanella carpatica*, *Trollius altissimus*, *Viola lutea*. The lowest mountain hay meadows occur in Lubochianska dolina valley and Jelenská dolina valley at an altitude of 600 m.a.s.l. The highest situated meadows of this type can be found in Rakytov in Veľká Fatra mountains at an altitude of 1,300 m.a.s.l.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN:

Conservation status in SCIs:

U1

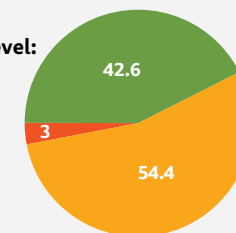
Overall conservation status on national level:

U1

By bioregion:

ALP: 42.6 **54.4** **3**

PAN:



7110* Active raised bogs

The habitat consists of natural, open communities of highly acidic and oligotrophic, ombrotrophic raised bogs with an intact water regime.

Number of PMLs: 8 **PML average area size:** 6,000 m²

Number of involved experts: 3 **Number of PML field visits:** 8

Average taxon count on record: 21

Typical species found in the PMLs: *Picea abies*, *Eriophorum vaginatum*, *Pinus mugo*, *Calluna vulgaris*, *Vaccinium myrtillus*, *Oxycoccus palustris*, *Sphagnum fallax*, *Sphagnum magellanicum*, *Vaccinium vitis-idaea*, *Carex nigra*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of September.

Habitat distribution and localization of PMLs: Habitat occurs in the Alpine Bioregion where it can be found only in the area of Tatry Mountains. Habitat is not recorded in the Pannonian Bioregion.



Monitoring results:

Estimate of trend of habitat development: ALP: –

PAN:

Habitat quality in PMLs:

ALP: 75 **12.5** **12.5**

PAN:

Overall habitat quality:

ALP: U1

PAN:

Habitat management in PMLs:

ALP: 87.5 **12.5**

PAN:

Habitat prospects in PMLs:

ALP: 87.5 **12.5**

PAN:

Overall prospects of habitat:

ALP: FV

PAN:

Pressures and threats: The most frequent negative pressures, of medium to high intensity, include outdoor, sport and recreational activities (50 %) and biological processes (50 %).

Assessment and notes on the monitoring results: The overall status of habitat in the Alpine Bioregion is unfavourable. The situation is the same for Sites of Community Importance. Threats to multiple sites of the habitat result from development of recreational and sport activities, particularly on low-lying bogs (around Štrbské pleso lake). Existing active raised bogs were formed by gradual filling of the lakes by soil in areas of the mountain to subalpine level. Natural threat is represented by primary succession, during which the originally non-forest plant communities pass into forest bogs and bog forests are formed. This is a long-term and irreversible process. From the perspective of human activities, the prospects of the habitat and its protection are relatively favourable. The situation is worse in areas situated in close vicinity to tourist centres. Practically, no management is necessary in case of maintained sites which are not affected by human activities. The succession process is very slow. In some cases it is possible to cut back the bushes every few years. Such intervention performed few years ago had a very positive effect on vitality and number of species of *Andromeda polifolia* in the nature reserve Rašelinisko na Štrbskom Plese. In case of damaged raised bog, the management is quite difficult and focuses mainly on the removal of self-seeding trees.



© Viera ŠeffEROVÁ StanOVÁ



© Daniel Dítě

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN:

Conservation status in SCIs:

Overall conservation status on national level:

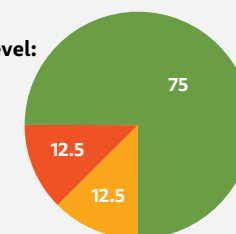
U1

U1

By bioregion:

ALP: 75 **12.5** **12.5**

PAN:



7120 Degraded raised bogs still capable of natural regeneration

Habitat consists of drying raised bogs affected by extraction with anthropogenically disturbed water regime and with altered species composition.

Number of PMLs: 8 PML average area size: 3.4 ha
Number of involved experts: 8 Number of PML field visits: 8
Average taxon count on record: 29

Typical species found in the PMLs: *Picea abies*, *Pinus sylvestris*, *Oxycoccus palustris*, *Vaccinium myrtillus*, *Carex nigra*, *Eriophorum vaginatum*, *Vaccinium uliginosum*, *Vaccinium vitis-idaea*, *Sphagnum fallax*, *Calluna vulgaris*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of September.

Habitat distribution and localization of PMLs: Habitat can be found in the Alpine Bioregion. PMLs are concentrated in the northernmost regions – Orava and area of Tatry Mountains. The habitat is not recorded in the Pannonian Bioregion.



Monitoring results:

Estimate of trend of habitat development: ALP: – PAN:

Habitat quality in PMLs:



PAN:

Overall habitat quality: ALP: U1 PAN:

Habitat management in PMLs:



PAN:

Habitat prospects in PMLs:



PAN:

Overall prospects of habitat: ALP: U1 PAN:

Pressures and threats: The most common negative pressures include human activities in forests (forest management), human-induced changes in hydrological conditions and abiotic (slow) natural and biological processes. Less major threats also result from timber harvesting and problem native species of plants.

Assessment and notes on the monitoring results: The overall status of the habitat in the Alpine Bioregion is unfavourable. Sites are particularly threatened by drainage, which took place in distant past and related vegetation changes. In some cases sites are threatened by forestry activities (insensitive timber harvesting or forestry activities). Sites are characterized by typical raised bog species, in some cases with relatively large population; however, typically well-developed raised bog plant communities can not be found here. Further development depends on advancing succession and changes to hydrological regime especially. The greatest threat results the site being overgrown by self-seeding tree and shrub species, expansion of which causes permanent and irreversible changes in species composition of the vegetation cover.

Despite this fact, several very rare bog species such as *Rhynchospora alba*, *Andromeda polifolia* or *Ledum palustre* have their last and most abundant populations within our country present in this habitat only.



© Viera Šefferyová Stanová



© Jaroslav Košťál

The vast majority of sites are located in the Orava region. Sites are very damaged by drainage or by peat extraction and their regenerations are very difficult. Degradation process slowdown is most desirable in locations of Klinské rašelinské bog, Rudné bog and in the raised bog of Spálený Grúnik National nature reserve. In addition to cutting the self-seeding tree species it is necessary to prevent the water drainage from sites by filling the drainage ditches.

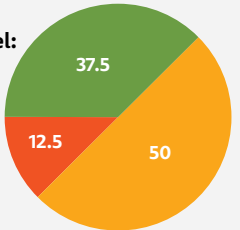
Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN:

Conservation status in SCIs: U1

Overall conservation status on national level: U1



By bioregion:



PAN:

7140 Transition mires and quaking bogs

Habitat forms a transition between the fens and bogs. It also includes nutrient-poor fens, fed by nutrient-poor ground water with acid character.

Number of PMLs: 56 **PML average area size:** 1.3 ha

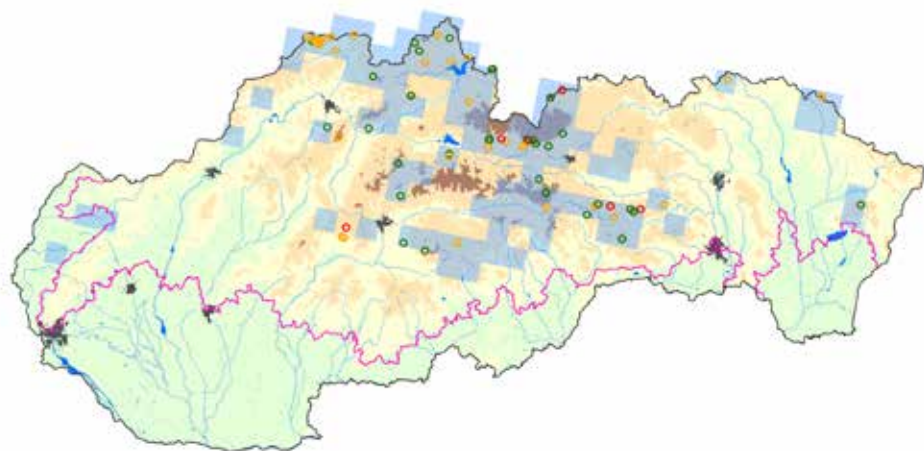
Number of involved experts: 15 **Number of PML field visits:** 56

Average taxon count on record: 44

Typical species found in the PMLs: *Aulacomnium palustre*, *Sphagnum fallax*, *Carex echinata*, *Carex nigra*, *Carex rostrata*, *Eriophorum angustifolium*, *Epilobium palustre*, *Menyanthes trifoliata*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of September.

Habitat distribution and localization of PMLs: Currently, the habitat can be found in the Alpine Bioregion only. It was not recorded in the Pannonian Bioregion. Distribution is centred in northern areas and in areas with high altitude. Habitat is usually located in mosaic pattern together with other wetland communities.



Monitoring results:

Estimate of trend of habitat development: ALP: –

PAN:

Habitat quality in PMLs:

ALP: 60.7 **32.1** **7.2**

PAN:

Overall habitat quality:

ALP: U1

PAN:

Habitat management in PMLs:

ALP: 49 **51**

PAN:

Habitat prospects in PMLs:

ALP: 50 **41.1** **8.9**

PAN:

Overall prospects of habitat:

ALP: U1

PAN:

Pressures and threats: The most common negative pressures, of medium to high intensity, include biological processes (46 %), land abandonment and lack of mowing (20 %), abiotic (slow) natural processes (12 %) and to a lesser extent some other factors.

Assessment and notes on the monitoring results: In the Alpine Bioregion the quality of the habitat in most of the sites is favourable (60 %), nevertheless the habitat is generally in unfavourable condition. This is caused by changes in the hydrological regime (often performed in more or less distant past) and lack of appropriate management or lack of management whatsoever (together 50 %). These facts are related to biological processes and represent a negative factor for almost half of the sites. To maintain good condition of the habitat it is necessary to ensure regular management – mowing – by hand or by light mechanisms that are adjusted to the environment. Mowing was assessed as a positive factor for more than 70 % of PMLs. In addition to provision of management it is important to restore the hydrological regime on the sites in unfavourable condition, implementation of which is quite complex and not always feasible.

The best preserved and most representative sites of this habitat in Slovakia can be found in Orava and Tatry region. The habitat is very rare in other parts of Slovakia. The most typical sites in Slovakia include peatlands near Slaná Voda in Orava region with the occurrence of *Carex limosa*, as well as site Surdíky near Oravská priehrada water dam with the occurrence of relict *Carex magellanica*. In the region of Nízke Tatry mountains the largest site is Barania hlava. Around ten plant species can be found in this extensive but species-poor transitional bog with preserved water regime.



© Daniel Dítě



© Viera Šefferyová Stanová

From the sites situated in south of Slovakia there is an interesting bog in Nature Reserve Jelšovec, where relict species of *Carex dioica* and *Eriophorum gracile* can be found. Also other interesting and rare species were recorded here such as *Carex lasiocarpa*, *Sparganium natans* or moss species *Paludella squarrosa*. The best management practice for these sites consists primarily of removing self-seeding tree species and mowing. In order to maintain the vast majority of sites in favourable conservation status, the maintenance requires an active management.

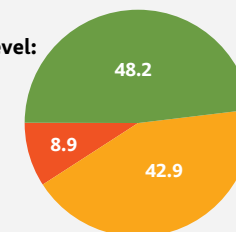
Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN:

Conservation status in SCIs:

Overall conservation status on national level:



By bioregion:

ALP: 48.2 **42.9** **8.9**

PAN:

7210* Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*

The habitat consists of a light-demanding community dominated by *Cladium mariscus* and with representation of calcareous fen species.

Number of PMLs: 4 PML average area size: 6,000 m²

Number of involved experts: 3 Number of PML field visits: 4

Average taxon count on record: 17

Typical species found in the PMLs: *Cladium mariscus*, *Eupatorium cannabinum*, *Lythrum salicaria*, *Phragmites australis*, *Centaurium littorale* subsp. *uliginosum*, *Carex paniculata*, *Carex panicea*, *Carex lepidocarpa*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of September.

Habitat distribution and localization of PMLs: Habitat is extremely rare in Slovakia. In the Alpine and Pannonian Bioregions there are only two sites in either bioregion.



Monitoring results:

Estimate of trend of habitat development: ALP: – PAN: –

Habitat quality in PMLs:

ALP: 100

PAN: 100

Overall habitat quality: ALP: FV PAN: U2

Habitat management in PMLs:

ALP: 95 5

PAN: 100

Habitat prospects in PMLs:

ALP: 100

PAN: 100

Overall prospects of habitat: ALP: FV PAN: U2

Pressures and threats: The most common negative pressures of medium to high intensity include biological processes (50 %) and invasive species (25 %).

Assessment and notes on the monitoring results: The overall status of the habitat in both bioregions is very different. While in the Alpine Bioregion the habitat status and prospects are favourable with suitable management occurring, the Pannonian Bioregion, however, is in unfavourable status with unfavourable – bad prospects. In the Alpine Bioregion we must maintain the current status of the best preserved site of *Cladium mariscus* in Slovakia in National reserve Močiar. There was a gradually expansion of cane in recent years. *Cladium mariscus* itself as a very robust and competitively strong species is not threatened as much as other accompanying species that are part of the habitat. Elimination of the impacts from the reed population



© Viera ŠeffEROVÁ StanOVÁ

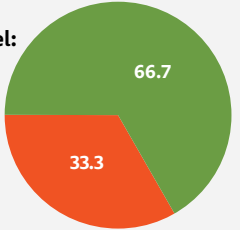


© Viera ŠeffEROVÁ StanOVÁ

growth, which is particularly displayed by accumulation of biomass, may only be achieved by regular maintenance. In the Pannonian Bioregion it is essential to start processes that will lead to the improvement of the habitat status. Occasional mowing must be ensured (once every three years) as first. Stabilization of the water regime in the lakes created after humolite mining is needed at the site of Dolný Bar. This issue is crucial. Currently, there is significant water level fluctuation, it overflows and subsequently the substrate dries out, which results in the retreat of several fen species (e.g. *Carex viridula*). *Cladium mariscus* itself is not much affected by these difficulties; on the contrary, the population of this species is increasing. In case of the Pannonian sites, the main goal is not only the preservation of the habitat, but also maintenance of the species itself in the flora of Slovakia, as with only four sites this species can be considered as one of our rarest plant species.

Overall assessment of the conservation status of habitat

Conservation status on national level:
Overall habitat status: ALP: FV PAN: U2
Conservation status in SCIs: U1 U1
Overall conservation status on national level:



By bioregion:

ALP: 100

PAN: 100

7220* Petrifying springs with tufa formation (*Cratoneurion*)

Small-scale widespread communities of limestone springs with alkaline and oxygen-rich cold water and dissolved calcium cations which precipitate on vegetation and form tufa structures.

Number of PMLs: 38 **PML average area size:** 1,400 m²

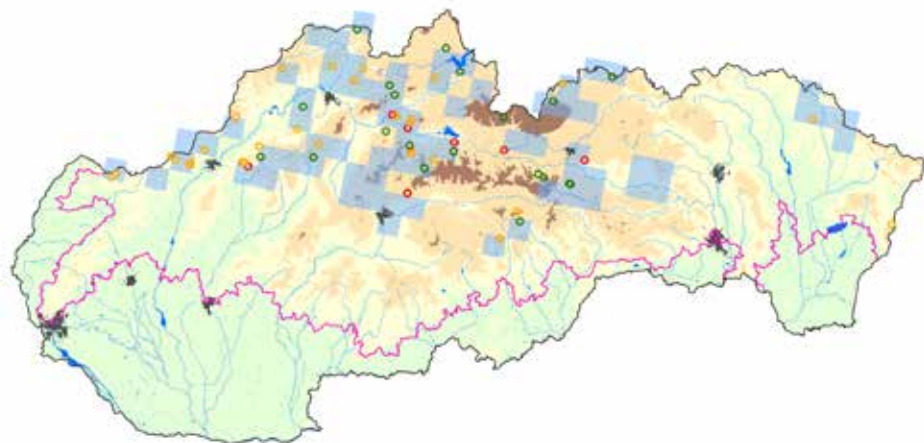
Number of involved experts: 15 **Number of PML field visits:** 38

Average taxon count on record: 34

Typical species found in the PMLs: *Potentilla erecta*, *Eupatorium cannabinum*, *Bryum pseudotriquetrum*, *Carex flacca*, *Carex panicea*, *Juncus articulatus*, *Palustriella commutata*, *Eriophorum angustifolium*, *Eriophorum latifolium*, *Cratoneuron fillicinum*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of September.

Habitat distribution and localization of PMLs: The centre of current distribution is in the Alpine Bioregion. It is usually located in a complex with other wetland communities, usually with alkaline fens.



Monitoring results:

Estimate of trend of habitat development: ALP: –

PAN:

Habitat quality in PMLs:

ALP: 64.9 **24.3** **10.8**

PAN:

Overall habitat quality:

ALP: U1

PAN:

Habitat management in PMLs:

ALP: 50.4 **49.6**

PAN:

Habitat prospects in PMLs:

ALP: 32.4 **54.1** **13.5**

PAN:

Overall prospects of habitat:

ALP: U1

PAN:

Pressures and threats: The most common negative pressures include biological processes (28 %) and human-induced hydrological changes (more than 11 %). The negative factors also include forestry activities (afforestation), species invasions and sports and outdoor activities.

Assessment and notes on the monitoring results: The overall status of the habitat is unfavourable. The situation is the same for Sites of Community Importance. In the Alpine Bioregion the quality of the habitat is favourable only in 32 % of the sites, the same are the prospects of the habitat. In order to preserve this habitat it is essential to maintain the water regime. In the past, a large number of sites disappeared due to interception of springs, and this fact threatens several locations even today. To conserve the natural habitat conditions, the habitat requires virtually no management, with its extremity and dynamics being sufficient to maintain it. Mowing or extensive grazing should be ensured for the less active tufa spring areas especially. The current status and distribution of habitat is influenced by intensive interception of springs for water supply network needs in late 60s and early 70s in the last century, to some extent it still continues in present time. Probably the largest tufa springs in Slovakia were damaged this way – natural monuments of Jazierske travertíny travertines and Bukovinka at the foot of the Veľká Fatra Mountains south of Ružomberok. The sites are interesting despite the fact that only fragments of the original quality and size of the habitat have survived here.



© Mário Duchoň



© Mário Duchoň

The rarest species of this habitat in Slovakia, *Cochlearia pyrenaica*, can be found only at these sites. There are, however, also several types of fen species present, such as *Pinguicula vulgaris* or *Primula farinosa*. The occurrence of *Ophrys holubyana* on tufa springs in the Biele Karpaty mountains is very interesting. Springs are threatened due to their small size especially, which is often only a few dozen square meters. In order to maintain their favourable status it is therefore, in addition to maintaining the water regime, necessary to limit disturbance of their immediate surroundings avoiding intensive grazing or construction activities.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN:

Conservation status in SCIs:

Overall conservation status on national level:

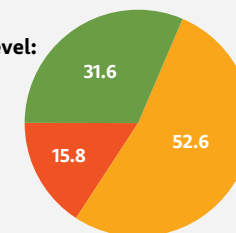
U1

U1

By bioregion:

ALP: 32.4 **51.4** **16.2**

PAN:



7230 Alkaline fens

Habitat consists of light-demanding communities of calcareous fens and fen meadows rich in mineral nutrients.

Number of PMLs: 113

PML average area size: 1 ha

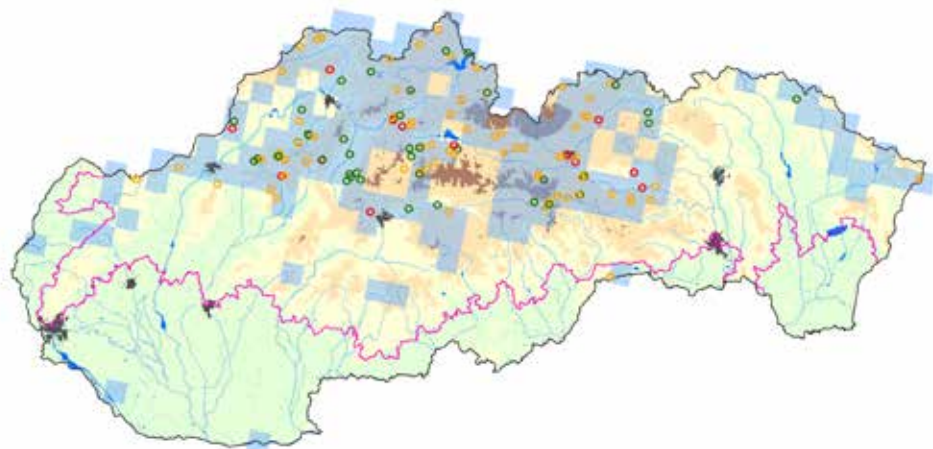
Number of involved experts: 18 **Number of PML field visits:** 113

Average taxon count on record: 60

Typical species found in the PMLs: *Bryum pseudotriquetrum*, *Carex davalliana*, *Drepanocladus cossonii*, *Epipactis palustris*, *Eriophorum latifolium*, *Gymnadenia densiflora*, *Parnassia palustris*, *Tomenthypnum nitens*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of May to 30th of September.

Habitat distribution and localization of PMLs: Current distribution is centred in the Alpine Bioregion with the habitat being very rare in the Pannonian Bioregion. It is usually found in a mosaic together with other wetland communities.



Monitoring results:

Estimate of trend of habitat development: ALP: –

PAN: –

Habitat quality in PMLs:

ALP: 53.6 **42.9** **3.5**

PAN: 100

Overall habitat quality: ALP: U1

PAN: U1

Habitat management in PMLs:

ALP: 40.0 **60.0**

PAN: 100

Habitat prospects in PMLs:

ALP: 32.1 **58** **9.9**

PAN: 100

Overall prospects of habitat: ALP: U1

PAN: U1

Pressures and threats: The most common negative pressures, of medium to high intensity, are abandonment of land and lack of mowing (80 %), succession (56 %) and drying out (42 %).

Assessment and notes on the monitoring results: In the Alpine Bioregion the habitat quality in most of the sites is favourable (51 %). Nevertheless, the habitat is generally in unfavourable condition here, as well as in the Pannonian Bioregion. The most likely reason are changes to hydrological regime and a lack of appropriate management or lack of management whatsoever (together 82 %). These reasons are most frequently noted pressures and threats. In the Pannonian Bioregion the prospects of the habitat are unfavourable because the habitat has been preserved in small fragments only. This is surrounded by intensively managed agricultural land. In the Alpine Bioregion, the situation is only slightly better and 32 % of the sites are assessed to be in overall favourable status. To maintain the good condition of the habitat it is necessary to ensure regular management, mowing, by hand or by light mechanisms that are adjusted to the environment. It is necessary to restore the hydrological regime at sites which are in unfavourable condition, reduce pollution from agricultural land in the area, etc. Examples of properly and regularly managed sites include several locations in Turčianska kotlina Basin (Rakša, Pribovce), in the foothills of Nízke Tatry Mountains (Demänovská slatina, Sliacké travertíny) or at the well-known Rojkovské rašelinisko mire. On the other hand, more attention is required for habitats in Orava region or in the foothills of Západné and Vysoké Tatry Mountains, where the largest well-preserved areas of fens with high bases content in Slovakia can be found. Very important fact in the maintenance measures is the removal of biomass from the fen area. Otherwise



© Zuzana Plesková



© Zuzana Plesková

the habitat is enriched by nutrients, which is accompanied by the onset of competitively stronger species and the retreat of competitively weak, often very rare plant species. Several rare species were recorded in the PMLs such as *Carex dioica*, *Carex hostiana*, *Dactylorhiza incarnata*, *Pedicularis sceptrum-carolinum* or *Triglochin maritima*. The most valuable glacial moss relics found here are the species of *Meesia triquetra*, *Pseudocalliergon trifarium* and *Scorpidium scorpioides*.

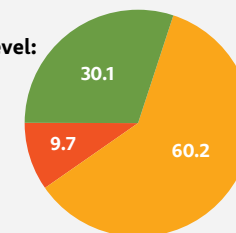
Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN: U1

Conservation status in SCIs: U1

Overall conservation status on national level: U1



By bioregion:



8110 Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*)

Habitat of species-poor to species-rich, weakly connected communities on acidic to neutral rock scree and scree fields in the highest altitude areas.

Number of PMLs: 13

PML average area size: 9 ha

Number of involved experts: 4

Number of PML field visits: 13

Average taxon count on record: 28

Typical species found in the PMLs: *Oreochloa disticha*, *Campanula alpina*, *Luzula alpinopilosa*, *Carex sempervirens*, *Ranunculus pseudomontanus*, *Silene acaulis*, *Doronicum stiriaticum*, *Campanula tatrae*, *Sedum alpestre*, *Festuca supina*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of August.

Habitat distribution and localization of PMLs: Habitat occurrence is restricted to silicate parts of the highest mountain ranges only – Vysoké Tatry Mountains and Nízke Tatry Mountains. Marginally it also occurs at Babia Hora Mountain and Pilsko Mountain.



Monitoring results:

Estimate of trend of habitat development: ALP: +

PAN:

Habitat quality in PMLs:

ALP: 76.9 23.1

PAN:

Overall habitat quality:

ALP: FV

PAN:

Habitat management in PMLs:

ALP: 91.5 8.5

PAN:

Habitat prospects in PMLs:

ALP: 100

PAN:

Overall prospects of habitat:

ALP: FV

PAN:

Pressures and threats: Habitat is not threatened by any significant threat. Negative impacts recorded at PMLs are posed by trampling and over utilization.

Assessment and notes on the monitoring results: Good habitat quality was recorded at nearly 77 % of the monitored sites. Areas assessed as poor include PMLs of Pilsko and Babia Hora Mountain. Both sites represent a marginal habitat occurrence in the northern part of Orava region. The sites are small-scaled, partially stabilized and overgrown by successional trees. In the Vysoké Tatry Mountain region the only site assessed as unfavourably-inadequate was PML Svišťovka, where the monitored scree is stable and heavily overgrown by species of *Juncus trifidus*, *Oreochloa disticha* and *Festuca supina*. Better quality places for monitoring purposes with the occurrence of this habitat are located on the north-facing slopes of the ridge, towards Zelené pleso lake.



Oreochloa disticha © Jozef Šibík



© Jozef Šibík

Habitat prospects are assessed as favourable in all PMLs. Estimate of the development trend of the habitat is thus increasing, and it can be expected that the current favourable status will be maintained.

More than 90 % of the sites show suitable management of the area. The most appropriate management consists of leaving the sites without any interventions; outdoor, sport and recreational activities should be regulated in the regions with strong erosion. Excessive trampling of the vegetation can be found on the most visited hiking trails.

Several rare or endemic plant species were recorded during monitoring of individual PMLs, such as *Armeria alpina*, *Cochlearia tatrae*, *Cardaminopsis neglecta*, *Saxifraga carpatica*, *Saxifraga wahlenbergii* and others.

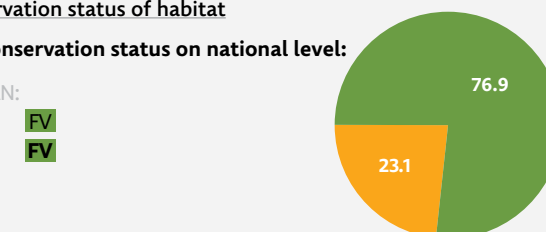
Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: FV PAN:

Conservation status in SCIs:

Overall conservation status on national level:



By bioregion:

ALP: 76.9 23.1

PAN:

8120 Calcareous and calshist screes of the montane to alpine levels (*Thlaspietalia rotundifolii*)

Loosened almost closed pioneer communities growing on limestone and dolomite rocky scree in the alpine and subalpine level.

Number of PMLs: 9 PML average area size: 5.9 ha

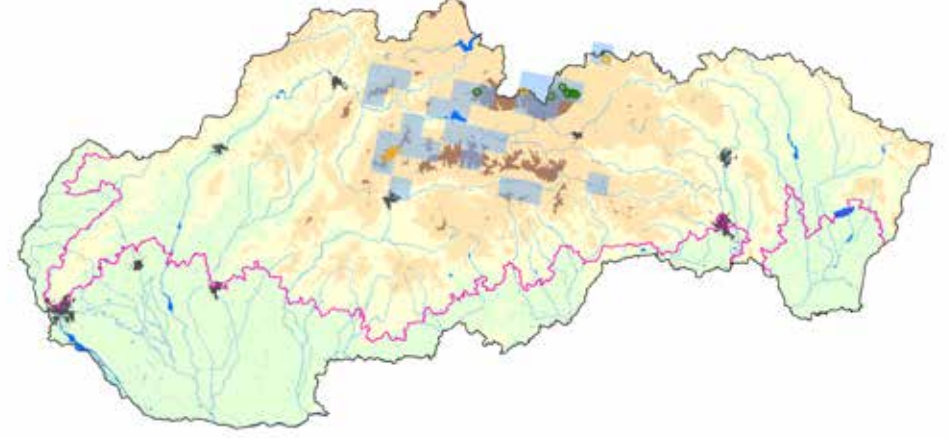
Number of involved experts: 2 Number of PML field visits: 9

Average taxon count on record: 43

Typical species found in the PMLs: *Festuca versicolor*, *Galium anisophyllum*, *Bistorta vivipara*, *Campanula tratrae*, *Carex firma*, *Dryas octopetala*, *Rhodax alpestris*, *Biscutella laevigata*, *Carex sempervirens*, *Pedicularis verticillata*, *Saxifraga aizoides*, *Saxifraga caesia*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of August.

Habitat distribution and localization of PMLs: In Slovakia the habitat can be found in all the mountains which are developed on carbonate parts of highest mountains, especially in Belianske Tatry, Pieniny, Malá Fatra, Veľká Fatra, Nízke Tatry.



Monitoring results:

Estimate of trend of habitat development: ALP: + PAN:

Habitat quality in PMLs:

ALP: 88.9 11.1

PAN:

Overall habitat quality: ALP: FV PAN:

Habitat management in PMLs:

ALP: 85.6 14.4

PAN:

Habitat prospects in PMLs:

ALP: 88.9 11.1

PAN:

Overall prospects of habitat: ALP: FV PAN:

Pressures and threats: Habitat is not threatened by significant threats. Trampling, over-exploitation and also succession to a small extent are negative pressures recorded at PMLs.

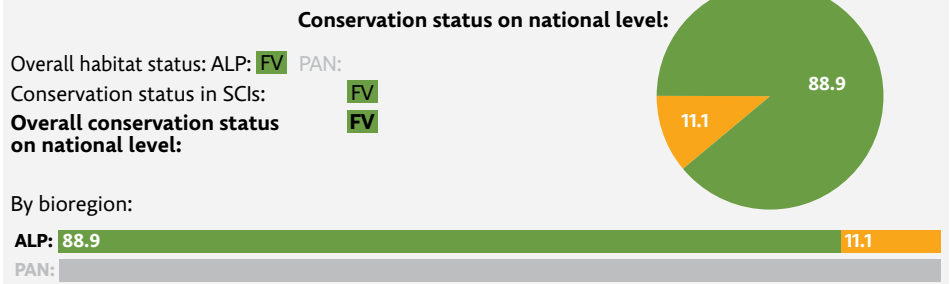
Assessment and notes on the monitoring results: The quality of the habitat is favourable at almost 90 % of the monitored sites and the prospects for the habitat are equally favourable. The estimate of the development trend is therefore increasing; more precisely the current status will not worsen. The only PML, which is assessed as unfavourable-bad, is PML Štrky and it is located in Tichá dolina valley in the Západné Tatry Mountains. Habitat occurs only on 50 % of the monitored area, the rest of the area is stabilized, overgrown by trees such as *Prunus spinosa*, *Salix caprea*, *Picea abies* and *Acer pseudoplatanus*. Status of



the habitat at this PML is favourable, with species composition typical for the habitat. It would be feasible to adjust the size of the monitored site to actual occurrence of the habitat in the future. Suitable maintenance of the area, which consists of absence of any interference, is recorded at 85 % of the sites. The presence of an excessive amount of recreational and outdoor activities can result in trampling and damage of vegetation. Maintenance of soft moving scree is important for the quality of habitat and it also ensures its typical species composition.

Several rare and endemic plant species were recorded during monitoring, such as *Arenaria tenella*, *Oxytropis carpatica*, *Primula halleri* subsp. *platyphylla*, *Petrocallis pyrenaica*, *Pseudorchis albidus*, *Saxifraga cernua* and others.

Overall assessment of the conservation status of habitat



8150 Medio-European upland siliceous screes

Sparse and species-poor pioneer communities growing on soft silicate rock screes in uplands and sub-montane areas.

Number of PMLs: 11 **PML average area size:** 3,300 m²

Number of involved experts: 4 **Number of PML field visits:** 11

Average taxon count on record: 26

Typical species found in the PMLs: *Dalanum ladanum*, *Polypodium vulgare*, *Hylotelephium maximum*, *Vincetoxicum hirundinaria*, *Geranium robertianum*, *Hypericum perforatum*, *Acetosella vulgaris*, *Steris viscaria*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of August.

Habitat distribution and localization of PMLs: Occurrence of the habitat is centred mainly in the mountains of Tribeč, Vtáčnik, Cerová vrchovina, Štiavnické vrchy and other neo-volcanic mountain ranges in Slovakia.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN: 0

Habitat quality in PMLs:

ALP: 85.7 **14.3**

PAN: 100

Overall habitat quality: ALP: **FV**

PAN: **U1**

Habitat management in PMLs:

ALP: 92.1 **7.9**

PAN: 50 **50**

Habitat prospects in PMLs:

ALP: 85.7 **14.3**

PAN: 100

Overall prospects of habitat: ALP: **FV**

PAN: **U1**

Pressures and threats: Habitat has no significant threats. Negative pressures recorded at PMLs include mainly mining and quarrying and outdoor, sport and recreational activities.

Assessment and notes on the monitoring results:

The overall negative status is a result of unfavourable-inadequate prospects and the quality of the habitat in the Pannonian Bioregion, which is also reflected in the overall assessment of the whole area. In the Alpine Bioregion, the prospects and quality of the habitat are assessed as favourable at more than 85 % of the sites. Only one site was assessed as unfavourable-inadequate in this bioregion – PML Predajná within Natural Monument Jajkovská sutina in the Slovenské Rudohorie Mountains. In order to preserve the favourable conservation status of the habitat it is essential to keep the scree free. Low ability of the soft substrate to retain humidity and its high acidity ensures preservation of typical species of this habitat. More than 92 % of the sites in the Alpine Bioregion are maintained appropriately. However, eutrophication together with excessive trampling of vegetation is often present in habitats



near to hiking trails. It is feasible to regulate these activities in case this impact becomes more significant. Up to 50 % of the sites in the Pannonian Bioregion are under unfavourable management, especially in the area of Cerová vrchovina Highland (PML Pohanský hrad, Šomoška, Steblová skala). This is a result of poorly regulated recreational activities, excessive trampling, onset of nitrophilous and invasive species (e.g. *Robina pseudoacacia*) in sites where eutrophication takes place. As for the development trend it can be expected that the Alpine and Pannonian Bioregion maintains its current status, or that the current status will not worsen. Occurrence of several interesting species was recorded at certain monitoring sites, such as *Buxbaumia viridis* and *Teucrium scorodonia*.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: **FV** PAN: **U1**

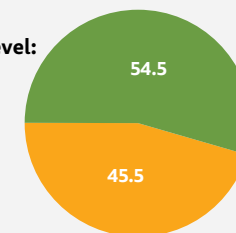
Conservation status in SCIs: **U1**

Overall conservation status on national level: **U1**

By bioregion:

ALP: 85.7 **14.3**

PAN: 100



8160* Medio-European calcareous scree of hill and montane levels

Environmentally wider group of heliophilous and shade-demanding plant communities on soft screes of carbonate rocks from highlands to mountain areas.

Number of PMLs: 35 **PML average area size:** 5,200 m²

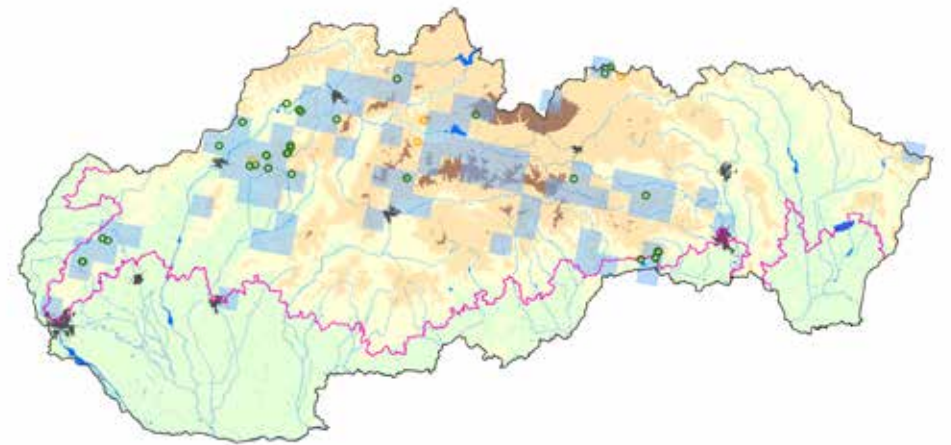
Number of involved experts: 12 **Number of PML field visits:** 36

Average taxon count on record: 36

Typical species found in the PMLs: *Geranium robertianum*, *Vincetoxicum hirundinaria*, *Sedum album*, *Galium album*, *Myelis muralis*, *Teucrium chamaedrys*, *Jovibarba globifera*, *Cardaminopsis arenosa*, *Gymnocarpium robertianum*, *Hylotelephium maximum*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of August.

Habitat distribution and localization of PMLs: In Slovakia the habitat can be found scattered in lower elevations of limestone and dolomite mountain ranges.



Monitoring results:

Estimate of trend of habitat development: ALP: + PAN: +

Habitat quality in PMLs:

ALP: 91.4 **8.6**

PAN: 100

Overall habitat quality: ALP: **FV** PAN: **FV**

Habitat management in PMLs:

ALP: 91.4 **8.6**

PAN: 100

Habitat prospects in PMLs:

ALP: 91.4 **8.6**

PAN: 100

Overall prospects of habitat: ALP: **FV** PAN: **FV**

Pressures and threats: Habitat has no significant threats. Negative pressures recorded for this PML include mainly succession and outdoor, sport and recreational activities.

Assessment and notes on the monitoring results: Quality of the habitat on monitored PMLs was assessed as favourable for all sites in the Pannonian Bioregion and for more than 91 % of sites in the Alpine Bioregion. Sites with unfavourable-inadequate conservation status include PML Omšenská Baba in Strážovské vrchy Mountains and PML Kýčera in Pieniny Mountains. While at the first PML the habitat was not confirmed, the second one is overgrown with successional trees (*Prunus spinosa*, *Corylus avellana*) on 20 % of its area, with part of the PML being covered by expansive species of grass, *Calamagrostis varia*.

Site management is assessed as favourable in both the Alpine and Pannonian Bioregions. The most suitable way of maintaining areas with moving scree is to leave the area to



© Mário Duchon



© Róbert Šuvada

self-development. In case an overgrowth by successional scrub and subsequent stabilization of the substrate is recorded, removal of tree species is recommended. Sites which are used by tourists may be affected by increased erosion, eutrophication or trampling of vegetation. In the case of high intensity of these pressures it is feasible to regulate the outdoor, sport and recreational activities. Shaded and damp, nutrient-rich scree can be penetrated by non-indigenous, invasive plant species (e.g. *Impatiens parviflora*). Habitat prospects are assessed as favourable in both bioregions, with the trend estimate increasing; more precisely the habitat status will not worsen.

Several rare species of plants were recorded during monitoring, such as *Aconitum firmum* subsp. *moravicum* and *Campanula xylocarpa*.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: **FV** PAN: **FV**

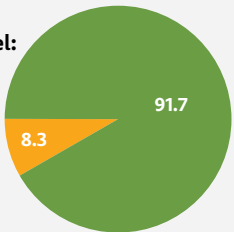
Conservation status in SCIs: **FV**

Overall conservation status on national level: **FV**

By bioregion:

ALP: 91.4 **8.6**

PAN: 100



8210 Calcareous rocky slopes with chasmophytic vegetation

Pioneer communities of plants that colonize the sun-exposed to shaded rock crevices and rock terraces in limestone and dolomite mountains.

Number of PMLs: 42 **PML average area size:** 0.74 ha

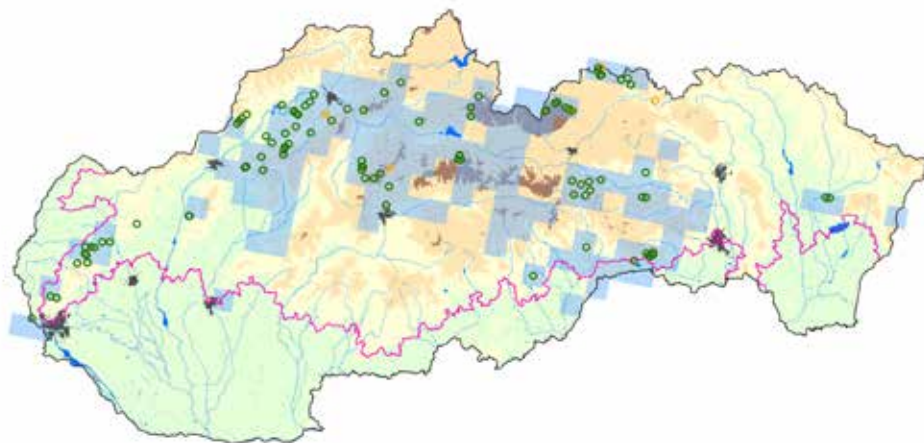
Number of involved experts: 10 **Number of PML field visits:** 42

Average taxon count on record: 34

Typical species found in the PMLs: *Asplenium trichomanes*, *Asplenium ruta-muraria*, *Cystopteris fragilis*, *Cardaminopsis arenosa*, *Geranium robertianum*, *Allium senescens* subsp. *montanum*, *Jovibarba globifera*, *Polypodium vulgare*, *Campanula carpatica*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of August.

Habitat distribution and localization of PMLs: Habitat can be found in all carbonate mountains in Slovakia.



Monitoring results:

Estimate of trend of habitat development: ALP: +

PAN: +

Habitat quality in PMLs:

ALP: 100

PAN: 100

Overall habitat quality: ALP: **FV**

PAN: **FV**

Habitat management in PMLs:

ALP: 97.6

PAN: 100

Habitat prospects in PMLs:

ALP: 95.1

PAN: 100

Overall prospects of habitat: ALP: **FV**

PAN: **FV**

Pressures and threats:

Habitat has no significant threats. Negative pressures recorded for the PML include mainly succession and outdoor, sport and recreational activities.

Assessment and notes

on the monitoring results:

Quality of the habitat in all monitored sites was assessed as favourable and it is one of the best assessed habitats in Slovakia overall. Two main types of the habitat were recorded during the monitoring. The first includes communities on shaded and damp rock walls, with rich representation of mosses

and ferns occurring mostly in narrow valleys and on north-facing rock walls. The second type includes sun-exposed communities in rock crevices where the coverage of herbaceous level often does not even reach 10 % and the species composition is influenced by surrounding grassland communities. Maintenance of the area is rated as very good with the most appropriate method being absence of any intervention. In

some areas succession was recorded, however, it is limited by nature of the habitat and does not affect its quality. In case erosion occurs at places of excessive use of the site by tourist, the activities should be regulated or diverted. Prospects of the habitat are favourable for all PMLs in the Pannonian Bioregion and for 95 % of sites in the Alpine Bioregion. An estimate of the development trend is therefore increasing; more precisely status of the habitat should not worsen. Several rare and endemic plant species were recorded during monitoring, such as *Alyssum tortuosum* subsp. *heterophyllum*, *Astragalus penduliflorus*, *Campanula xylocarpa*, *Ceterach javorkeanum*, *Dendranthema zawadskii*, *Draba lasiocarpa* subsp. *klasterskyi*, *Petrocallis pyrenaica* and others.



© Róbert Šuvada



© Richard Watzka

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: **FV** PAN: **FV**

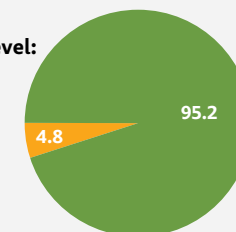
Conservation status in SCIs: **FV**

Overall conservation status on national level: **FV**

By bioregion:

ALP: 95.1

PAN: 100



8220 Siliceous rocky slopes with chasmophytic vegetation

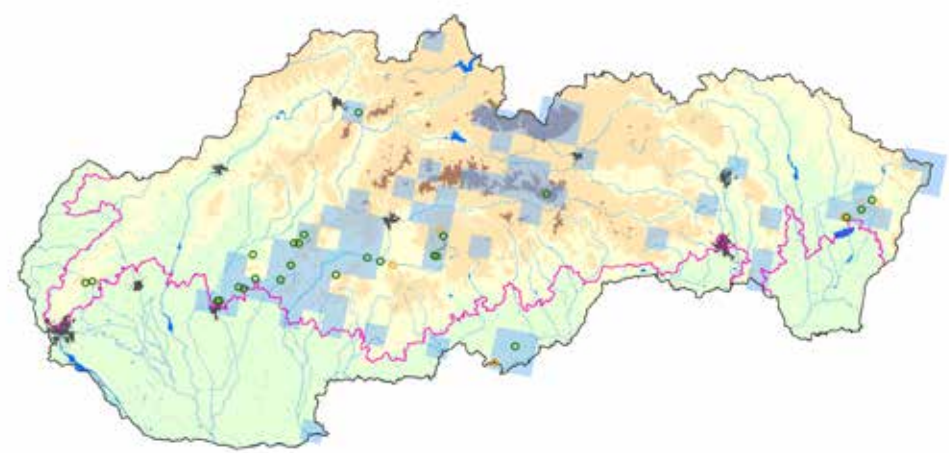
Floristic poor pioneer communities colonizing rock crevices and rock terraces in the mountains with silicate rocks from highlands to alpine levels.

Number of PMLs: 27 PML average area size: 1.1 ha
Number of involved experts: 9 Number of PML field visits: 28
Average taxon count on record: 25

Typical species found in the PMLs: *Polypodium vulgare*, *Asplenium trichomanes*, *Asplenium septentrionale*, *Geranium robertianum*, *Cardaminopsis arenosa*, *Hylotelephium maximum*, *Cystopteris fragilis*, *Woodsia ilvensis*, *Acetosella vulgaris*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of June to 30th of August.

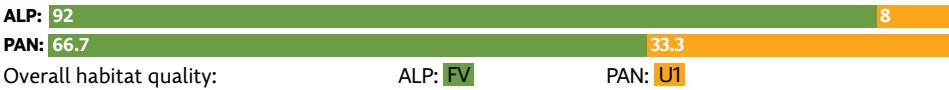
Habitat distribution and localization of PMLs: Habitat can be found on silicate rocks in core and neo-volcanic mountains in Slovakia.



Monitoring results:

Estimate of trend of habitat development: ALP: + PAN: +

Habitat quality in PMLs:



Habitat management in PMLs:



Habitat prospects in PMLs:



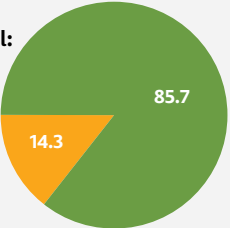
Pressures and threats: Habitat has no significant threats. Negative pressures recorded for the PML include mainly succession and outdoor, sport and recreational activities.

Assessment and notes on the monitoring results: The habitat status is assessed as unfavourable-inadequate in the Pannonian Bioregion and as favourable in the Alpine Bioregion. Sites in inadequate condition include PML Šomoška in Cerová vrchovina Highland, which is a sun-exposed rock wall directly under the castle tower with a mosaic of rocky crevice and grasslands vegetation. The area is in close proximity to a tourist trail and recreational activities are negatively affecting the habitat. A part of the site is affected by eutrophication. Other habitats assessed as unfavourable-inadequate include the PML Pod Veprom at Poľana Mountain and PML Zalužná near town of Zvolen. These are partially shaded areas with low coverage of herbaceous layer dominated by ferns *Polypodium vulgare* and *Athyrium filix-femina*. Habitat is in very good condition on certain places of both sites, however, certain part of the area was assessed as unfavourable-inadequate and therefore overall status of these PMLs is unfavourable-inadequate. Two bioregions differ also in the quality of habitats and its prospects. While in the Alpine Bioregion the habitat prospects are favourable, in the Pannonian Bioregion the outcome is unfavourable-inadequate. Estimate of the development trend of the habitat is nevertheless increasing for both bioregions; more precisely the current national level will not get worse mainly due to absence of significant threats. Succession was recorded at some areas; however, it is still limited by nature of the habitat (just as it is in case of carbonate rock walls and slopes) and does not have any significant influence. The most appropriate management means absence of any interventions. Several interesting species have been recorded on the monitored sites, such as *Lychnis coronaria* and *Woodsia ilvensis*.



Overall assessment of the conservation status of habitat

Conservation status on national level:
Overall habitat status: ALP: FV PAN: U1
Conservation status in SCIs: FV FV
Overall conservation status on national level:



By bioregion:



8230 Siliceous rock with pioneer vegetation of the *Sedo-Scleranthion* or of the *Sedo albi-Veronicion dillenii*

Pioneer community with dominance of succulent and annual species on shallow, nutrient-poor, silicate soils on rocks and rocky slopes in lower and medium altitudes.

Number of PMLs: 12 PML average area size: 3,900 m²

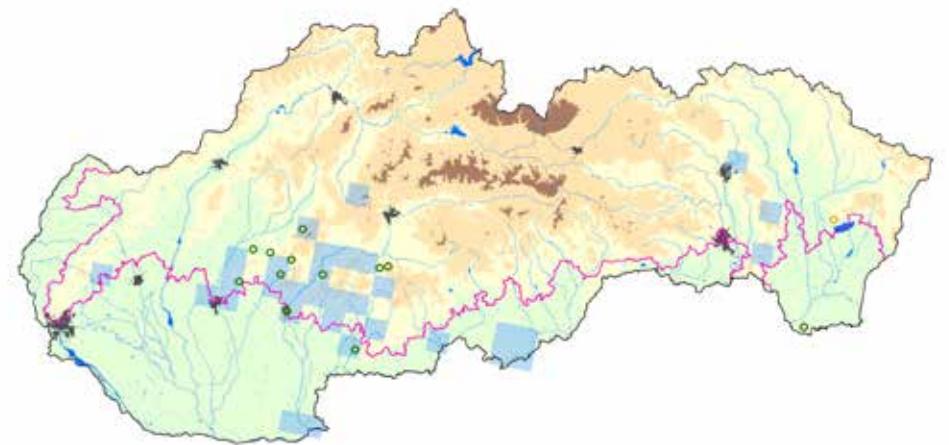
Number of involved experts: 4 Number of PML field visits: 12

Average taxon count on record: 29

Typical species found in the PMLs: *Sedum acre*, *Sedum sexangulare*, *Poa bulbosa*, *Acetosella vulgaris*, *Arenaria serpyllifolia*, *Erophila verna*, *Steris viscaria*, *Trifolium arvense*, *Cardaminopsis arenosa*, *Scleranthus annuus*, *Seseli osseum*, *Jovibarba globifera*, *Arabidopsis thaliana*, *Allium flavum*

Monitoring method: Plant species record with the coverage estimated according to the Tansley scale. The coverage of the vegetation levels and impacts on the habitat were also assessed. This was done in the period from 1st of May to 30th of September.

Habitat distribution and localization of PMLs: Habitat can be found mainly in areas of neo-volcanic mountain ranges, as well as on quartzitic rocks in the mountains of Tribeč and Malé Karpaty Mountains.



Monitoring results:

Estimate of trend of habitat development: ALP: + PAN: +

Habitat quality in PMLs:

ALP: 90 10

PAN: 100

Overall habitat quality: ALP: FV PAN: FV

Habitat management in PMLs:

ALP: 88.5 11.5

PAN: 90 10

Habitat prospects in PMLs:

ALP: 90 10

PAN: 100

Overall prospects of habitat: ALP: FV PAN: FV

Pressures and threats: The most commonly reported negative trends in the Alpine Bioregion include the succession, lack of grazing and the presence of invasive species. In the Pannonian Bioregion it is especially the erosion.

Assessment and notes on the monitoring results: The quality of habitat is favourable in Slovakia and the prospects of the habitat on monitored sites are the same. Estimate of development trend is increasing. The only site evaluated as unfavourable-bad is the PML Vinné, a hillside below the castle. This site is affected by succession, with the area being overgrown by competitively stronger grasses. A part of PML Vinné shows also favourable quality of the habitat, especially near the edges of hiking trails and in areas with shallow layer of soil near exposed rocks. Sheep and goat grazing would benefit the quality of the habitat. In terms of care for the individual areas, suitable management is taking place at most sites. In order to maintain the



© Jaroslav Košťál



© Jaroslav Košťál

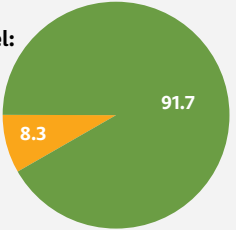
favourable conservation status of the habitat it is necessary to ensure activities which limit successional processes and lead to disturbance of vegetation cover and prevention of spreading of competitively stronger species of grass. This habitat includes also many rare species of plants. The following species were recorded during the monitoring *Campanula macrostachya*, *Cleistogenes serotina* or *Sempervivum wettsteinii* subsp. *heterophyllum*. The soil where the habitat is found is shallow and gets significantly dry over the hot summer months. For this reason the vegetation develops mainly in the spring, several early-blooming and ephemeral species occur there. Monitoring should therefore be adjusted to vegetation optimum.

Overall assessment of the conservation status of habitat

Conservation status on national level:
Overall habitat status: ALP: FV PAN: FV
Conservation status in SCIs: FV
Overall conservation status on national level: FV

By bioregion:

ALP: 90 10
PAN: 100



9110 *Luzulo-Fagetum* beech forests

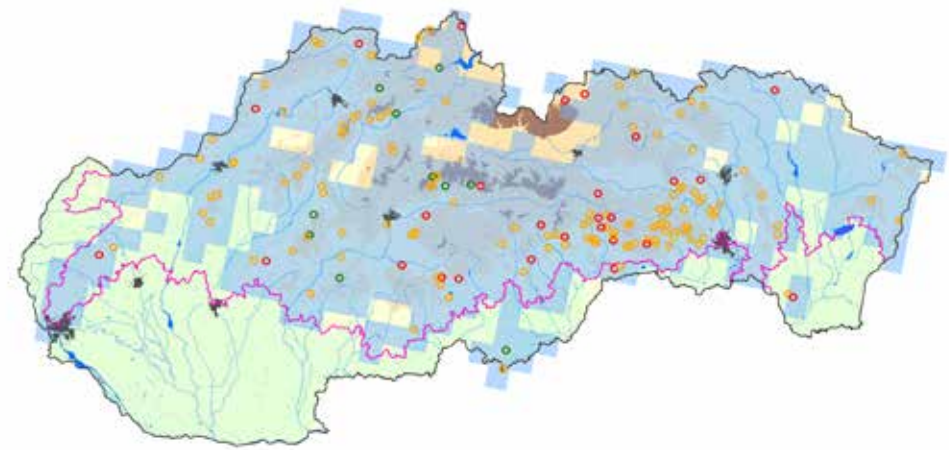
The habitat consists of acidophilus beech stands on nutrient-poor soils. In the lower levels it occurs with oak and in higher altitudes with addition of fir and spruce.

Number of PMLs: 168 PML average area size: 9.4 ha
Number of involved experts: 20 Number of PML field visits: 168
Average taxon count on record: 30

Typical species found in the PMLs: *Fagus sylvatica*, *Picea abies*, *Abies alba*, *Quercus petraea*, *Carpinus betulus*, *Sorbus aucuparia*, *Acer pseudoplatanus*, *Dryopteris filix-mas*, *Calamagrostis arundinacea*, *Luzula luzuloides*, *Vaccinium myrtillus*, *Dryopteris dilatata*, *Avenella flexuosa*, *Calamagrostis villosa*

Monitoring method: Plant species record with the coverage estimated according to the modified Tansley scale. The coverage of the vegetation levels, forest structure and impacts on the habitat were also assessed. This was done in the period from 1st of April to 30th of November.

Habitat distribution and localization of PMLs: Current distribution is centred in the Alpine Bioregion with the habitat being rarer in the Pannonian Bioregion. Usually it is found in a mosaic together with other beech communities.



Monitoring results:

Estimate of trend of habitat development: ALP: 0 PAN: 0

Habitat quality in PMLs:



Overall habitat quality: ALP: U1 PAN: U1

Habitat management in PMLs:



Habitat prospects in PMLs:



Overall prospects of habitat: ALP: U1 PAN: U1

Pressures and threats: The most frequent negative impacts, with medium to high intensity, include: the management and the transport networks.

Assessment and notes on the monitoring results: The overall status for the habitat in the bioregions is unfavourable. The situation is the same for Sites of Community Importance. The unfavourable status is a relatively assessment, based on the assessment methodology both of the species composition, but also the forest stand structure. The structure, especially, often caused that stands with relatively well-preserved species composition were evaluated as stands in unfavourable condition. Because most of the stands of this habitat type were and still are regularly managed and therefore we see the absence of more richly structured stands with large trees, which are a prerequisite for the creation of large dead wood. Tree species composition is mostly preserved and the occurrence of invasive species was identified in a minimum number of areas. It is similar with the composition of the undergrowth, which consists of indigenous species. The habitat occurs in a mosaic together with other beech communities and often a smooth transition forms between the different types. Sometimes it is quite difficult to distinguish between the different types. The condition of the habitat is most influenced by management with a low impact from the transport network, which is often a prerequisite for the implementation of suitable management. Stands are best preserved in a favourable condition mainly in protected forests and forests protected with non-intervention regimes.

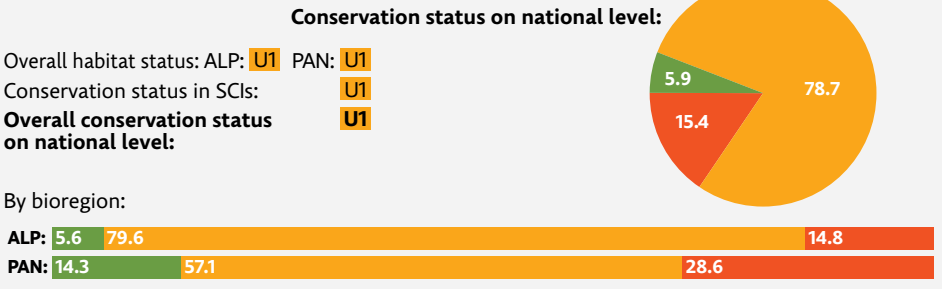


© Norbert Hatala



© Norbert Hatala

Overall assessment of the conservation status of habitat



9130 *Asperulo-Fagetum* beech forests

The habitat consists of mesotrophic and eutrophic beech forests on nutrient-rich soils, in the lower locations with addition of oak and hornbeam and in higher altitudes with addition of fir and spruce.

Number of PMLs: 483 **PML average area size:** 9.6 ha

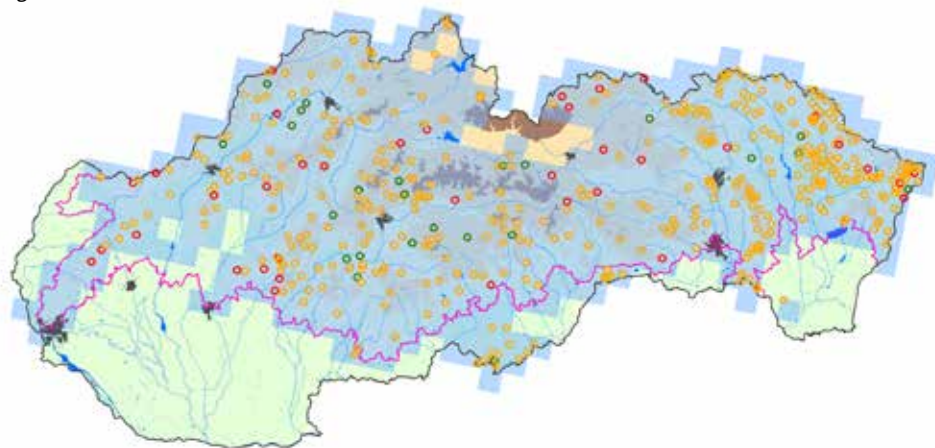
Number of involved experts: 20 **Number of PML field visits:** 483

Average taxon count on record: 47

Typical species found in the PMLs: *Fagus sylvatica*, *Acer pseudoplatanus*, *Carpinus betulus*, *Fraxinus excelsior*, *Abies alba*, *Corylus avellana*, *Dryopteris filix-mas*, *Quercus petraea*, *Acer platanoides*, *Galium odoratum*, *Dentaria bulbifera*, *Carex pilosa*, *Dentaria glandulosa*

Monitoring method: Plant species record with the coverage estimated according to the modified Tansley scale. The coverage of the vegetation levels, forest structure and impacts on the habitat were also assessed. This was done in the period from 1st of April to 30th of November.

Habitat distribution and localization of PMLs: Current distribution is centred in the Alpine Bioregion, with the habitat being rarer in the Pannonian Bioregion. The habitat is widely distributed or in a mosaic together with other beech communities.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN: 0

Habitat quality in PMLs:

ALP: 8.7 **84.5** **6.8**

PAN: 12 **88**

Overall habitat quality: ALP: **U1**

PAN: **U1**

Habitat management in PMLs:

ALP: 66.8 **33.2**

PAN: 74.1 **25.9**

Habitat prospects in PMLs:

ALP: 18.8 **78.2** **3**

PAN: 36 **64**

Overall prospects of habitat: ALP: **U1**

PAN: **U1**

Pressures and threats: The most frequent negative impacts, with medium to high intensity, include the management and transport network.

Assessment and notes on the monitoring results: The overall status of the habitat in both bioregions is unfavourable, as well as for Sites of Community Importance. The unfavourable status is related to the assessment methodology of the species composition and structure of forest stand. Unsuitable structure of stands, often caused by regular management, is the reason for assessment of this particular stand as unfavourable despite having the proper tree species composition. This habitat also lacks the occurrence of large trees, which are a prerequisite for the creation of large dead wood. Tree species composition is mostly preserved and the occurrence of invasive species is identified in minimum number of areas. The undergrowth consists of indigenous species. The habitat occurs in mosaic together with other beech communities and often a smooth transition forms between the different types. Sometimes it is quite difficult to distinguish between the different types. This particularly includes the forest types assigned to the edaphic series A/B. The condition of the habitat is most influenced by management with a low impact from the transport network, which is often a prerequisite for the implementation of suitable management. Stands are preserved in a favourable condition mainly in protected forests and forests protected with non-intervention regimes.



© Michal Vyšinsky



© Jaroslav Košťál

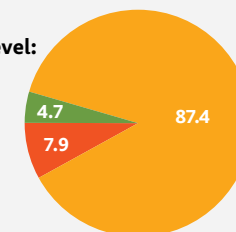
Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: **U1** PAN: **U1**

Conservation status in SCIs: **U1**

Overall conservation status on national level: **U1**



By bioregion:



9140 Medio-European subalpine beech woods with *Acer* and *Rumex arifolius*

The habitat consists of maple-beech forests with tall herbs, often with limited growth at timberline or near the spruce vegetation belt.

Number of PMLs: 85

PML average area size: 9.7 ha

Number of involved experts: 16

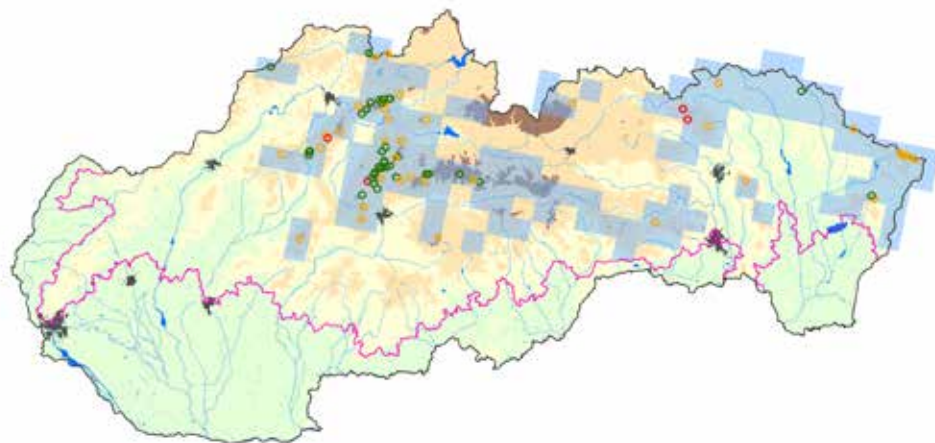
Number of PML field visits: 85

Average taxon count on record: 42

Typical species found in the PMLs: *Fagus sylvatica*, *Acer pseudoplatanus*, *Picea abies*, *Sorbus aucuparia*, *Abies alba*, *Dryopteris filix-mas*, *Oxalis acetosella*, *Prenanthes purpurea*, *Athyrium filix-femina*, *Allium ursinum*, *Adenostyles alliariae*, *Cicerbita alpina*, *Athyrium distentifolium*

Monitoring method: Plant species record with the coverage estimated according to the modified Tansley scale. The coverage of the vegetation levels, forest structure and impacts on the habitat were also assessed. This was done in the period from 1st of April to 30th of November.

Habitat distribution and localization of PMLs: The habitat occurs only in Alpine Bioregion.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN:

Habitat quality in PMLs:

ALP: 51.2 45.3 3.5

PAN:

Overall habitat quality:

ALP: U1

PAN:

Habitat management in PMLs:

ALP: 85.1 14.9

PAN:

Habitat prospects in PMLs:

ALP: 57 40.7 2.3

PAN:

Overall prospects of habitat:

ALP: U1

PAN:

Pressures and threats: The most frequent negative impacts, with medium to high intensity, include the impacts of: strong storms, uprooted trees during the storms, management and grazing in the past.

Assessment and notes on the monitoring results: The habitat only occurs in the Alpine bioregion and its condition is unfavourable. Nevertheless, almost half of the stands are in a favourable condition. The situation is the same for Sites of Community Importance. The reason is that most of the stands of this type of habitat have been regularly managed or affected by grazing in the past. Therefore we can rarely find any more richly structured stands that have large trees and large dead wood. Tree species composition is mostly preserved and invasive species are not present. It is similar with the composition of the undergrowth, which consists of indigenous species. The habitat occurs in mosaic together with other beech communities and often a smooth transition forms between the different types. Sometimes it is quite difficult to distinguish between the different types. This particularly includes the forest types assigned to the edaphic series A/B. Forest type 6221, which is physiognomically similar to these stands, but with the absence of broad-leaved tall herbs and dominance of grasses and acidophilous species in the undergrowth. However, generally it does not belong to this habitat, but to the habitat of acidophilous beech communities. The condition of the habitat is mostly influenced by management, avalanches in the avalanche gutters and by storms associated with uprooted trees. When this habitat occurs in protected forests it is mostly well preserved. There is a premise for suitable management. Often these stands are also included in the non-intervention regime for nature conservation. In the past, however, some areas were changed to spruce communities, which currently suffer from damage either by mechanical impacts from snow or biotic forest pests.



© Martin Pirchala



© Jaroslav Košťál

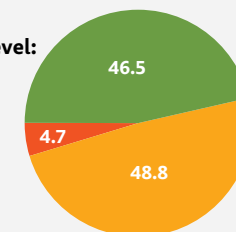
Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN:

Conservation status in SCIs: U1

Overall conservation status on national level: U1



By bioregion:

ALP: 46.5 48.8 4.7

PAN:

9150 Medio-European limestone beech forests of the *Cephalanthero-Fagion*

The habitat consists of calcareous beech forests or mixed forests with a prevalence of beech on limestone and dolomite.

Number of PMLs: 150

PML average area size: 11.9 ha

Number of involved experts: 19

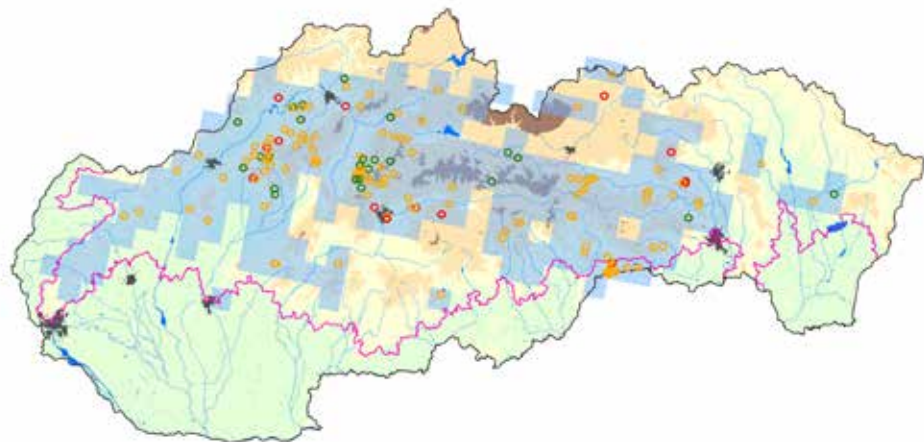
Number of PML field visits: 350

Average taxon count on record: 63

Typical species found in the PMLs: *Fagus sylvatica*, *Acer pseudoplatanus*, *Picea abies*, *Sorbus aria*, *Fraxinus excelsior*, *Abies alba*, *Corylus avellana*, *Acer campestre*, *Acer platanoides*, *Mercurialis perennis*, *Carex alba*, *Calamagrostis varia*, *Cephalanthera* sp., *Sesleria albicans*

Monitoring method: Plant species record with the coverage estimated according to the modified Tansley scale. The coverage of the vegetation levels, forest structure and impacts on the habitat were also assessed. This was done in the period from 1st of April to 30th of November.

Habitat distribution and localization of PMLs: Current distribution is centred in the Alpine Bioregion, with the habitat being rarer in the Pannonian Bioregion. Usually it is found across a whole area or in a mosaic together with other beech or scree communities on calcareous soil.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN: 0

Habitat quality in PMLs:

ALP: 20.9 (green bar) 70.1 (orange bar) 9 (red bar)

PAN: 12.5 (green bar) 81.3 (orange bar) 6.2 (red bar)

Overall habitat quality:

ALP: U1

PAN: U1

Habitat management in PMLs:

ALP: 80.5 (green bar) 19.5 (red bar)

PAN: 44.5 (green bar) 55.5 (red bar)

Habitat prospects in PMLs:

ALP: 44 (green bar) 53.7 (orange bar) 2.3 (red bar)

PAN: 87.5 (green bar) 12.5 (red bar)

Overall prospects of habitat:

ALP: U1

PAN: U1

Pressures and threats: The most frequent negative impacts, with medium to high intensity, include the management, transport networks and grazing in the past.

Assessment and notes on the monitoring results: The overall status of the habitat in the bioregions is unfavourable. The situation is the same for Sites of Community Importance. Unfavourable conditions are often caused by the fact that most of the stands of this type of habitat were regularly managed and currently there is a lack of richer structure, large trees and large dead wood. These stands were very often intensively harvested and therefore deliberately thinned down. Tree species composition is mostly preserved and the occurrence of invasive species is identified in a minimal number of areas. The undergrowth also consists of indigenous species. The habitat occurs in mosaic together with other beech communities and often a smooth transition forms between the different types. Sometimes it is quite difficult to distinguish between the different types. This particularly includes the transitions to *Asperulo-Fagetum* beech forests. Conditions in the habitat are most influenced by management (especially in the past) with a small impact from the transport network, which is often a prerequisite for the implementation of suitable management. Stands are best preserved in favourable conservation condition in protected forests, where this habitat most often occurs, and in forests protected with non-intervention regimes. The overall conservation status is more favourable than in *Asperulo-Fagetum* beech forests.



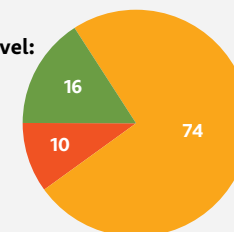
Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN: U1

Conservation status in SCIs: U1

Overall conservation status on national level: U1



By bioregion:



9170 *Galio-Carpinetum* oak-hornbeam forests

The habitat consists of fragments of oak forests in the interior of Carpathian basins.

Number of PMLs: 15 PML average area size: 0.6 ha

Number of involved experts: 3 Number of PML field visits: 30

Average taxon count on record: 72

Typical species found in the PMLs: *Corylus avellana*, *Acer pseudoplatanus*, *Quercus petraea*, *Fagus sylvatica*, *Tilia cordata*, *Tilia platyphyllos*, *Abies alba*, *Populus tremula*, *Acer platanoides*

Monitoring method: Plant species record with the coverage estimated according to the modified Tansley scale. The coverage of the vegetation levels, forest structure and impacts on the habitat were also assessed. This was done in the period from 1st of April to 30th of November.

Habitat distribution and localization of PMLs: The habitat occurs only in Alpine Bioregion, in Carpathian Basins.



Monitoring results:

Estimate of trend of habitat development: ALP: + PAN:

Habitat quality in PMLs:



PAN:

Overall habitat quality: ALP: U2 PAN:

Habitat management in PMLs:



PAN:

Habitat prospects in PMLs:



PAN:

Overall prospects of habitat: ALP: U1 PAN:

Pressures and threats: The most frequent negative impacts, with high intensity, include the management (change of tree species composition) and related transport networks.

Assessment and notes on the monitoring results: The habitat can be found only in the Alpine bioregion and its condition is unfavourable-bad. It is associated with a long historical period of utilising these habitat sites in the past and with the associated change to tree species composition. The situation is the same for Sites of Community Importance. The unfavourable situation is mainly based on assessment of forest stand structure, since there often is a lack of more richly structured stands and a low occurrence of large trees and large dead wood. Tree species composition is largely unaffected and invasive species are not present. The composition of the undergrowth remains the same, it consists of indigenous species. The habitat can be found in mosaic with altered forests. The condition of the habitat is mainly affected by management. In the past some areas were changed to spruce communities, which currently suffer from damage by biotic forest pests.



© Viliam Flachbart



© Viliam Flachbart

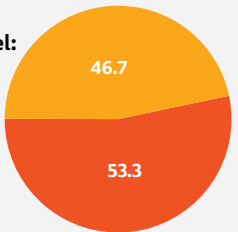
Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U2 PAN:

Conservation status in SCIs: U1

Overall conservation status on national level: U1



By bioregion:



PAN:

9180* *Tilio-Acerion* forests of slope, screes and ravines

The habitat consists of ravine forests from the oak zone to the spruce-fir-beech altitudinal zone.

Number of PMLs: 113 PML average area size: 0.6 ha

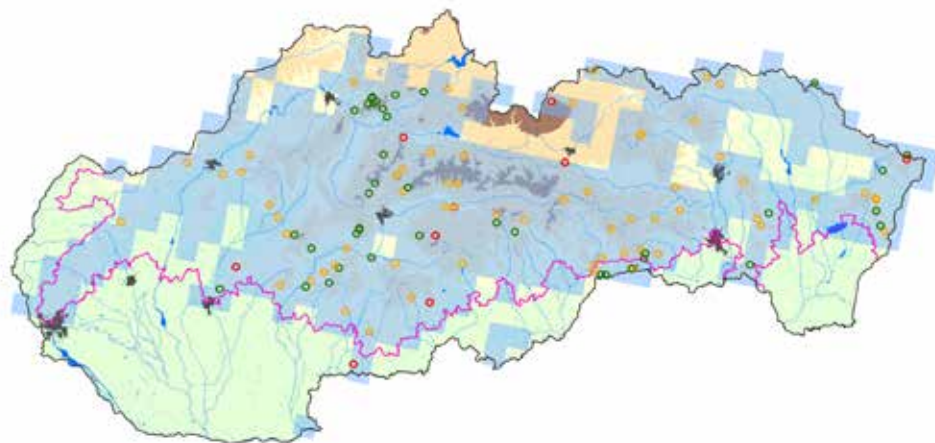
Number of involved experts: 19 Number of PML field visits: 113

Average taxon count on record: 54

Typical species found in the PMLs: *Fagus sylvatica*, *Quercus petraea*, *Acer pseudoplatanus*, *Acer platanoides*, *Fraxinus excelsior*, *Abies alba*, *Corylus avellana*, *Geranium robertianum*, *Ulmus glabra*, *Dryopteris filix-mas*, *Mercurialis perennis*, *Lunaria rediviva*

Monitoring method: Plant species record with the coverage estimated according to the modified Tansley scale. The coverage of the vegetation levels, forest structure and impacts on the habitat were also assessed. This was done in the period from 1st of April to 30th of November.

Habitat distribution and localization of PMLs: The habitat occurs mainly in the Alpine Bioregion.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN: 0

Habitat quality in PMLs:

ALP: 38.7 53.8 7.5

PAN: 50 50

Overall habitat quality: ALP: U1

PAN: U1

Habitat management in PMLs:

ALP: 83.1 16.9

PAN: 67.5 32.5

Habitat prospects in PMLs:

ALP: 50.9 48.1 1

PAN: 50 37.5 12.5

Overall prospects of habitat: ALP: U1

PAN: U1

Pressures and threats: The most frequent negative impacts, of medium to high intensity, arise from the impact of management (30 %), there are also negative effects, with low intensity, from damage of trees by wild animals.

Assessment and notes on the monitoring results:

The habitat can be found in both bioregions and its status is unfavourable. Nevertheless, almost half of the stands in the Pannonian Bioregion are in a favourable status. The situation is the same for Sites of Community Importance. The reason is that most of the stands of this type of habitat have been regularly utilized in a clear cutting manner. This is why there is often a lack of more richly structured stands, large trees and large dead wood. Tree species composition is mostly preserved and invasive species are not present. The undergrowth consists of indigenous species. The habitat occurs in mosaic with other zone forests and often a smooth transition forms between different types so it is often difficult to distinguish between them. The condition of the habitat is mostly influenced by avalanches in the avalanche gutters and by storms. A relatively high level of preservation occurs in protected forests where there is a premise for suitable management; often these stands are also included in the non-intervention regime for nature conservation. In the past, some areas were changed to spruce communities, these currently suffer from damage by biotic forest pests.



© Viliam Flachbart



© Jaroslav Košťál

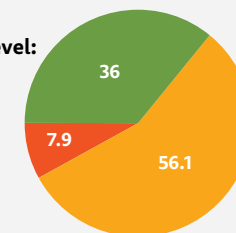
Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN: U1

Conservation status in SCIs: U1

Overall conservation status on national level: U1



By bioregion:

ALP: 34.9 57.5 7.6

PAN: 50 37.5 12.5

9190 Old acidophilous oak woods with *Quercus robur* on sandy plains

The habitat consists of hydrophilic stands of oaks and birches mixed with pine in depressions of the lowland terrain.

Number of PMLs: 20

PML average area size: 7.4 ha

Number of involved experts: 2

Number of PML field visits: 39

Average taxon count on record: 64

Typical species found in the PMLs: *Frangula alnus*, *Quercus robur*, *Pinus sylvestris*, *Alnus glutinosa*, *Crataegus oxyacantha*, *Corylus avellana*, *Quercus petraea*, *Rubus* sp., *Lysimachia vulgaris*, *Tilia cordata*, *Molinia arundinacea*

Monitoring method: Plant species record with the coverage estimated according to the modified Tansley scale. The coverage of the vegetation levels, forest structure and impacts on the habitat were also assessed. This was done in the period from 1st of April to 30th of November.

Habitat distribution and localization of PMLs: The habitat is centred in the Pannonian Bioregion in mosaic with other habitats or cultivated forests in depressions in the terrain.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN: 0

Habitat quality in PMLs:

ALP: 100

PAN: 93.8

Overall habitat quality:

ALP: U1

PAN: U1

Habitat management in PMLs:

ALP: 90

PAN: 100

Habitat prospects in PMLs:

ALP: 100

PAN: 65.6

Overall prospects of habitat:

ALP: U1

PAN: U1

Pressures and threats: The most frequent negative impacts, of medium to high intensity, include the management, transport networks and invasive non-indigenous species.

Assessment and notes on the monitoring results:

The overall status for the habitat in the bioregions is unfavourable. The situation is the same for Sites of Community Importance. Stand structure often cause stands with relatively well-preserved species composition to be evaluated as unfavourable. This is because most of the stands of this habitat type were regularly managed, and therefore we see the absence of more richly structured stands with the occurrence of large trees, which are a prerequisite for the creation of large dead wood. The status of the habitat is most influenced by management and major changes in the hydrological conditions, both



© Norbert Hatala

in a positive or negative fashion. In the past the area of Borská nížina Lowland was stabilized by common pine afforestation due to shifting sands. Therefore, pine is present in this habitat type, but it is not part the original conditions. This involved complete soil preparation before the artificial reforestation, with removal of the humus layer, which could have impacted the hydrological conditions, as even a slight deepening of the profile of the terrain can cause relatively favourable conditions for the occurrence of this type of habitat. There is a similar case on a site where the sand "dunes" where mined away and today the site is paradoxically waterlogged.

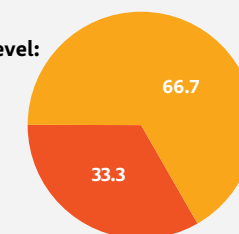
Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN: U1

Conservation status in SCIs: U1

Overall conservation status on national level: U1



By bioregion:

ALP: 100

PAN: 59.4

40.6

91D0* Bog woodland

Habitat consists of birch, spruce and pine stands on mires and peaty soils.

Number of PMLs: 71

PML average area size: 8.9 ha

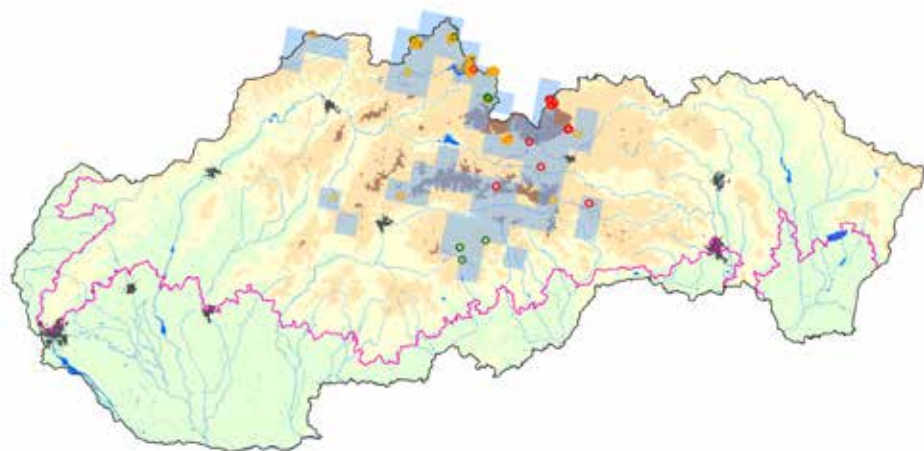
Number of involved experts: 10 Number of PML field visits: 142

Average taxon count on record: 50

Typical species found in the PMLs: *Picea abies*, *Sorbus aucuparia*, *Salix caprea*, *Vaccinium myrtillus*, *Betula pubescens*, *Eriophorum vaginatum*, *Calluna vulgaris*, *Equisetum sylvaticum*, *Juncus effusus*, *Sphagnum* sp.

Monitoring method: Plant species record with the coverage estimated according to the modified Tansley scale. The coverage of the vegetation levels, forest structure and impacts on the habitat were also assessed. This was done in the period from 1st of April to 30th of November.

Habitat distribution and localization of PMLs: This habitat is located in the mosaic of mire habitats, depending on the successional development of mire, it occurs only in the Alpine Bioregion.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN:

Habitat quality in PMLs:

ALP: 20.4 57 22.6

PAN:

Overall habitat quality:

ALP: U1

PAN:

Habitat management in PMLs:

ALP: 81.8 18.2

PAN:

Habitat prospects in PMLs:

ALP: 23.9 68.3 7.8

PAN:

Overall prospects of habitat:

ALP: U1

PAN:

Pressures and threats: The most frequent negative impacts, with medium to high intensity, include the forest management and changing of hydrological conditions.

Assessment and notes on the monitoring results: The overall status of the habitat in the bioregion is unfavourable. The situation is the same for Sites of Community Importance. The unfavourable status stems from the assessment methodology of the species composition and structure of forest stand. Particularly the stand structure often causes the stands with relatively well-preserved species composition to be evaluated as stands in unfavourable condition. Most of the stands of this habitat type were managed in the past. The status of the habitat is influenced mostly by management and major changes in the hydrological conditions, either positively or negatively. Hydrological changes consisted mainly of attempts to drain the waterlogged areas with a system of ditches and so change them to cultivatable stands. The best preserved stands in favourable condition were preserved mainly in forests protected with a non-intervention regime, but here we can also see attempts from the past to modify the water regime in these stands.

Stands of pine forest are gradually changed to spruce forests, therefore it is expected that these will finally change to spruce subtype. Today, these stands are included in the category of protected forests with the major assumption that the succession will have a free course and with mosaic canopy or decomposition of stands there will be a change to different types of mire forests.



© Viliam Flachbart



© Viera ŠeffEROVÁ StanOVÁ

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN:

Conservation status in SCIs:

Overall conservation status on national level:

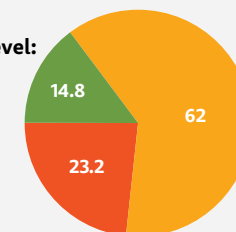
U1

U1

By bioregion:

ALP: 14.8 62 23.2

PAN:



91E0* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)

Habitat consists of riparian forests of willow-poplar, foothill ash-alder and mountain alder.

Number of PMLs: 116

PML average area size: 6.9 ha

Number of involved experts: 16

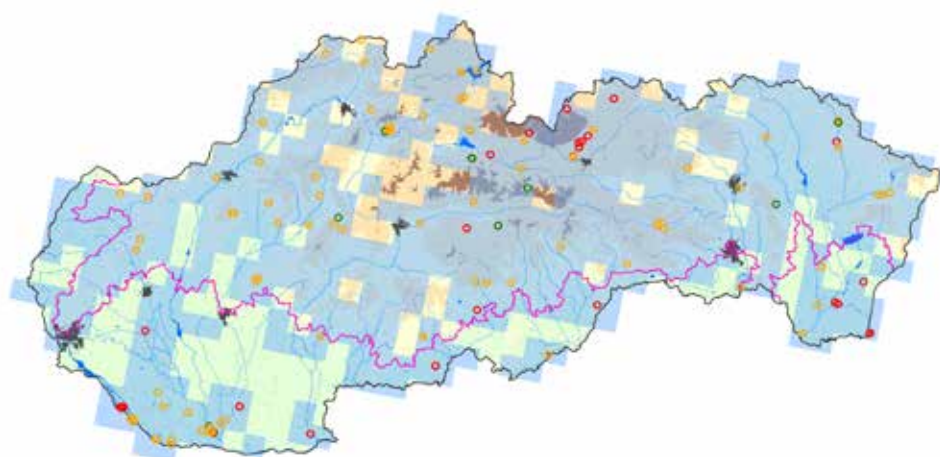
Number of PML field visits: 227

Average taxon count on record: 62

Typical species found in the PMLs: *Alnus glutinosa*, *Fraxinus excelsior*, *Salix alba*, *Acer pseudoplatanus*, *Urtica dioica*, *Alnus incana*, *Aegopodium podagraria*, *Crepis paludosa*, *Chaerophyllum hirsutum*, *Picea abies*

Monitoring method: Plant species record with the coverage estimated according to the modified Tansley scale. The coverage of the vegetation levels, forest structure and impacts on the habitat were also assessed. This was done in the period from 1st of April to 30th of November.

Habitat distribution and localization of PMLs: Habitat occurs in both bioregions near watercourses.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN: 0

Habitat quality in PMLs:

ALP: 9.9 74.2 15.9

PAN: 15.8 53.9 30.3

Overall habitat quality: ALP: U1

PAN: U1

Habitat management in PMLs:

ALP: 83.9 16.1

PAN: 77.3 22.7

Habitat prospects in PMLs:

ALP: 17.9 79.5 2.6

PAN: 17.1 57.9 25

Overall prospects of habitat: ALP: U1

PAN: U1

Pressures and threats: The most frequent negative impacts, with medium to high intensity, include the change of water regimes, management and invasion by non-indigenous species.

Assessment and notes on the monitoring results: The overall status of the habitat in the bioregions is unfavourable. The situation is the same for Sites of Community Importance. The reason is that most stands of this habitat type were cultivated in the past, which lead to a simplified structure and the absence of large trees and large dead wood. These stands were very often intensively cultivated, and therefore deliberately thinned down. In the Pannonian Bioregion especially these stands were changed to softwood plantations with very intensive use and cultivation of non-indigenous tree species. Although the tree species composition is usually relatively preserved, the occurrence of invasive species is very strong. It is similar with the composition of undergrowth consisting of indigenous species in the spring, but in summer it is often dominated by invasive species. Situation of the habitat is mostly influenced by water management, regulation of rivers and streams and progressing invasion of non-indigenous species of trees and plants.



© Viliam Flachbart



© Jaroslav Košťál

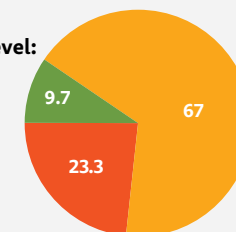
Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN: U1

Conservation status in SCIs: U1

Overall conservation status on national level: U1



By bioregion:

ALP: 9.3 74.8 15.9

PAN: 10.5 51.3 38.2

91F0 Riparian mixed forests of *Quercus robur*, *Ulmus laevis* and *Ulmus minor*, *Fraxinus excelsior* or *Fraxinus angustifolia*, along the great rivers (*Ulmenion minoris*)

Habitat consists of stands of *Quercus robur* and *Fraxinus excelsior* along lowland rivers.

Number of PMLs: 96

PML average area size: 8.2 ha

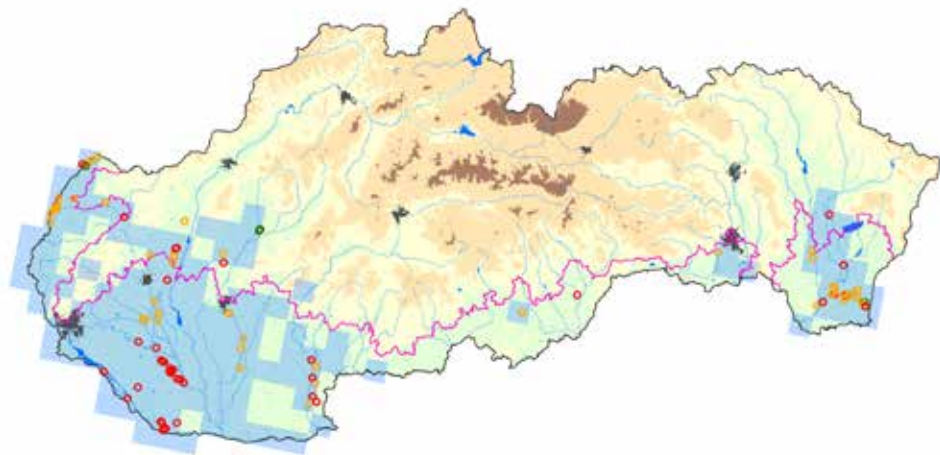
Number of involved experts: 16 Number of PML field visits: 96

Average taxon count on record: 52

Typical species found in the PMLs: *Acer campestre*, *Fraxinus angustifolia*, *Quercus robur*, *Sambucus nigra*, *Fraxinus excelsior*, *Ulmus minor*, *Populus alba*, *Swida sanguinea*, *Rubus caesius*, *Aegopodium podagraria*

Monitoring method: Plant species record with the coverage estimated according to the modified Tansley scale. The coverage of the vegetation levels, forest structure and impacts on the habitat were also assessed. This was done in the period from 1st of April to 30th of November.

Habitat distribution and localization of PMLs: Habitat is situated along lowland rivers in both bioregions with the occurrence centred in the Pannonian Bioregion.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN: 0

Habitat quality in PMLs:

ALP: 20 46.7 33.3

PAN: 3.7 51.9 44.4

Overall habitat quality: ALP: U1

PAN: U1

Habitat management in PMLs:

ALP: 86.3 13.7

PAN: 63.9 36.1

Habitat prospects in PMLs:

ALP: 20 46.7 33.3

PAN: 2.5 67.9 29.6

Overall prospects of habitat: ALP: U1

PAN: U1

Pressures and threats: The most frequent negative impacts, with medium to high intensity, include the forest management, changes to hydrological conditions and invasion and increasing distribution of non-indigenous species.

Assessment and notes on the monitoring results: The overall status of the habitat in the bioregions is unfavourable. The situation is the same for Sites of Community Importance. Most of the stands of this habitat type are regularly cultivated, therefore there is an absence of richer structured vegetation with the occurrence of large trees and large dead wood. Very often, especially in the Pannonian Bioregion, the area of this habitat is changed into plantations with only one tree species being planted intentionally. Very often instead of narrow-leaved ash the common ash or a non-indigenous sycamore maple is used incorrectly. Such stands were rated as unfavourable-bad. Stands are often planted in rows, which also affects their structure. A frequent occurrence of invasive species can be found mainly in the Pannonian Bioregion where *Robinia pseudoacacia* and *Ailanthus altissima* can be commonly found. There are similar problems with the composition of the undergrowth, which consists of indigenous species in the spring, but is often replaced and ousted by invasive non-indigenous species which thrive better in these conditions, this had an impact on the assessment of the habitat status. The status of the habitat is mostly influenced by management and major changes in the hydrological conditions, either in positive or negative fashion. Hydrological changes occurred mainly in the Pannonian Bioregion, but their influence was with small intensity in the Alpine Bioregion. Stands are best preserved in a favourable condition mainly in forests protected with non-intervention regimes.



© Michal Vyšinský



© Jaroslav Košťál

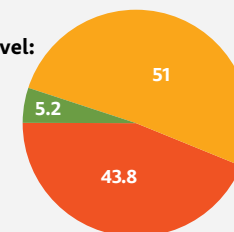
Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN: U1

Conservation status in SCIs: U1

Overall conservation status on national level: U1



By bioregion:



91G0* Pannonic woods with *Quercus petraea* and *Carpinus betulus*

Habitat consists of stands of *Quercus petraea*, *Quercus robur* and hornbeam under the Pannonian influence.

Number of PMLs: 127

PML average area size: 10.1 ha

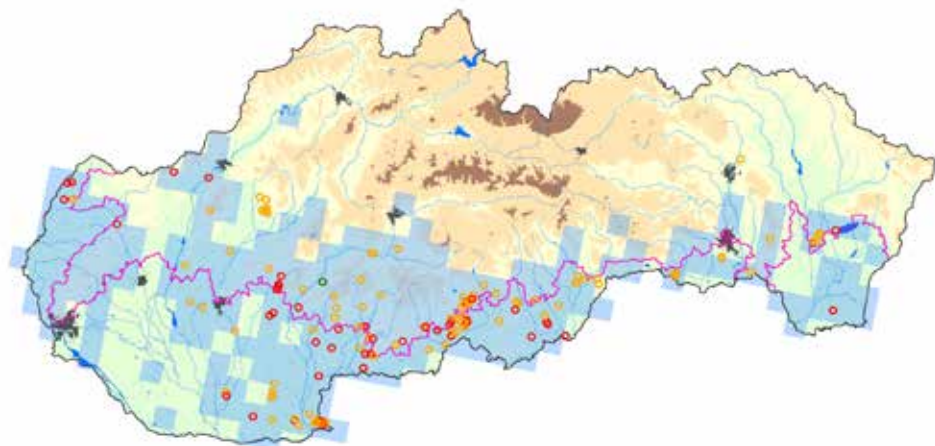
Number of involved experts: 16 Number of PML field visits: 127

Average taxon count on record: 45

Typical species found in the PMLs: *Carpinus betulus*, *Acer campestre*, *Quercus cerris*, *Quercus petraea*, *Ligustrum vulgare*, *Cerasus avium*, *Crataegus monogyna*, *Quercus robur*, *Tilia cordata*, *Melica uniflora*

Monitoring method: Plant species record with the coverage estimated according to the modified Tansley scale. The coverage of the vegetation levels, forest structure and impacts on the habitat were also assessed. This was done in the period from 1st of April to 30th of November.

Habitat distribution and localization of PMLs: The habitat has its centre in the Pannonian Bioregion, but it also occurs widely in the Alpine Bioregion.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN: 0

Habitat quality in PMLs:

ALP: 1.8 70.2 28

PAN: 75.7 24.3

Overall habitat quality: ALP: U1

PAN: U1

Habitat management in PMLs:

ALP: 73.6 26.4

PAN: 77.2 22.8

Habitat prospects in PMLs:

ALP: 17.5 64.9 17.6

PAN: 12.9 67.1 20

Overall prospects of habitat: ALP: U1

PAN: U1

Pressures and threats: The most frequent negative effects, with high intensity, include: the management, changes to the woods' composition, related transport network and hunted of animals. The habitat also influences the expansion of invasive species of herbaceous plants and trees (*Robinia pseudoacacia*).

Assessment and notes on the monitoring results: The habitat in both bioregions is in unfavourable condition. It is associated with a long historical period affecting this habitat type sites with frequent cutting of stands, with a deliberate preference for oak. The situation is the same for Sites of Community Importance. Stand structure often causes the stands with relatively well-preserved species composition to be evaluated as stands in unfavourable conditions. Often these lack any more richly structured stands with large trees, which are a prerequisite for the creation of large dead wood. Tree species composition is relatively preserved, but there are also invasive species (*Robinia pseudoacacia*), the intentional cultivation of which significantly affects the continued existence of this habitat. It is similar with the composition of the undergrowth, which consists of indigenous species along with some occurrences of invasive species (*Impatiens parviflora*). This habitat occurs mainly in commercial forests and in protected forests it forms a transition to other units.



© Jaroslav Košťál



© Ján Lukočka

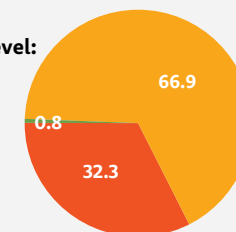
Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN: U1

Conservation status in SCIs: U1

Overall conservation status on national level: U1



By bioregion:

ALP: 1.8 64.9 33.3

PAN: 68.6 31.4

91H0* Pannonian woods with *Quercus pubescens*

Habitat consists of xerophilic open stands of *Quercus pubescens* and other oak trees on the warmest sunlit sites.

Number of PMLs: 129

PML average area size: 12.4 ha

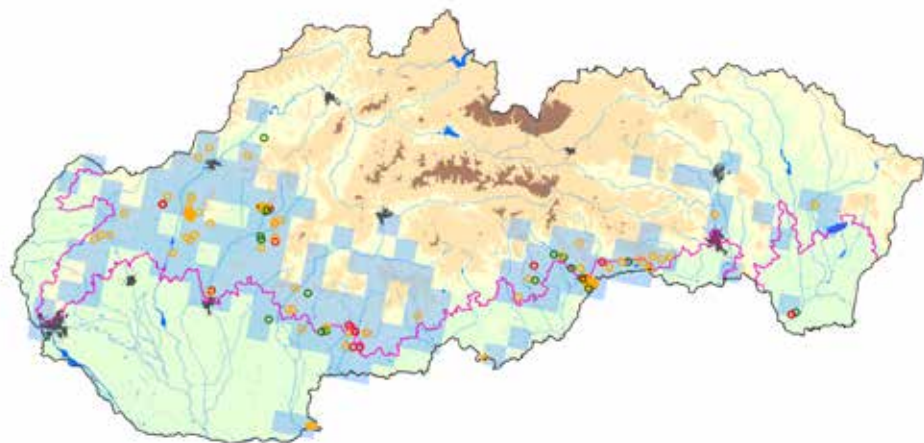
Number of involved experts: 15 Number of PML field visits: 129

Average taxon count on record: 70

Typical species found in the PMLs: *Cornus mas*, *Acer campestre*, *Sorbus torminalis*, *Quercus cerris*, *Quercus pubescens*, *Quercus petraea*, *Crataegus monogyna*, *Vincetoxicum hirundinaria*, *Carex humilis*, *Brachypodium pinnatum*

Monitoring method: Plant species record with the coverage estimated according to the modified Tansley scale. The coverage of the vegetation levels, forest structure and impacts on the habitat were also assessed. This was done in the period from 1st of April to 30th of November.

Habitat distribution and localization of PMLs: Habitat is centred in the Pannonian Bioregion but is also abundant in the Alpine Bioregion, especially along the connection with the Pannonian Bioregion.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN: 0

Habitat quality in PMLs:

ALP: 17.1 75 7.9

PAN: 18.9 64.2 16.9

Overall habitat quality: ALP: U1

PAN: U1

Habitat management in PMLs:

ALP: 88.8 11.2

PAN: 86.9 13.1

Habitat prospects in PMLs:

ALP: 23.7 71.1 5.2

PAN: 66 30.2 3.8

Overall prospects of habitat: ALP: U1

PAN: U1

Pressures and threats: The most frequent negative impacts, with different intensities, include: the occurrence of hunted animals and grazing livestock. The habitat is also affected by expansion of invasive species of plants and trees (*Robinia pseudoacacia*).

Assessment and notes on the monitoring results: The habitat in both bioregions is in unfavourable status. It is associated with a long historical period of affecting these habitat sites in the past, mainly by grazing. Locally there was also some afforestation with *Fraxinus ornus*, the nativity of which is questionable in many sites, and with non-indigenous *Pinus nigra*. The situation is the same for Sites of Community Importance. Unfavourable conservation status, according to the methodology, is based on the assessment of the species composition of stands, but also on the simplified structure of forest stands. Tree species composition is relatively preserved, but there are also some invasive species (*Robinia pseudoacacia*), which has spread to relatively more productive areas of the habitat from the surrounding stands. Undergrowth consists largely of indigenous species, but there are also invasive species and weeds. The habitat occurs usually in protected forests and there are generally no protective measures planned. Gradually, however, the long-term succession to more developed types can cause the disappearance of the original structure and its change to habitat 91G0 or 91M0.



© Jaroslav Košťál



© Jaroslav Košťál

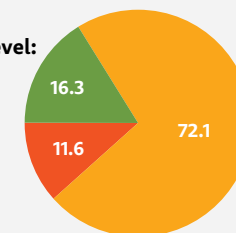
Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN: U1

Conservation status in SCIs: U1

Overall conservation status on national level: U1



By bioregion:



9110* Euro-Siberian steppic woods with *Quercus* spp.

Habitat consists of oak silverweed forests, dry and acidophilous oak forests and very rare thermophilic Pontic-Pannonian oak forests on loess and sand.

Number of PMLs: 175 PML average area size: 0.6 ha

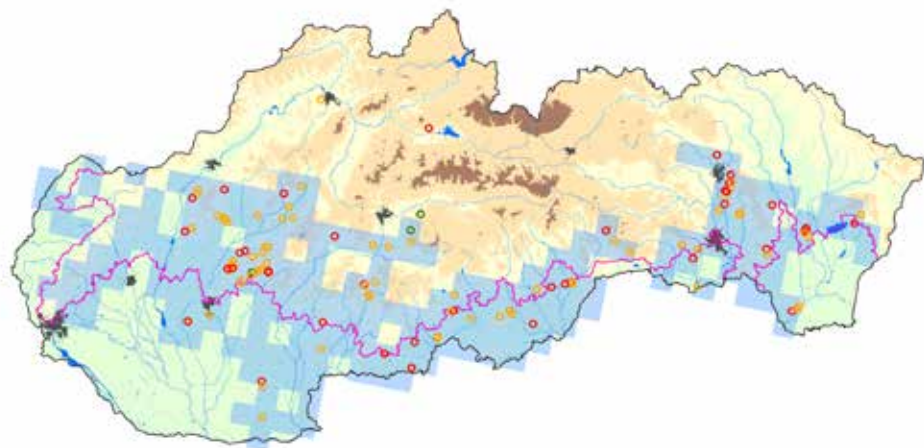
Number of involved experts: 16 Number of PML field visits: 175

Average taxon count on record: 49

Typical species found in the PMLs: *Quercus petraea*, *Quercus cerris*, *Frangula alnus*, *Acer campestre*, *Cerasus avium*, *Ligustrum vulgare*, *Crataegus monogyna*, *Prunus spinosa*, *Potentilla alba*, *Luzula luzuloides*

Monitoring method: Plant species record with the coverage estimated according to the modified Tansley scale. The coverage of the vegetation levels, forest structure and impacts on the habitat were also assessed. This was done in the period from 1st of April to 30th of November.

Habitat distribution and localization of PMLs: The habitat is centred in the Pannonian Bioregion but is also abundant in the Alpine Bioregion.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN: 0

Habitat quality in PMLs:

ALP: 5.9 71.3 22.8

PAN: 66.7 33.3

Overall habitat quality: ALP: U1

PAN: U1

Habitat management in PMLs:

ALP: 72.9 27.1

PAN: 77.9 22.1

Habitat prospects in PMLs:

ALP: 8.9 76.2 14.9

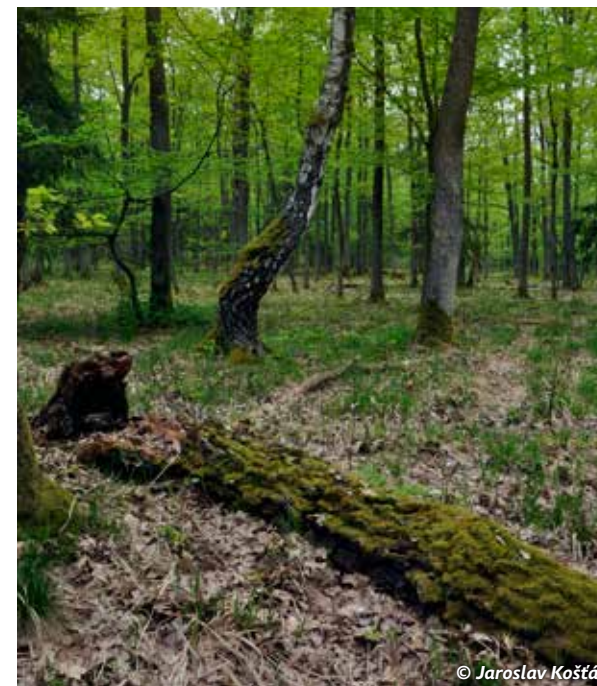
PAN: 9.3 69.3 21.4

Overall prospects of habitat: ALP: U1

PAN: U1

Pressures and threats: The most frequent negative impacts, with high intensity, include: the forest management, changes to the tree species composition, transport networks and the breeding of hunted animals. The habitat is also affected by expansion of invasive species of plants and trees (*Robinia pseudoacacia*).

Assessment and notes on the monitoring results: The habitat is in unfavourable status in both bioregions. This is related to a long period of influence on oak forests in the past with frequent cutting of these stands, with the deliberate preference for oak. The situation is the same for Sites of Community Importance. The structure of these stands is often changed with a significant lack of large trees and large dead wood. Tree species composition is relatively preserved, but there are some invasive species (*Robinia*



pseudoacacia) – cultivation of which substantially influences the existence of this habitat. It is similar with the undergrowth, which consists of indigenous species and some invasive species (*Impatiens parviflora*). The habitat occurs mainly in the areas of commercial forests with the subtype of dry and acidophilous oak forests occurring in protected forests.

The unit is one of the hardest habitat types to identify based on the transfer of units of forest typology and the subtype of Pontic-Pannonian forests and needs to be checked to make sure it is not a 91M0 unit or 91G0 unit.

In Žilina and Liptovská kotlina basin this unit is a transition habitat to 9170 and these sites will also need to be critically reviewed.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN: U1

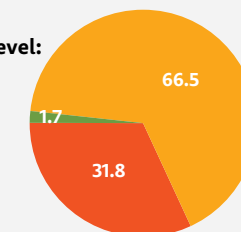
Conservation status in SCIs: U1

Overall conservation status on national level: U1

By bioregion:

ALP: 3 70.3 26.7

PAN: 61.3 38.7



91M0 Pannonian-Balkanic turkey oak-sessile oak forests

Habitat consists of stands of oak with increased occurrence of *Quercus cerris*.

Number of PMLs: 128 PML average area size: 9.9 ha

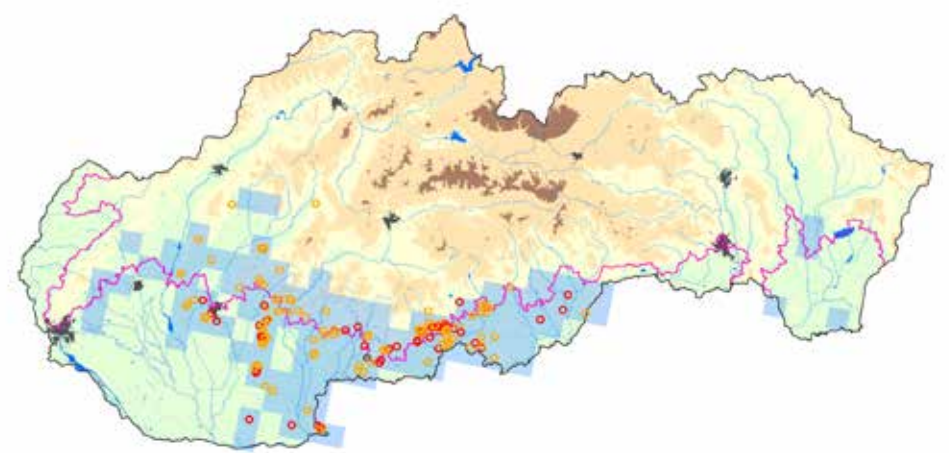
Number of involved experts: 11 Number of PML field visits: 128

Average taxon count on record: 50

Typical species found in the PMLs: *Quercus cerris*, *Acer campestre*, *Ligustrum vulgare*, *Prunus spinosa*, *Crataegus monogyna*, *Quercus petraea*, *Cerasus avium*, *Rosa canina*, *Lathyrus niger*, *Melittis melissophyllum*

Monitoring method: Plant species record with the coverage estimated according to the modified Tansley scale. The coverage of the vegetation levels, forest structure and impacts on the habitat were also assessed. This was done in the period from 1st of April to 30th of November.

Habitat distribution and localization of PMLs: The habitat can be found in both bioregions.



Monitoring results:

Estimate of trend of habitat development: ALP: 0 PAN: 0

Habitat quality in PMLs:



Overall habitat quality: ALP: U1 PAN: U1

Habitat management in PMLs:



Habitat prospects in PMLs:



Overall prospects of habitat: ALP: U1 PAN: U1

Pressures and threats: The most frequent negative impacts, with high intensity, include: the forest management, changes to tree species composition, transport networks and the breeding of hunted animals. The habitat is also affected by expansion of invasive species of plants and trees (*Robinia pseudoacacia*).

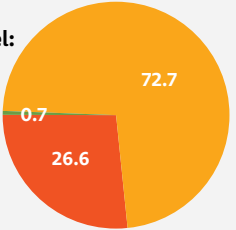
Assessment and notes on the monitoring results: The habitat is in unfavourable status in both bioregions. This is related to a long period of influence on oak sites in the past with frequent cutting of these stands, with the deliberate preference for oak. The situation is the same for Sites of Community Importance. Unfavourable status is based on the assessment of species composition, but also on the structure of forest stands. The structure especially often means that even the stands with relatively well-preserved species composition were evaluated as stands in unfavourable conditions. Tree species composition is relatively preserved, but there are also some invasive species (*Robinia pseudoacacia*), cultivation of which influences substantially the existence of this habitat. It is similar with the undergrowth, which consists of indigenous species, but there are also invasive species (*Impatiens parviflora*). The habitat occurs mainly in areas of commercial forests and partially in protected forests.

Differentiation between 91G0 and 91M0 habitats is not clear, this means that the stands where the *Quercus cerris* has dominated over the sessile oak cannot be reliably considered as non-indigenous.



Overall assessment of the conservation status of habitat

Conservation status on national level:
Overall habitat status: ALP: U1 PAN: U1
Conservation status in SCIs: U1
Overall conservation status on national level: U1



By bioregion:



91N0* Pannonic inland sand dune thicket
(*Junipero-Populetum albae*)

Habitat consists of white poplar stands with juniper in various successive development.

Number of PMLs: 5 PML average area size: 7.2 ha

Number of involved experts: 4 Number of PML field visits: 10

Average taxon count on record: 65

Typical species found in the PMLs: *Juniperus communis*, *Populus alba*, *Berberis vulgaris*, *Crataegus oxyacantha*, *Prunus spinosa*, *Ligustrum vulgare*, *Quercus cerris*

Monitoring method: Plant species record with the coverage estimated according to the modified Tansley scale. The coverage of the vegetation levels, forest structure and impacts on the habitat were also assessed. This was done in the period from 1st of April to 30th of November.

Habitat distribution and localization of PMLs: The habitat can be found only in the Pannonian Bioregion in locality Čenkovská lesostep forest steppe.



Monitoring results:

Estimate of trend of habitat development: ALP: PAN: 0

Habitat quality in PMLs:



Overall habitat quality: ALP: PAN: U1

Habitat management in PMLs:



Habitat prospects in PMLs:



Overall prospects of habitat: ALP: PAN: U1

Pressures and threats: The most frequent negative impacts, with medium to high intensity, include invasive non-indigenous species of plants and trees and successive processes.

Assessment and notes on the monitoring results: The habitat can be found only in the Pannonian Bioregion and only on one site of calcareous sand. The overall status of the habitat is unfavourable. The habitat does not occur naturally, as is the case with other forest habitats. It is a successive unit (forest where grazing was provided). Grazing is a prerequisite for existence of such a habitat, especially for the permanent occurrence of juniper in well-lit areas and as well as for the local occurrence of white poplar and other broadleaved species. As the grazing is interrupted currently there is a gradual succession to another closed forest type. The original character of grazing forest is gradually but irreversibly changing, with a gradual overall decline of heliophilous juniper. Among the spreading tree species we can identify some invasive species, e.g. *Robinia pseudoacacia* and *Ailanthus altissima*.

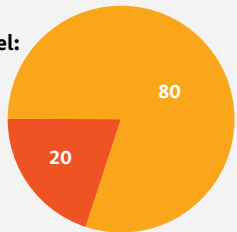


The non-controlled propagation of *Ailanthus altissima* seriously endangers the existence of this habitat.

In order to establish the lighting conditions suitable for juniper, it is necessary to restore the previous management. A gradual decline of acacia is helping, but the overall process is irreversible until the grazing will not be reintroduced and invasive plants will be eradicated.

Overall assessment of the conservation status of habitat

Conservation status on national level:
Overall habitat status: ALP: PAN: U1
Conservation status in SCIs: U1
Overall conservation status on national level: U1



By bioregion:



91Q0 Western Carpathian calcicolous *Pinus sylvestris* forests

The habitat consists of open stands of relict pine and larch on limestone and dolomite areas with extreme relief.

Number of PMLs: 45 **PML average area size:** 13.4 ha

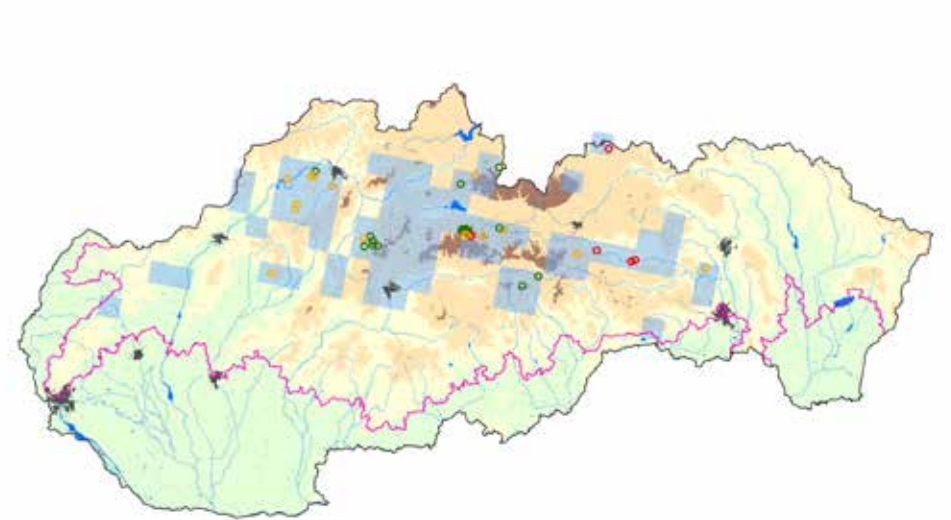
Number of involved experts: 13 **Number of PML field visits:** 45

Average taxon count on record: 57

Typical species found in the PMLs: *Pinus sylvestris*, *Sorbus aria*, *Larix decidua*, *Juniperus communis*, *Sorbus aucuparia*, *Calamagrostis varia*, *Sesleria albicans*, *Laserpitium latifolium*, *Carex alba*, *Carex humilis*

Monitoring method: Plant species record with the coverage estimated according to the modified Tansley scale. The coverage of the vegetation levels, forest structure and impacts on the habitat were also assessed. This was done in the period from 1st of April to 30th of November.

Habitat distribution and localization of PMLs: The habitat can be found in Alpine Bioregion.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN:

Habitat quality in PMLs:

ALP: 53.3 **35.6** **11.1**

PAN:

Overall habitat quality:

ALP: U1

PAN:

Habitat management in PMLs:

ALP: 95.3 **4.7**

PAN:

Habitat prospects in PMLs:

ALP: 64.4 **33.3** **2.3**

PAN:

Overall prospects of habitat:

ALP: U1

PAN:

Pressures and threats: Bark beetle calamities, wind storms and grazing in the past.

Assessment and notes on the monitoring results: The overall status for the habitat in the bioregion is unfavourable. The situation is the same for Sites of Community Importance. Most of the stands of this habitat type were sporadically utilized in the past for grazing or burnt, and therefore we can see the absence of richer structured stands with large trees, which are a prerequisite for the creation of large dead wood. Tree species composition is largely preserved and the occurrence of invasive species is identified in minimum number of areas. The habitat also features planting of non-indigenous black pine, which is not being continued. Its composition of the undergrowth is similar, consisting of indigenous species. This habitat occurs in mosaic



© Jaroslav Košťál

with beech calcicolous forests and rocky crevice vegetation and often a smooth transition forms between the two types. The habitat's situation is most affected by natural processes such as: calamities, insect infestation and forest fires. Little influence comes from management, as this is a territory without deliberately planned interventions (rocky area). It is partially influenced by the mining of limestone and dolomite. Some sites present a progressing succession to calcicolous beech forests with the pine being gradually pushed out without the possibility of natural regeneration. Often in polygons, intended for mapping, the habitat occurred only marginally and occurred more often on the so-called infertile areas located outside the stand area.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN:

Conservation status in SCIs:

U1

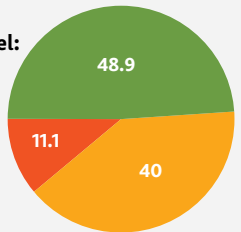
Overall conservation status on national level:

U1

By bioregion:

ALP: 48.9 **40** **11.1**

PAN:



9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*)

The habitat consists of blueberry and waterlogged spruce forests with indigenous tall herbs undergrowth.

Number of PMLs: 89 **PML average area size:** 12.8 ha

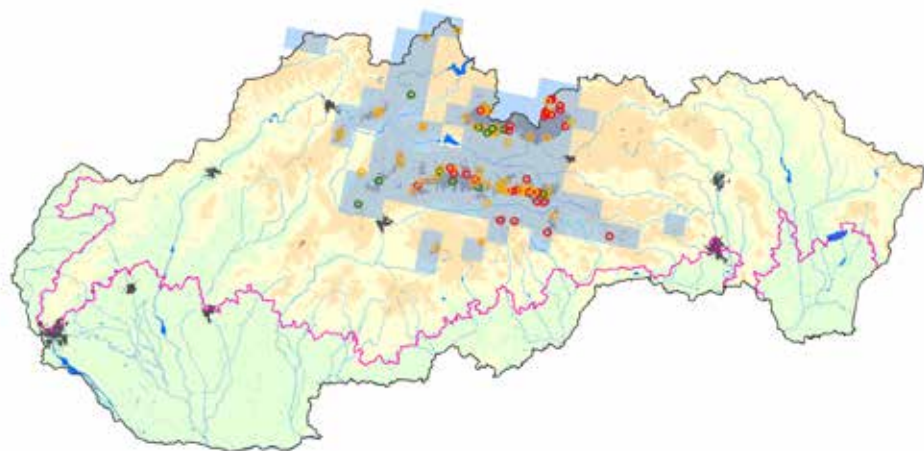
Number of involved experts: 16 **Number of PML field visits:** 89

Average taxon count on record: 39

Typical species found in the PMLs: *Picea abies*, *Sorbus aucuparia*, *Vaccinium myrtillus*, *Calamagrostis villosa*, *Homogyne alpina*, *Oxalis acetosella*, *Vaccinium vitis-idaea*, *Luzula sylvatica*, *Salix caprea*, *Avenella flexuosa*

Monitoring method: Plant species record with the coverage estimated according to the modified Tansley scale. The coverage of the vegetation levels, forest structure and impacts on the habitat were also assessed. This was done in the period from 1st of April to 30th of November.

Habitat distribution and localization of PMLs: The habitat can be found only in Alpine Bioregion.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN:

Habitat quality in PMLs:

ALP: 16.9 55.1 28

PAN:

Overall habitat quality:

ALP: U1

PAN:

Habitat management in PMLs:

ALP: 81.8 18.2

PAN:

Habitat prospects in PMLs:

ALP: 28.1 61.8 10.1

PAN:

Overall prospects of habitat:

ALP: U1

PAN:

Pressures and threats: The most frequent negative impacts, with medium to high intensity, include the management, windstorms and subsequent bark beetle infestations and grazing in the past.

Assessment and notes on the monitoring results: The habitat can be found only in the Alpine Bioregion and its status is unfavourable. Nevertheless, more than half of the sites were evaluated as in a favourable condition. Other stands have retained their tree species composition, but not the corresponding structure. In the past these were often utilized and harvested, especially at the timberline. Today, the spruce stands are disrupted by wind and subsequent bark beetle infestations. Bark beetle infestations are currently a widespread phenomenon affecting the condition of the habitat over large areas of almost all mountain ranges. These result from both unmanaged and unsuitable managed windstorm calamities, but the mainly influence comes from the changing climate. This regularly allows the bark beetle to create more generations during one year, which has not happened so far.



Preserved stands of this habitat generally do not require any management; others are either left to recover on their own or even artificially rejuvenated based on the classification to a particular protected areas. Their artificial rejuvenation is generally difficult and prolonged. Cultivations suffer from effects of snow cover and are also slow growing due to the short growing season. It is therefore necessary to allow the natural succession of pioneer tree species, as they are present in the particular area, as long as possible, until the original spruce is in competition with them.

Overall assessment of the conservation status of habitat

Conservation status on national level:

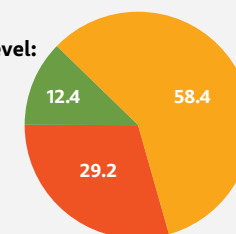
Overall habitat status: ALP: U1 PAN:

Conservation status in SCIs:

Overall conservation status on national level:

U1

U1



By bioregion:

ALP: 12.4 58.4 29.2

PAN:

9420 Alpine *Larix decidua* and/or *Pinus cembra* forests

The habitat consists of indigenous stands of spruce, larch and dwarf pine with stone pine in Vysoké Tatry Mountains.

Number of PMLs: 30 **PML average area size:** 15.8 ha

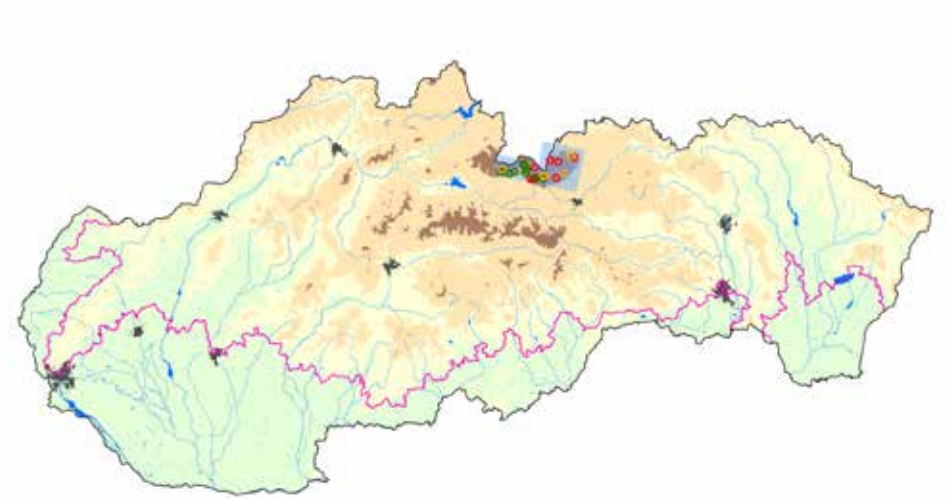
Number of involved experts: 8 **Number of PML field visits:** 30

Average taxon count on record: 52

Typical species found in the PMLs: *Picea abies*, *Pinus cembra*, *Sorbus aucuparia*, *Pinus mugo*, *Salix caprea*, *Larix decidua*, *Vaccinium myrtillus*, *Calamagrostis villosa*, *Homogyne alpina*, *Vaccinium vitis-idaea*

Monitoring method: Plant species record with the coverage estimated according to the modified Tansley scale. The coverage of the vegetation levels, forest structure and impacts on the habitat were also assessed. This was done in the period from 1st of April to 30th of November.

Habitat distribution and localization of PMLs: The habitat can be found only in the Alpine Bioregion.



Monitoring results:

Estimate of trend of habitat development: ALP: 0

PAN:

Habitat quality in PMLs:

ALP: 50 **36.7** **13.3**

PAN:

Overall habitat quality:

ALP: U1

PAN:

Habitat management in PMLs:

ALP: 92.1 **7.9**

PAN:

Habitat prospects in PMLs:

ALP: 56.7 **30** **13.3**

PAN:

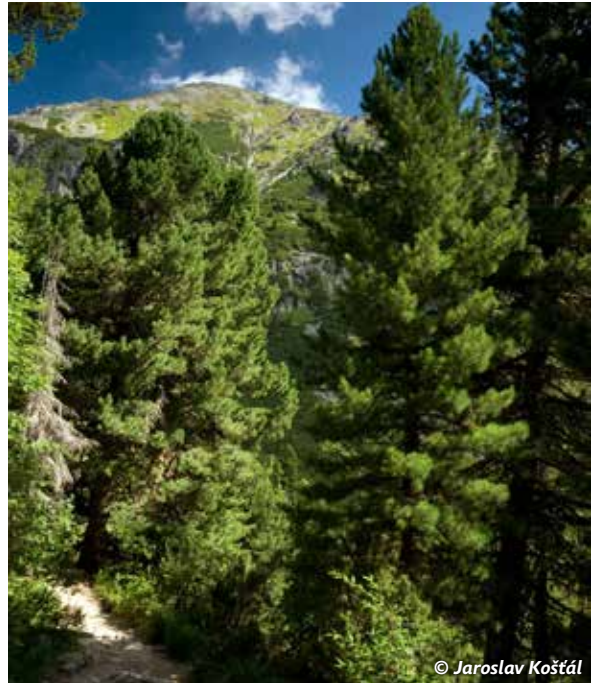
Overall prospects of habitat:

ALP: U1

PAN:

Pressures and threats: The most frequent negative impacts, of medium to high intensity, are abiotic (slow) natural processes, transport networks and outdoor, sports and recreational activities.

Assessment and notes on the monitoring results: The habitat can be found only in the Alpine Bioregion in one geomorphological complex of Tatra Mountains and its status is unfavourable. Nevertheless, more than half of the sites were evaluated as in a favourable conditions. Other stands have retained their tree species composition, but not the corresponding structure. In the past these were often utilized and harvested, especially at timberline. Some potential sites of this type no longer have stone pine and so were included in the habitat of spruce forests.



Stands have sometimes disrupted by wind and consequently affected by bark beetle calamities.

Stone pine stands in timberline do not require any management. Other stands are either left to develop on their own or artificially rejuvenated based on their classification to particular protected areas. Given the extremity of the environment their artificial rejuvenation is always intensive and long lasting. It is therefore necessary to use the natural succession of pioneer tree species and to accept very long periods of restoration of these areas by target tree species.

Overall assessment of the conservation status of habitat

Conservation status on national level:

Overall habitat status: ALP: U1 PAN:

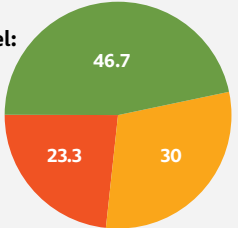
Conservation status in SCIs: U1

Overall conservation status on national level: U1

By bioregion:

ALP: 46.7 **30** **23.3**

PAN:



Experts used data forms to record all required data. The data forms follow up the mosses monitoring methodologies, which set out the required data fields. Experts added data into on-line forms in CIMS. All data were evaluated to prepare comprehensive information.

Výkon monitoringu:

Fotografie a prílohy v rámci TML
Zoznam TML
Zoznam lokalít
Hľadanie verzií

Základné informácie

SVM58
Google map

Kód TML*
Štát*
Oblasť monitoringu*
Význam*

Plocha TML*
Kód a názov druhu*
Meno nálezcu/ky*
Dátum*

Skratky strechy TML*
Long
Názov lokality

Typ biotopu druhu (Kód podľa Katalógu biotopov, alebo opis)*

Kód biotopu druhu:
Oblasť:

Kvalita biotopu druhu na lokalite (v % z celkovej plochy TML)

Dobrá?
Nevyhovujúca?
Zlá?

Súčasná a budúca aktivita ovplyvňujúca TML

Aktivita na lokalite*
% plochy*
Intenzita vplyvu*
Vplyv/budúci vplyv*

Pozor

Aktivita na lokalite	Intenzita vplyvu	% plochy	Vplyv/budúci vplyv	Akcia
Pre zvýšenie šírky neposkytujú žiadne skrátené názvy na obrazovke.				

Výhľadky biotopu druhu do budúcnosti na lokalite (v % z celkovej plochy TML)

Dobrá?
Nevyhovujúca?
Zlá?

Kvalita populácie druhu na lokalite

Dobrá?
Nevyhovujúca?
Zlá?

Počasia*

Poznámka

Iné fotografie a prílohy v rámci TML

[+ Pridať](#)

Názov súboru fotky/prílohy	Objekt fotenia/prílohy	Akcia
Pre zverejnenie kliknite na odkaz. Zobraziť ďalšie záznamy na stránke.		

Fotografie a přílohy v rámci TML **Zobrazit TML** Zobrazit taxidno Hledat věci

Zoznam TML (mínus samplingu) v rámci TML

☒ Přidat – vybrat z existujících TML
 ☐ Nové – vytvořit novou TML

č. TML:

Šířka TML (ong./lat.): Rozměry TML (š. x d.) v m:

Fixace TML:

Název souboru fotky:

č. TML	Šířka TML (ong./lat.)	Rozměry TML (š. x d.) v m	Fixace TML	Název souboru fotky	Akce
Pro zvolený šifr neexistují žádné záznamy na zobrazení.					

Fotografie a přílohy v rámci TML Znovu TML **Znovu zadání** Možná věst

Záznam taxidnov, ich početnosti a charakteristiky sdělov

Název taxidnov:

č. TML:

Početnost v TML [je]:



Spůsob zřev:

Početnost v TML [je]:

Charakteristika:

Prost

Název taxidnov	č. TML	Početnost v TML	Početnost v TML	Spůsob zřev	Charakteristika	Akce
Pro zvolený řáek neexistují řádkové záznamy na zobrazení.						

Zaevidevateľ	Verzia	Stav	Metodika	Biolog/Druh	Kód TML	Datum	Meno mapovateľa	Názov lokality	Komentár	Akcie
1	Koncept	Metodika monitoringu - Buršausma vlna	Taxon					Murínska planina, Muráh, Javorčikova dolina		 

Experts used data forms to record all required data. The data forms follow up the vascular plants monitoring methodologies, which set out the required data fields. Experts added data into on-line forms in CIMS. All data were evaluated to prepare comprehensive information.

Monitoring

Výkon monitoringu:

Fotografie a přílohy v rámci TML Stav zachovatelnosti lokality Zoznam TMP Zoznam taxonov História verzií

Základné informácie

Kód TML* Stav*
 Inzerovaný kód lokality* Účel monitoringu:
 Plocha TML*
 Kód a názov druhu*
 Miesto napovedať* Smernice (stred) TML*
 Dátum* Názov lokality

Typ biotopu druhu (Kód podľa Katalógu biotopov, alebo opis)*

Kód biotopu druhu:
 Opis:

Kvalita biotopu druhu na lokalite (v % z celkovej plochy TML)

Dobrá* 0,0 Nevýhovorná* 0,0 Zlá* 0,0

Súčasná a budúce aktivity ovplyvňujúce TML

Aktivita na lokalite*
 % plochy*
 Intenzita vplyvu* Výpry/budúci vplyv*

Aktivita na lokalite	Intenzita vplyvu	% plochy	Výpry/budúci vplyv	Akcia
Pre zvolený filter neexistujú žiadne záznamy na zobrazenie.				

Výsledky biotopu druhu do budúcnosti na lokalite (v % z celkovej plochy TML)

Dobrá* 0,0 Nevýhovorná* 0,0 Zlá* 0,0

Kvalita populácie druhu na lokalite

Dobrá* 0,0 Nevýhovorná* 0,0 Zlá* 0,0

Poznámka

Fotografie a prílohy v rámci TML Stav zachovatelnosti lokality Zoznam TMP Zoznam taxonov História verzií

Iné fotografie a prílohy v rámci TML

Názov súboru fotky/prílohy	Objekt fotenia/prílohy	Akcia
Pre zvolený filter neexistujú žiadne záznamy na zobrazenie.		

Fotografie a prílohy v rámci TML Stav zachovatelnosti lokality Zoznam TMP Zoznam taxonov História verzií

Stav zachovatelnosti lokality (TML)

1.1 VEKOSŤ PLOCHY VÝSKYTU (m²)* 0,00 Hodnotenie stavu (A, B, C, D)* --- nezádaná hodnota ---
 1.2 POČET JEDINCOV (ks)* 0 Hodnotenie stavu (A, B, C, D)* --- nezádaná hodnota ---
 1.3 VITALITA POPULÁCIE (%) Hodnotenie stavu (A, B, C, D)* --- nezádaná hodnota ---
 1.3.1 Fertilitná realita:
 1.3.2 Sterilitná realita:
 1.3.3 Plošná realita:
 1.4 STAV BIOTOPU:
 1.4.1 Veľkosť biotopu (m²)* 0,00 Hodnotenie stavu (A, B, C, D)* --- nezádaná hodnota ---
 1.4.2 % inváznych neinváznych tax.* 0,00 Hodnotenie stavu (A, B, C, D)* --- nezádaná hodnota ---
 1.4.3 Zastavenie (hrádky, stromy) (%) 0,00 Hodnotenie stavu (A, B, C, D)* --- nezádaná hodnota ---
 1.4.4 Injektivita vplyvu* --- nezádaná hodnota --- Hodnotenie stavu (A, B, C, D)* --- nezádaná hodnota ---
 1.5 DYNAMIKA POPULÁCIE* --- nezádaná hodnota --- Hodnotenie stavu (A, B, C, D)* --- nezádaná hodnota ---

Fotografie a prílohy v rámci TML Stav zachovatelnosti lokality Zoznam TMP Zoznam taxonov História verzií

Zoznam TMP (miest samplings) v rámci TML

Príloha - vytvoriť z existujúcich TMP Nové - vytvoriť novú TMP

2. TMP* --- nezádaná hodnota ---
 Smernice TMP (long, lat.) Rozmery TMP (š x d) v m
 Názov súboru fotky --- nezádaná hodnota ---
 Počet jedincov (ks)* Fertilitná jedinec (ks)*
 Sterilitná jedinec (ks)* Vitalita (%)

2. TMP	Smernice TMP (long, lat.)	Rozmery TMP (š x d) v m	Počet jedincov	Fertilitná (ks)	Sterilitná (ks)	Vitalita (%)	Názov súboru fotky	Akcia
Pre zvolený filter neexistujú žiadne záznamy na zobrazenie.								

Fotografie a prílohy v rámci TML Stav zachovatelnosti lokality Zoznam TMP Zoznam taxonov História verzií

Zoznam taxonov, ich početnosti a charakteristiky nálezu

Názov taxonu*
 Ochranný
 Invázny
 Ochranný

Názov taxonu	Ochranný	Invázny	Početnosť/Pokryvosť v TML	Akcia
Pre zvolený filter neexistujú žiadne záznamy na zobrazenie.				

Fotografie a prílohy v rámci TML Stav zachovatelnosti lokality Zoznam TMP Zoznam taxonov História verzií

Zverejnené	Verzia	Stav	Metódika	Biologický	Kód TML	Dátum	Miesto napovedať	Názov lokality	Komentár	Akcia
I	1	Koncept	Taxon			13.11.2015		Chas		<input type="text"/>

Následných 1 položiek

Experts used data forms to record all required data. The data forms follow up the non-forest habitat monitoring methodologies, which set out the required data fields. Experts added data into on-line forms in CIMS. All data were evaluated to prepare comprehensive information.

Monitoring

Výkon monitoringu:

Fotografie a prílohy v rámci TML Zoznam taxónov História verzií

Základné informácie

Kód TML*

Stav* Údaje monitoringu:

% z plochy*

Kód a názov biotopu*

Meno naspisovateľa*

Názov lokality

TMP

Kódy biotopov podľa Katalógu biotopov

Kód biotopu*

% z plochy*

Kód biotopu podľa Katalógu biotopov	% z plochy	Akcia
Pre zvolený filter neexistujú žiadne záznamy na zobrazenie.		

Pokryvnosť otáči

E1* E2* E3* E4*

Súčasná a budúce aktivity ovplyvňujúce TML

Aktivita na lokalite*

% plochy*

Intenzita vplyvu* Vplyv/budúci vplyv*

Aktivita na lokalite	Intenzita vplyvu	% plochy	Vplyv/budúci vplyv	Akcia
Pre zvolený filter neexistujú žiadne záznamy na zobrazenie.				

Kvalita biotopu na lokalite (v % z celkovej plochy biotopu)

Dobrá* 0,0 Nevýhovojúca* 0,0 Zlá* 0,0

Manažment biotopu (v % z celkovej plochy biotopu)

Vhodný* 0,00 Nevhodný* 0,00

Výhľadky biotopu do budúcnosti na lokalite (v % z celkovej plochy biotopu)

Dobrá* 0,0 Nevýhovojúca* 0,0 Zlá* 0,0

Poznámka

Fotografie a prílohy v rámci TML Zoznam taxónov História verzií

Iné fotografie a prílohy v rámci TML

Názov súboru fotky/prílohy	Objekt fotenia/prílohy	Akcia
Pre zvolený filter neexistujú žiadne záznamy na zobrazenie.		

Fotografie a prílohy v rámci TML Zoznam taxónov História verzií

Zoznam taxónov

Taxon*

Dat*

Abund TML*

Taxon	Etas	Abund TMP	Abund TML	Akcia
Pre zvolený filter neexistujú žiadne záznamy na zobrazenie.				

Experts used data forms to record all required data. The data forms follow up the forest habitat monitoring methodologies, which set out the required data fields. Experts added data into on-line forms in CIMS. All data were evaluated to prepare comprehensive information.

Monitoring

Výkon monitoringu:

Indikatory stavu Manažment biotopu Fotografie a prílohy v rámci TML Zoznam taxónov História verzií

Základné informácie

Kód TML*

Kód a názov biotopu*

Názov lokality

Meno respondentu*

Výmera TML*

Kódy biotopov podľa Katalógu biotopov

Kód biotopu*

% z plochy*

Kód biotopu podľa Katalógu biotopov

% z plochy Akcia

Pre zvolený filter neexistujú žiadne záznamy na zobrazenie.

Pokryvnosť státi

E1* E2* E3* E4*

Geografické údaje

Stred TML / TMP (N, E)*

Nadmorská výška (Min, Max)*

Sklon (%)

Expozícia*

Poznámka

9130 - Buková a jedľová kvetnatá leś / TML_9130_408 Indikatory stavu Manažment biotopu Fotografie a prílohy v rámci TML Zoznam taxónov História verzií

A1 Dreviny

Zastúpenie v %

Prírodnosť*

Nepřírodnosť*

Invázivnosť*

Stav*

A2 Byliny a kry

Pokryvnosť v %

Prírodnosť*

Invázivnosť*

Stav*

B1 Veková štruktúra

Podiel v %

Rozmernosť*

Rozmernosť (> 20 r)*

Rozmernosť (> 50 r)*

Stav*

B1 Veková štruktúra - vek / rastový stupeň

Vek (r)	Rastový stupeň	
	Min	Max
Rozmernosť*	0	5
Podiel rozmerov %*	0	5
Rozmernosť (> 20 r)*	0	5
Rozmernosť (> 50 r)*	0	5

B2 Zmladenie

Pokryvnosť v %

Prírodnosť*

Z nich invázivnosť*

Umelosť*

Stav*

B3 Výstavba

Podiel v %

Jednotlivosť*

Dvojčinnosť*

Viacčinnosť*

Stav*

B4 M, a zvl. c. stromy

Koľko

Hrubosť*

Zvl. c. stromy*

Stav*

B5 Hrubé mŕtve drevo

Koľko

Stavosť*

Stavosť*

C1 Zdravotný stav

Podiel v %

0 - Zdravý*

1 - Menšie škody*

2 - Stredne škodlivý*

3 - Výrazne škodlivý*

Stavosť*

Stav*

9130 - Buková a jedľová kvetnatá leś / TML_9130_408 Indikatory stavu Manažment biotopu Fotografie a prílohy v rámci TML Zoznam taxónov História verzií

Manažment biotopu aktívny

Manažment biotopu*

Podiel (%)

Aktívny manažment biotopu

Podiel (%) Akcia

Pre zvolený filter neexistujú žiadne záznamy na zobrazenie.

Vhodný (aktívny)*

Manažment biotopu pasívny

Manažment biotopu*

Podiel (%)

Pasívny manažment biotopu

Podiel (%) Akcia

Pre zvolený filter neexistujú žiadne záznamy na zobrazenie.

Vhodný (pasívny)*

Aktivita na TML a jej potencionálne ohrozenie

Aktivita na lokalite*

% plochy*

Intenzita vplyvu*

Výsledok vplyvu*

Aktivita na lokalite

Intenzita vplyvu % plochy Vplyv/Bodový vplyv Akcia

Pre zvolený filter neexistujú žiadne záznamy na zobrazenie.

Kvalita biotopu na lokalite (v % z celkovej plochy biotopu)

Dobrot*

Nevyhovnosť*

Za*

Výhľadky biotopu do budúcnosti na lokalite (v % z celkovej plochy biotopu)

Dobrot*

Nevyhovnosť*

Za*

9130 - Buková a jedľová kvetnatá leś / TML_9130_408 Indikatory stavu Manažment biotopu Fotografie a prílohy v rámci TML Zoznam taxónov História verzií

Iné fotografie a prílohy v rámci TML

Typ	Názov súboru fotky/prílohy	Súradnice fotky (long./lat.)	Objekt fotenia/prílohy	Akcia

Pre zvolený filter neexistujú žiadne záznamy na zobrazenie.

9130 - Buková a jedľová kvetnatá leś / TML_9130_408 Indikatory stavu Manažment biotopu Fotografie a prílohy v rámci TML Zoznam taxónov História verzií

Zoznam rastlinných druhov na TML

Taxón*

Typ taxónu*

Etáž*

Nepřírodnosť/invázivnosť*

Pole (%)

Taxón/Štefka

Typ taxónu Etáž Nepřírodnosť/invázivnosť Pokrytie (%) Frekvencia výskytu Pokrytie (Tensely) Akcia

Pre zvolený filter neexistujú žiadne záznamy na zobrazenie.

Photo attachment



© Julie Jandová

↑ *Buxbaumia viridis* is species of European importance which can be found in the most ordinary spruce monocultures, in which only few of the strongest species of bryophytes grow. There are three requirements for its occurrence: air humidity (water streams does not have to be necessarily present), adequate shading provided by surrounding forest stand and tree stumps left after logging. If there are no tree stumps left, population of moss dies out due to lack of suitable substrate for its growth.

↓ *Leucobryum glaucum*. Ideal habitat for mass occurrence of the species was recorded in Kysuce, near Raková village. Detail is from the locality TML_LeucGlau_067 near the village Šajdíkové Humence near Senica, at blow-in sand.



© Tomáš Figura



© Janka Galvánková

↑ *Mannia triandra*. Competitively weak species of *Marchantiophyta*. Its body of turquoise-green colour breaks down during the maturation of spores. Places of its frequent occurrence, mostly on exposed soil substrates, are dotted with small 2-3 mm long sporangia caps.

↓ Habitat of species *Lindernia procumbens* – the river Latorica oxbow-lake. The year 2015 was exceptionally good in the floodplain area of Latorica River for species *Lindernia procumbens* and habitat 3130; represented by species *Eleocharis acicularis*, *Dichostylis micheliana* and *Cyperus fuscus* which did extremely well, too.



© Andrea Šimková, detail Miloš Balla



↑ *Marsilea quadrifolia* develops homogeneous and fully connected growth over a large area after full exposure of material pits in the floodplains of the Latorica and Laborec Rivers.

↓ TML_1340_015 * *Inland salt meadows*. Hundreds of individuals of critically endangered species *Plantago tenuiflora* appeared on the locality after grazing restoration in SCI Mostová, which started in 2013. Site is mowed in early July. Intensive grazing by sheep herd with 99 individuals takes place at the end of August or beginning of September.



↑ TML_1340_025 Grazing at Kamenínske Slanisko salt meadow was once again restored after few decades of its absence. This was done within the project LIFE10NAT/SK/083. Positive impact was reflected almost immediately and after only two growing seasons an improvement of vegetation status can be seen. Two species of halophytes, which occurrence could not be proved for a long time here – *Carex divisa* and *Trifolium retusum*, were confirmed in the territory in 2015.

↓ Valuable habitat 2340 * *Pannonic inland dunes* occurs in Slovakia in the Borská nížina Lowland only. In the picture, summer aspect with *Stipa borysthenica* at the locality Krížnica, TML_2340_012.





© Heňa Sedláková

↑ Stand with *Sparganium angustifolium* (habitat 3130 Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and /or *Isoëto-Nanojuncetea*) at the locality Lysá Poľana.

↓ TML_3140_005 Example of habitat 3140 Hard oligo-mesotrophic waters with benthic vegetation of *Chara* formations at the locality Mlynná near the village Vernár.



© Anna Leskovjanská



© Peter Baláži

↑ TML_3150_069 Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* – type vegetation. Species *Nymphaea alba* prefers deeper, vertical, rather eutrophic waters rich in calcium. Locality So-motor, Starý Bodrog.

↓ TML_3230_042 Alpine rivers and their ligneous vegetation with *Myricaria germanica* on the river Torysa. The existence of habitat is threatened by planned construction of a water reservoir above the village Tichý Potok.



© Martin Hrušický



© Tomáš Figura

↑ TML_3240_039 Alpine rivers and their ligneous vegetation with *Salix elaeagnos*. Preserved habitat with a dominant occurrence of this willow near the village of Malý Lipník.

↓ TML_3260_005 and 007 Water courses of plain to montane levels with the *Ranunculon fluitantis* and *Callitricho-Batrachion* vegetation. Water buttercups *Batrachium aquatile* and *B. trichophyllum* at Turiec River in the localities Moškovec and Socovce. They prefer mesotrophic to slightly eutrophic stagnant or flowing waters with muddy, sandy or clayey river bottom.



© Peter Baláži



© Tomáš Figura

↑ TML_4060_089 Alpine and boreal heaths. Massive habitat plantations at the locality Chrapáky in Krivánska Malá Fatra Mountains. Photo taken from Koniarky Mountain.

↓ TML_4080_012 Formations with *Salix helvetica* in Hlinská dolina Valley (Habitat 4080 Sub-Arctic *Salix* spp. scrub).



© Jozef Šibík



© Dobromil Galváněk

↑ Habitat 5130 *Juniperus communis* formations on heaths or calcareous grasslands developed on extensively grazed areas.

↓ Species *Daphne arbuscula*, endemit of Muránska planina Mountain, inhabits steep cliff edges.



© Drahoš Blanár



© Matej Dudáš

↑ TML_6110_040 *Rupicolous calcareous or basophilic grasslands of the Alysso-Sedion albi. Scan of the individual found while mapping of locality Sivec. They were identified as *Taraxacum cf. pudicum*. It is a new taxon from the *Erythrosperma* section and also new species for the flora of Slovakia (Vašut, Majeský 2015).

↓ *Dianthus praecox* subsp. *lumnitzeri* grows at Devínska hradná skala rock on shallow carbonate substrate.



© Helga Kothajová



© Janka Galvánková



© Tomáš Figura

↑ Flowering habitat 6170 Alpine and subalpine calcareous grasslands at the locality Vyšné Kopské sedlo with significant aspect of species *Silene acaulis* and *Pedicularis oederi*.

↑ TML_6190_019 Rupicolous pannonic grasslands near Košecké podhradie with orchid species *Ophrys apifera*.

↓ *Pulsatilla grandis* is growing in habitat 6190 Rupicolous pannonic grasslands.



© Dobromil Galvánek, detail Tomáš Figura



© Tomáš Dražil

↑↓ TML_6211_058 and TML_6211_059 Semi-natural dry grasslands and scrubland facies on calcareous substrates, * important orchid sites. Kopanecké lúky meadows in the Slovenský raj national park is a site of outstanding diversity of meadow habitats. They belong to the richest plant communities in the world in terms of species abundance. New world record was reached here at Kopanické lúky meadows, when there were 52 species recorded at an area of 0,25 m² and 63 species at an area of 0,5 m², states the study on the richest plant communities in Czech republic and Slovakia published lately (Chytrý et al.2015).



© Milan Barlog



© Iveta Škodová

↑ TML_6211_034 Semi-natural dry grasslands and scrubland facies on calcareous substrates, * important orchid sites. Stands with occurrence of orchids and *Ornithogallum sphaerocarpum*, overgrown with shrubs, were mulched in September at the locality Dúbravy in Bošácka dolina Valley in Biele Karpaty Mountains (within LIFE09 NAT/CZ/000364 project).

↓ TML_6211_122 Controlled grazing – goats grazing in secluded areas in Biele Karpaty Mountains at locality Nová Bošáca, part Španie.



© Katarína Devánová



© Tomáš Figura

← TML_6211_113 Semi-natural dry grasslands and scrubland facies on calcareous substrates, *important orchid sites with occurrence of *Ophrys holubyana* at locality Málová. Both localities Čerenec and Málová are threatened by overgrowth.

↓ Tall grasslands can become dominating in case of lack of grazing in habitat 6230* Species-rich *Nardus* grasslands on siliceous substrates in mountain areas. The picture shows stands of *Calamagrostis* sp. at slopes of Krížna in Veľká Fatra Mountains.



© Dobromil Galváněk



← TML_6240_048 *Sub – pannonic steppic grasslands. There is abundance of several rare species, *Neottinea tridentata* including, at locality Čerenec near Prašník.

↓ TML_6240_215 *Sub – pannonic steppic grasslands at locality Žibrické lúky meadows are maintained by protective management.

© Tomáš Figura



© Janka Galvánková



© Tomáš Figura

← TML_6430_333 Hydrophilous tall-herb fringe communities of alpine level in terrain depressions or around springs at slopes in Krivánska Malá Fatra Mountains with dominant species *Adenostyles alliariae*.

↓ TML_6430_399 Hydrophilous tall-herb fringe communities are attacked by invasive species in the flats of the rivers from lowlands to foothills, e.g. *Heracleum mantegazzianum*, *Impatiens glandulifera* or *Reynoutria* spp.



© Tomáš Figura



© Dobromil Galváněk

↑ Floods represent an important ecological factor influencing habitat 6440 *Alluvial meadows of river valleys of the Cnidion venosi alliance*.

↓ Late summer aspect of habitat 6440 with dominant species *Clematis integrifolia*.



© Dobromil Galváněk



© Dobromil Galváněk, detail Tomáš Figura

↑ Summer aspect of habitat 6510 *Lowland hay meadows*. At TML_6510_358 lowland hay meadows with population of species *Orchis militaris*.

↓ TML_6510_725 *Lowland hay meadows* are regularly mowed at locality Švancarovci in Kysuce Region.



© Patrícia Ďurčanová



← TML_7140_003 Transition mires and quaking bogs at locality Chraste II. Fens or transition mires with lack of water often overgrow by *Calluna vulgaris*.

↙ TML_7220_088 *Petrifying springs with tufa formation at locality Tajovská kopa.

↓ TML_7220_140 *Petrifying springs with tufa formation at locality Horný Vadičov (Za Ladonhorou) are extensively grazed by sheep and goats.



© Dobromil Galváněk



© Patrícia Ďurčanová



© Zuzana Plesková

↑ TML_7230_089 Alkaline fens. An example of alkaline fens with flowering *Eriophorum* sp. and orchids at locality Demänovská dolina valley near Nízke Tatry Mountains.

↓ TML_7230_090 Alkaline fens. Puchmajerovej jazierko lake conserving fallen spruce tree trunks in its dystrophic waters. Around lake there is transition mire. The detail picture shows water drops on leaves of sundew (*Drosera anglica*) near Puchmajerovej jazierko lake.



© Zuzana Plesková



← TML_7230_119 Alkaline fens. Threeranked humpmoss (*Meesia triquetra*) is critically endangered species of our bryoflora growing at well-preserved fens only. It can be found at locality Švihrová.

↓ TML_7230_094 Angled Paludella moss (*Paludella squarrosa*) is critically endangered moss with only several localities in Slovakia, Peciská II is one of the localities.



© Zuzana Plesková



© Zuzana Plesková

↑ TML_7230_121 Alkaline fens. *Pseudocalliergon trifarium* is critically endangered species of Slovak bryoflora. It can be found at alkaline fen at locality Belianske lúky meadows.

↓ TML_7230_121 Alkaline fens. A part of fen at locality Belianske lúky meadows with Belianske Tatry Mountains view.



© Zuzana Plesková



← Little, critically endangered fen orchid (*Liparis loeselii*) at locality Čertižné in Východné Karpaty Mountains, TML_7230_130.

↙ Closer view of alkaline fen vegetation (TML_7230_144), growth of endangered variegated horsetail (*Hippochaete variegata*) and marsh grass of Parnassus (*Parnassia palustris*) at locality Machy.

↓ A stream that saturates the tufa formations and alkaline fen at locality near Liptovská Teplička village, TML_7230_153 Vikartovský mlyn II.



© Zuzana Plesková



© Zuzana Plesková



← Rare and protected fen species *Ligularia sibirica* in Nízke Tatry Mountains at locality Vikartovský mlyn (TML_7230_152).

↓ View of alkaline fen at locality Vikartovský mlyn towards the ridge of Nízke Tatry Mountains, TML_7230_152 Vikartovský mlyn.



© Zuzana Plesková



© Juraj Daniel-Szabó



© Juraj Daniel-Szabó

↑ TML_9110_084 *Luzula nemorosa* is dominant in the undergrowth of the habitat 9110.

↑ TML_9110_182 *Pteridium aquilinum* and *Vaccinium myrtillus* in undergrowth of the habitat 9110.

↓ TML_9130_112 *Asperulo-Fagetum* beech forests (Ls5.1). Examples of forest restoration in the foothills of Trábeč Mountain.



© Norbert Hatala



© Juraj Daniel-Szabó

↑ TML_9130_419 Example of suitable management in the forest near town of Stropkov.



© Juraj Daniel-Szabó

↑ TML_9130_540 Non-indigenous species *Erichthites eracifolius*, which can be invasive at times.

↓ Multilayered structure, restricted in space and time to places with disconnected vegetation closure in stands. Habitat 9130 *Asperulo-Fagetum* beech forests (Ls5.1) in Nízke Tatry Mountains.



© Michal Vyšinský



↑ TML_9140_073 Trees damaged by avalanches and snow in beech woods with *Acer* sp. in Veľká Fatra Mountains.

↓ TML_9150_031 Example of unsuitable management of beech forests in Strážovské vrchy Mountains by coppicing in the past. Habitat 9150 *Medio-European limestone beech forests of the Cephalanthero-Fagion* (Ls5.4).



↑ TML_9170_008 *Galio-Carpinetum* oak-hornbeam forests (Ls2.3.1) belongs to habitats which are significantly and in long-term influenced by human activities to the point that its naturalness is questionable. Locality Mariánska hora in forest management unit LHC Levoča.

↓ TML_9190_005 Example of suitable forest structure of habitat 9190 *Old acidophilous oak woods with Quercus robur* on sandy plains (Ls3.6).

↓ TML_9190_012 Outstanding occurrence of habitat at locality Duchonka in forest management unit LHC Topolčany outside of up to now evidenced distribution in Borská nížina Lowland. Development of habitat at this site was influenced by construction of forest railway in 19th century.





© Norbert Hatala

↑ TML_9190_020 Old acidophilous oak woods with *Quercus robur* on sandy plains (Ls3.6). Example of unsuitable forest structure.



© Norbert Hatala

↑ TML_91E0_016 Habitat *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Ls1.1) occurrence without significant human influence in inundation of water dam Gabčíkovo.

↓ TML_91D0_049 *Bog woodlands (Ls7.3) were also influenced by human activities, despite its protective character. Typical natural restoration takes place at uprooted windblown trees of former generation. Locality Podspády – Bor in forest management unit LHC Vysoké Tatry.



© Viliam Flachbart



© Juraj Daniel-Szabó

↑ TML_91E0_033 Monotonous phytocenosis with *Allium ursinum* in valley of Velká Fatra Mountains.

↓ TML_91E0_038 Dense growth with species *Carex brizoides*.



© Juraj Daniel-Szabó

↑ TML_91E0_033 * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Ls1.1). Spring aspect with species *Scilla bifolia*, *Gagea lutea* and *Allium ursinum* at locality Krásny Brod.



© Juraj Daniel-Szabó



© Norbert Hatala

↑ TML_91E0_084 *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Ls1.1). Early spring in remnants of oxbow lake surrounded by fields at locality Žitný ostrov.

↓ TML_91E0_088 * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Ls1.1) belong to the wettest areas which are permanently and significantly influenced by water levels. Their natural restoration is therefore complicated. Polder Beša in forest management unit LHC Sobrance.



© Viliam Flachbart



© Norbert Hatala

↑ TML_91E0_092 Example of unsuitable habitat management * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* habitat (unit Ls1.3 *Fraxinus-Alnus* submontane alluvial forests) at locality Trábeč.

↓ TML_91F0_078 Habitat Riparian mixed forests of *Quercus robur*, *Ulmus laevis* and *Ulmus minor*, *Fraxinus excelsior* or *Fraxinus angustifolia*, along the great rivers (*Ulmion minoris*). Unsuitable change of tree species composition from original native poplars to trees of hardwood alluvium forest at Žitný ostrov.



© Norbert Hatala



↑ TML_91H0_116 *Pannonian woods with *Quercus pubescens* (Ls3.1). Example of suitable forest structure with dead wood left in habitat at locality Považský Inovec.

↓ TML_91H0_148 Non-indigenous and invasive *Ailanthus altissima* on calcareous karrens, locality Jablonov nad Turňou.



↑ TML_91H0_018 Forest stand with oaks *Quercus pubescens*, *Q. daleschampii* and *Cornus mas* at locality Jablonov.

↓ Extreme localities are typical by restricted growth of trees, even at their old age. Picture shows „apple tree“ look of pubescent oak (*Quercus pubescens*) and sessile oak (*Q. petraea*) in habitat 91H0 *Pannonian woods with *Quercus pubescens* (Ls3.1) at locality Považský Inovec Mountain.





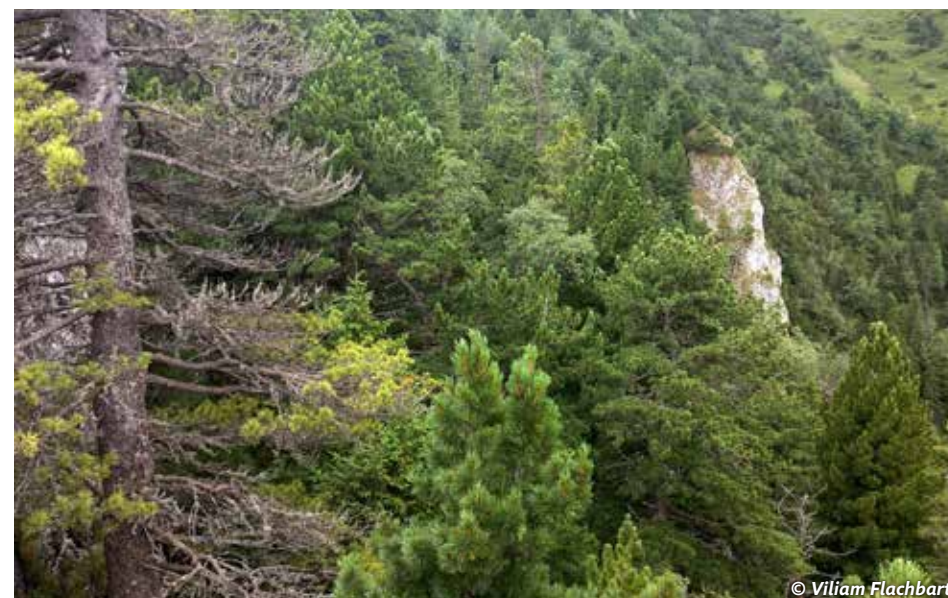
↑ TML_9110_156 Habitat Euro-Siberian steppic woods with *Quercus* spp. (Ls3.3) with species *Quercus robur*, *Pinus sylvestris* and *Frangula alnus* in poor quality.

↓ TML_91N0_003 *Pannonic inland sand dune thicket with *Juniperus communis* (Ls10). Example of unsuitable succession of shrubs after completion of animal grazing in 50ties of last century in Čenkovský les complex.



↑ *Western Carpathian calcicolous *Pinus sylvestris* forests 91Q0 (Ls6.2) occur naturally only in fragments of convex terrain shapes, edges of rocky terraces and ridges, most often with unit Ls5.4 Limestone beech forests, or Ls4 *Tilio-Acerion* forests of slopes, screes and ravines. Locality Kozie chrbty in Nízke Tatry Mountains.

↓ TML_9420_031 Alpine *Larix decidua* and/or *Pinus cembra* forests (Ls9.4) occur at timberline in forest area LO Tatry. They are important for preserving genofond of native species of pine (*Pinus cembra*). Some bird species, spotted nutcracker especially, contribute to this.



References

- Chytrý M., Dražil T., Hájek M., Kalníková V., Preislerová Z., Šibík J., Ujházy K., Axmanová I., Bernátová D., Blanár D., Dančák M., Dřevojan P., Fajmon K., Galváneš D., Hájková P., Herben T., Hrivnák R., Janeček Š., Janišová M., Jiráská Š., Kliment J., Kochjarová J., Lepš J., Leskovjanská A., Merunková K., Mládek J., Slezák M., Šeffer J., Šefferová V., Škodová I., Uhlířová J., Ujházyová M. & Vymazalová M. (2015): The most species-rich plant communities in the Czech Republic and Slovakia (with new world records). – *Preslia* 87: 217-278.
- Kolarčík V., Zozomová Lihová J. & Mártonfi P. 2010. Systematics and evolutionary history of the *Asterotricha* group of the genus *Onosma* (*Boraginaceae*) in central and southern Europe inferred from AFLP and nrDNA ITS data. *Plant Syst. Evol.* 290: 21-45.
- Mártonfi P., Kolarčík V. & Somlyay L. 2014. Lectotypification of *Onosma viridis* and synonymization of *O. tornensis* with *O. viridis* (*Boraginaceae*). *Ann. Bot. Fennici* 51: 201-206.
- Sanz M., Schönswetter P., Vallès J., Schneeweiss G. M. & Vilatersana R. 2014. Southern isolation and northern long-distance dispersal shaped the phylogeography of the widespread, but highly disjunct, European high mountain plant *Artemisia eriantha* (*Asteraceae*). *Bot. J. Linn. Soc.* 174: 214-226.
- Vašut R.J., Majeský Ľ. 2015. *Taraxacum pudicum*, a new apomictic microspecies of *T.* section *Erythrosperma* (*Asteraceae*) from Central Europe. *Phytotaxa* 227 (3): 243–252.



Investícia do Vašej budúcnosti

This publication has been produced in the framework of the project
*Preparation and implementation of monitoring of habitats and species and improving
the access to information to the public*, project code (ITMS):24150120030,
within the context of the Operational Programme Environment,
co-financed by the European Regional Development Fund.



ISBN: 978-80-8184-023-4



9 788081 840234