

Report on habitats on the Mateševo – Andrijevića

A total of 14 habitat types from Annex I of the Habitats Directive (NATURA 2000) were identified as considered significant characteristics of biodiversity.

Table: NATURA 2000 habitats in researched area

No.	Habitats	Eunis code	Pal. Class.	NATURA 2000 code
1.	Alpine rivers and the herbaceous vegetation along their banks	C3.5, C3.551, C3.552	24.221, 24.2211, 24.222, 24.2222	3220, Annex I
2.	Alpine rivers and their ligneous vegetation with <i>Myricaria germanica</i>	F9.1, F9.11, F9.13	24.223, 44.111	3230, Annex I
3.	Alpine rivers and their ligneous vegetation with <i>Salix eleagnos</i>	F9.1, F9.11, F9.14	24.224	3240, Annex I
4.	Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites)	E1.2, E1.22, E1.26, E1.27, E1.28	34.31, 34.32, 34.33, 34.34	6210, Annex I
5.	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	E5.4, E5.41, E5.43, E5.5, E5.51, E5.52, E5.57, E5.58	37.7, 37.71, 37.72, 37.8, 37.81, 37.82, 37.87, 37.88	6430, Annex I
6.	Lowland hay meadows (<i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i>)	E2.2, E2.22, E2.23	38.2, 38.22, 38.23	6510, Annex I
7.	Mountain hay meadows	E2.3, E2.31	38.3, 38.31	6520, Annex I
8.	Alkaline fens	D4.1	54.2	7230, Annex I
9.	Siliceous rocky slopes with chasmophytic vegetation	H3.1	62.2	8220, Annex I
10.	<i>Luzulo-Fagetum</i> beech forests	G1.6, G1.61	41.11, 41.112	9110, Annex I
11.	*Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>)	G1.1, G1.111, G1.12, G1.121, G1.2, G1.21, G1.211, G1.212, G1.213	44.13, 44.2, 44.21, 44.3, 44.31, 44.32, 44.33	91E0, Annex I
12.	Illyrian oak-hornbeam forests (<i>Erythronio-Carpinion</i>)	G1, A1A	41.2A	91L0, Annex I
13.	Pannonian-Balkan turkey oak - sessile oak forests	G1.769	41.769	91M0, Annex I
14.	Acidophilous Picea forests of the montane to alpine level (<i>Vaccinio-Piceetea</i>)	G3.1, G3.1B	42.25	9410, Annex I

No aquatic habitats were found on the route.

On the route of the highway, cultivated agricultural and modified habitats were found: **G1.D4 Orchards, (Fruit orchards)** and **I Cultivated agricultural, horticultural and domestic habitats (Regularly or recently cultivated agricultural, horticultural and domestic habitats)**, as well as naturally degraded habitat with eagle fern **E5.3 Pteridium aquilinum (Pteridium aquilinum fields)**.

Habitat Evaluation and Sensitivity

A detailed description of the habitat through which the route runs is presented as an Annex to this Report. Thirteen types of (semi)natural habitats from Annex I of the Habitats Directive (NATURA 2000) have been identified along the route of the Mateševci - Andrijevica road. This appendix provides a detailed description of the habitat types found.

Of these 14 habitat types - the habitat '91E0 * Alluvial forests of black alder and mountain ash (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)' belongs to the Priority habitat type (*) in terms of the Habitats Directive, ie NATURA 2000.

The following types of NATURA 2000 habitats are represented on the planned route:

3220 Alpine rivers and the herbaceous vegetation along their banks

HABITAT DESCRIPTION: The habitat includes open pioneer communities of herbaceous plants and shrubs of *Epilobium fleischeri* and *Calamagrostis pseudophragmitis*, which are developed on unbounded gravelly-sandy banks of fast watercourses of mountain rivers, which are characterized by high water flow.

The habitat includes open pioneer communities of herbaceous plants and shrubs of shrubby willows and German tamarisk, developed on the gravelly banks of fast watercourses of mountain rivers, which are characterized by high water flow in the summer. Typical plant species that are dominant in communities of this type habitat is *Epilobium dodonei* and/or *Calamagrostis pseudophragmites* and other species and seedlings of hygrophilous shrubs (*Salix elaeagnos*, *S. purpurea*, *S. amplexicaulis*), sometimes heather (*Myricaria germanica*) are also present. which may develop into characteristic shrubs due to the constant movement of the substrate caused by strong spring and autumn torrents.

INDICATOR SPECIES: *Calamagrostis pseudophragmites*, *Epilobium dodonaei* and seedlings of *Salix elaeagnos*, *S. purpurea*, *Myricaria germanica*. In addition to the mentioned indicator species, these habitat types are also common: *Cirsium candelabrum*, *Saponaria officinalis*, *Agrostis stolonifera*, *Elymus caninus*, *Tussilago farfara*, *Pastinaca sativa*, *Melilotus albus*, *Epilobium hirsutum* and others.

COMMUNITIES: *Epilobietum dodonaei*, *Calamagrostietum pseudophragmitis*.

This type of habitat was found along the Lim River in the Andrijevica area. The habitat is represented in two localities: on the banks of the river Lim in the Andrijevica area as well as in the Kraštica river area in the area of Bare Kraljske, where it is presented in the form of fragments.

On the bank of Lim River in the area of Andrijevica (4244790N 1947417E, alt. 750 m) the habitat on about 2,8 ha is predominantly represented by the species *Calamagrostis pseudophragmites*. In addition to the dominant species, *Epilobium dodonei* has a significant

participation. Individually, introduced alien plant species were present in the vicinity: *Helianthus tuberosus*, *Reynoutria japonica*, *Solanum* sp. A little further downstream (4244974N 1947490E) this habitat type was represented by *Calamagrostis pseudophragmites*, *Eupatorium cannabinum*, *Tussilago farfara*, *Persicaria maculosa*, *Saponaria officinalis*, *Agrostis castellana*, *Triticum durum*, *Silene vulgaris*, *Epilobium dodonei*, *Geranium robertianum*, *Clematis vitalba*, *Scrophularia nodosa*, *Microrrhinum minus*, *Plantago intermedia*, *Mentha longifolia* and seedlings of *Myricaria germanica* and *Salix eleagnos*. The presence of *Calamagrostis pseudophragmites* was dominant here with a large number of seedlings of *Myricaria germanica* and *Salix eleagnos*, while the presence of other species was sporadic.

Ovaj lokalitet staništa na lijevoj obali Lima u području Andrijevice nalazi se u zoni EMERALD Područja i u tom smislu važno je kao potencijalno prioritetni lokalitet za zaštitu u okviru mreže zaštićenih područja NATURA 2000.

	
Photo 1. <i>Calamagrostietum pseudophragmitis</i>, Lim River	Photo 2. <i>Epilobietum dodonei</i>, Lim River
	
Photo 3. <i>Calamagrostietum pseudophragmitis</i>, Lim River	Photo 4. <i>Calamagrostietum pseudophragmitis</i>, Lim River

On the left bank of the river Kraštica (Kralje) this type of habitat occurs in the form of fragments. Here, habitat fragments were predominantly represented by species: *Epilobium dodonei*, *Epilobium parviflorum* and *Phalaris arundinacea*, and to a lesser extent the species *Stellaria media*, *Potentilla reptans*, *Brachypodium sylvaticum*, *Tussilago farfara*, *Mentha longifolia*, *Veronica beccabunga*, *Aegopodium podagraria*, *Equisetum arvense*, *Lycopus europaeus*, *Rumex conglomeratus*, *Cynosurus cristatus*, *Agrostis capillaris*, *Cardamine* sp.



Photo 5. Kraštica

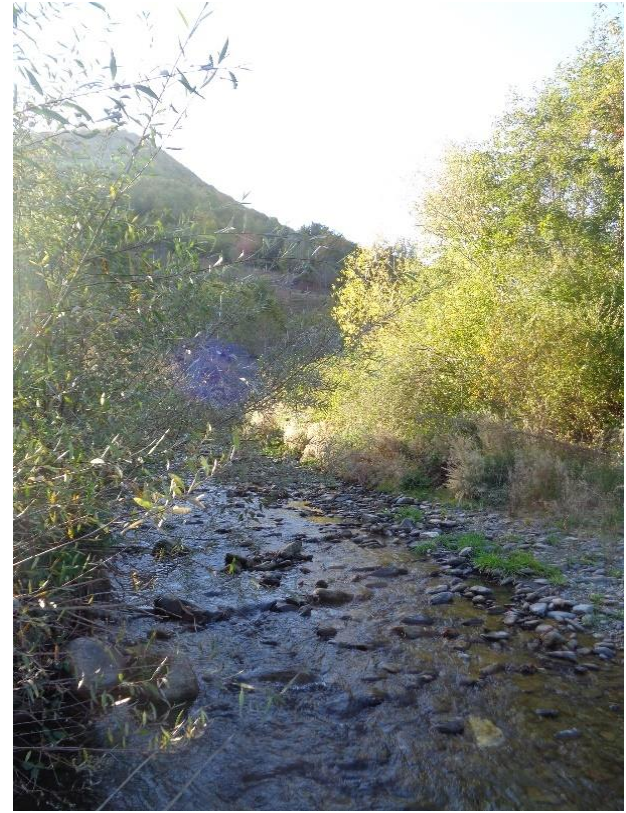


Photo 6. Kraštica

Representivity of the habitat: B.

Habitat cover: cca 3 ha

Vulnerability to Project Impacts: Construction within the Project's impact area could directly (directly physically endanger habitat/species in terms of their removal) or indirectly (possibility of disposing of excess material during road construction) lead to habitat/species endangerment at the site in question.

The project could have an impact on the water regime of the Lim River, which would negatively affect the physico-chemical parameters of the abiotic component of the habitat.

Sensitivity on habitat fragmentation: There is no danger of habitat fragmentation because this type of habitat (annual community) expands rapidly and conquers unbound gravel areas along the Lim River.

Note:

During the execution of works, the possibility of physical impact on the stated coordinates of the locality where this habitat was ascertained should be excluded.

When disposing of excess material during the construction of the Project, this site should be bypassed. Also, the disposal and concentration of excess material during the construction of the

road should be foreseen in such a way that the consequences of such disposal do not disrupt the regime and flow of Lima waters in this locality.

3230 Alpine rivers and their ligneous vegetation with *Myricaria germanica*

HABITAT DESCRIPTION: This habitat includes communities of low pioneer shrubs on gravelly and sandy river sediments, dominated by German tamarisk (*Myricaria germanica*) and shrubby river willows (*Salix spp.*). It occurs in alpine, subalpine and mountain belts of high mountains, on the banks of rivers with a high flow regime in the summer months.

INDICATOR SPECIES: In this type of habitat, the most important species is *Myricaria germanica* (cover above 30%), which is already enough to distinguish this type of habitat. German tamarisk in the Lim River Valley is also accompanied by *Salix amplexicaulis*, *S. fragilis*, *Polygonum lapatifolium*, *Rubus caesius*, *Solanum dulcamara*, *Saponaria officinalis*, *Ranunculus repens*, *Bidens tripartitus*, *Mentha aquatica*, *M. longifolia*, *Equisetum palustre* and others.

COMMUNITIES: *Myricarietum ernesti-mayerii*, *Salici-Myricarietum*.

This type of habitat was found on the route of the road at three locations on the left bank of the Lim River in the Andrijevica area, while on the right bank of the river there are individual specimens within the *Salicetum* comm.

At the site on the bank of the Lim River in the Andrijevica area (4244949N 1947456E, alt. 750 m a.s.l.), the habitat was predominantly represented by *Myricaria germanica* but the presence of low shrubs of *Salix eleagnos* and *Salix fragilis* was also significant, while *Salix alba* was sporadically represented. At the third location (4245505N 1948208E, alt. 747m) is a representative habitat dominated by *Myricaria germanica* with sporadically present shrubs *Salix eleagnos* and *Salix purpurea*.



Photo 7. *Myricarietum* na Limu



Photo 8. *Myricaria germanica*, Lim River



Photo 9. *Myricaria germanica*, Lim River



Photo 10. Devastation in the Lim riverbed



Photo 11. View of Lim in the direction of Andrijevisa from the Sitna luka site

At the mentioned locations, this type of habitat is in progression (the habitat conquers sandy places on the locality), but it is under a strong anthropogenic influence (gravel extraction and regulation of the Lim river flow - construction of fortifications).

Representivity of the habitat: B. A very rare habitat type in Montenegro. It was recorded in the valley of the river Lim in Andrijevisa and Bijelo Polje. The best stands are developed along the river Zlorečica, a left tributary of the Lim, which also represents most of the area of this type of habitat in Montenegro.

Habitat cover: cca 2 ha

Vulnerability to Project Impacts: Construction within the area of influence of the Project could in a direct (direct physical endangerment of habitat/species in terms of their removal) or indirect (possibility of disposal of excess material during road construction) lead to endangerment of habitat/species in the site. Also, the construction of the Project could have an impact on the water regime of the Lim River, which would negatively affect the physico-

chemical parameters of the abiotic habitat component (water regime in the zone of the sandy habitat component) and result in its disappearance.

Sensitivity on habitat fragmentation: The projected route of the road is at a third location only 66 m away from the habitat, which endangers its survival. The areas covered by the habitat are not large enough to be fragmented. There is a danger of direct influence, ie. physical removal of the complete habitat and/or its parts. The habitat is negatively affected by the disturbance of the physical and chemical parameters of its abiotic component (primarily sandy deposits but also the regime of the Lim waters in this area).

Note:

The habitat is basically built by the species *Myricaria germanica* (syn. *Myricaria ernesti-mayeri*) - a species that is on the List of protected species in Montenegro (Decision on placing certain plant and animal species under protection, Official Gazette of Montenegro 76/06). The habitat is located in the zone of the site intended for protection within the EMERALD Project and in that sense it will be important as a potential priority site for protection within NATURA 2000.

3240 Alpine rivers and their ligneous vegetation with *Salix eleagnos*

HABITAT DESCRIPTION: The habitat includes coastal galleries and low sparse or folded shrub formations on gravelly river deposits along fast mountain watercourses dominated by gray willow (*Salix eleagnos*) or occasionally some other species (*Salix amplexicaulis*, *S. purpurea*, *Alnus incana*). They occur in the mountainous and subalpine belt of high mountains, on the banks of rivers with a high flow regime in the summer months. Communities developed on different types of alluvial deposits, mainly on limestone substrates dominated by gravel and coarse sand along the banks of fast and cold mountain streams and smaller rivers, whose water level drops significantly during the summer months, so the substrate can be significantly dry, loose and with plenty of air.

INDICATOR SPECIES: In this type of habitat, the most important indicator species is *Salix eleagnos*, which most often dominates this habitat in the form of low shrubs (above 1 m), all the way to low groves and galleries along watercourses, from semi-open formations should be above 30%) to folded stands. Sometimes this habitat type is dominated by *Salix purpurea* and *S. amplexicaulis*, and sometimes they are joined by gray alder (*Alnus incana*) on sediments along rivers. In addition to these woody species, which determine the physiognomy of the habitat, the following also occur in communities: *Populus nigra*, *Mentha aquatica*, *M. longifolia*, *Polygonum lapathifolium*, *Eupatorium cannabinum*, *Acer pseudoplatanus*, *Rhamnus fallax*, *Fraxinus excelsior*, *Petasites hybridus*, *Tussilago farfara*, *Telekia speciosa*, *Epilobium dodonaei* et al.

COMMUNITIES: *Salicetum eleagni*, *Salicetum amplexicaulis*.

This habitat type was found at the following localities in the Project impact zone:

Mateševo - Drcka River (425527N 1933845E, alt. 1005 m; 4244986N 1934559, alt. 1028m);

Kralje - Kraštica River (4242960N 1945062E, alt. 825 m to the mouth of the river Lim);

Andrijevisa - along Lim (4244917N 1947430E to 4245008N 1947537E, alt. 750 m).

In the area of influence on the site of Mateševo on the left bank of the Drcka River, the line coordinates of the coastal vegetation formed by willow dominated by *Salix eleagnos* and species *Alnus incana*, *Salix purpurea*, *Salix sp.*, *Clematis vitalba*, *Rubus ulmifolius*. In the ground layer of herbaceous species, *Petasites hybridus* is predominantly present, and in addition to it, *Tussilago farfara*, *Brachypodium sylvaticum*, *Nasturtium officinale*, *Fragaria vesca*, *Scrophularia nodosa*,

Daucus carota subsp. maximus, Agrostis capillaris, Mentha longifolia, Epilobium parviflorum, Stellaria media, Rumex conglomeratus, Juncus articularus, Plantago intermedia, Persicaria maculata, Lamium purpureum, Cirsium arvense, Chaeniorhinum majus, Capsella bursa-pastoris, Veronica beccabunga, Atriplex patula.



Photo 12. *Salicetum eleagni*, Drcka River



Photo 13. *Salicetum eleagni*, Drcka River



Photo 14. *Salicetum eleagni*, Drcka-Mateševu



Photo 15. *Salicetum eleagni*, Drcka-Mateševu

At the site in the area of Andrijevisa - along the Lim, this type of habitat covers a significant area measured in hectares and for the most part the representativeness is very good (with the exceptions of anthropogenic impact in some places). Riparian vegetation is built on this locality by willows with a dominant presence of *Salix eleagnos*, but there are also other species of willows *Salix purpurea*, *Salix alba* as well as gray alder - *Alnus incana*.



Photo 16. *Salicetum eleagnii*, Lim



Photo 17. *Salicetum eleagnii*, Lim



Photo 18. *Salicetum eleagnii*, Lim



Photo 19. *Salicetum eleagnii*, Lim

Representivity of the habitat: B-A.

The representativeness of the habitat at the localities Mateševo and Kralje - Kraštica River is B. At the locality Andrijevisa - next to Lim the representativeness is B-A; namely, this is an extremely well-developed type of habitat with a width that in some parts is measured in tens of meters. The habitat site of Andrijevisa - next to Lim is located in the zone of the site intended for protection within the EMERALD Project and in that sense it will be important as a potentially priority site for protection within NATURA 2000.

Habitat cover: cca 50ha



Photo 20. Kraštica



Photo 21. Kraštica, *Salicetum eleagnii*

Vulnerability and Impact of the Project: communities of this type are not uncommon along Montenegrin rivers. The projected route of the road passes through the habitat on Mateševo along Drcka, and the habitat is very well developed with exceptional potential for maintenance in the future.

Habitat sensitivity to fragmentation: Due to the fact that in the area of the Andrijevića locality - along with Lim river it is an extremely well-developed habitat type (representativeness B-A), the possible physical impact in this area could have negative consequences in terms of vegetation fragmentation. There is a certain anthropogenic impact on the mentioned locality, but based on field research, it has been noticed that this is a very vital type of habitat that resists this influence.

Direct impact (physical removal of vegetation) and indirect impact (disposal of excess material during construction) would have a crucial impact on permanent fragmentation and, consequently, habitat degradation. As an indirect impact, the disturbance of physical and chemical parameters of the abiotic component of the habitat (primarily sandy sediments but also the regime of Lim waters in this area) could be mentioned, which would also have a significant negative impact on the habitat.

Note:

During the construction works, any possibility of physical impact on the stated coordinates of the locality where this habitat was found should be excluded.

When disposing of excess material during the construction of the Project, this site should be completely bypassed. Also, the disposal and concentration of excess material during the construction of the road should be foreseen in such a way that the consequences of such disposal do not disrupt the regime and flow of Lima waters in this locality.

6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)

HABITAT DESCRIPTION: Dry to semi-dry carbonate meadows and pastures of the *Festuco-Brometea* class. This habitat type includes, on the one hand, steppe and steppe-like subcontinental grasslands (*Festucetalia valesiacae*) and, on the other hand, grasslands under Atlantic or sub-Mediterranean influence (*Brometalia erecti*). The latter are differentiated into primary dry *Xerobromion* grasslands, and secondary moderate-moist (semi-natural) *Mesobromion* grasslands dominated by *Bromus erectus*, which represent significant habitats for orchids.

Significant orchid habitats can be interpreted as sites that are significant by one of the following criteria:

- (a) the site is a habitat for a large number of different species of orchids,
- (b) there is a very significant population of at least one species of orchid on the site, which is very rare in the national territory,
- (c) the site is a habitat for several species of orchids that are considered rare, very rare or exceptional in the national territory.

INDICATOR SPECIES: Important indicator plant species are: *Anthyllis vulneraria*, *Arabis hirsuta*, *Brachypodium pinnatum*, *Bromus erectus*, *B. inermis*, *Campanula glomerata*, *Carex caryophylla*, *Carlina vulgaris*, *Centaurea scabiosa*, *Koeleria pyramidata*, *Dianthus carthusianorum*, *Erygium campestre*, *Leontodon hispidus*, *Medicago sativa* ssp. *falcata*, *Polygala comosa*, *Primula veris*, *Sanguisorba minor*, *Scabiosa columbaria*, *Veronica teucrium*, *Hippocrepis comosa*, *Festuca valesiaca*, *Silene otites*, *Avenula pubescens*, *Hieracium pilosella*, *Thymus pulegioides* i *Stipa joannis*. When orchids are registered in the habitat, the type is classified as a habitat of priority, and the most common are: *Ophrys apifera*, *O. insectifera*, *Orchis mascula*, *O. militaris*, *O. morio*, *O. purpurea*, *O. ustulata*, etc. Some other species can be added to this list for the area of Montenegro: *Festuca rupicola*, *Botriochloa ischaemum*, *Chrysopogon gryllus*, *Danthonia alpina*, *Carex humilis*, *Asphodelus albus*, *Centaurea kotshyana*, *Carex montana*, *Festuca rubra* ssp. *fallax*, *Stipa pennata*, *Plantago media* and others.

COMMUNITIES: *Brometum erecti*, *Bromo-Plantaginietum mediae*, *Festucetum valesiacae*.

However, in the locality near Mateševu, this type of habitat with *Bromus erectus* dominance occurs on a mixed **carbonate-silicate** substrate.

In the zone of influence of the construction of the Project on the site Mateševu (4244914N 1934741E, alt. 1028 m) on both sides of the road from Mateševu to Bare Kraljske at the above coordinates, there is vegetation of meadows on carbonate-silicate substrate belonging to *Mesobromion* in this period (June 2020) were represented by the dominant species *Bromus erectus* and *Festuca valesiaca*; in addition to them, *Potentilla erecta*, *Helianthemum obscurum* ssp. *canum*, *Polygala commosum*, *Galium verum*, *Cruciata laevipes*, *Sanguisorba minor*, *Plantago media*, *P. lanceolata*, *Thymus pulegioides*, *Genista sagittalis*, *Leucanthemum vulgare*, *Briza media*, *Trifolium montanum*, *Clamatis vitalba*, *Teucrium chamaedrys*, *Knautia* sp., *Lathyrus* sp. Of the orchids they occur *Anacamptis morio* (*Orchis morio*) and *Neotinea ustulata* (*Orchis ustulata*).

	
Photo 22. Mateševo (right bank of Drcka River)	Photo 23. Mateševo (right bank of Drcka River)
	
Photo 24. Mateševo (right bank of Drcka River)	Photo 25. Mateševo (right bank of Drcka River)

Especially environmentally highly valuable *Mesobromion* meadow at the confluence Vranještica in drcko (4245113N 1936110E, alt. 1020 m) in which it was recorded seven species of orchids: *Anacamptis morio*, *Anacamptis coriophora*, *Anacamptis tridentata*, *Neotinea ustulata*, *Traunsteinera globosa*, *Gymnadenia conopsea*, *Neottia ovata*.

In the Miravčine locality (4244549N 1944454E, alt. 940 m), the lowland hay meadows were predominantly represented by the species *Brachypodium sylvaticum*, *Danthonia alpina*, *Leucanthemum vulgare* as well as *Scabiosa ochroleuca* and *Dorycnium herbaceum*, and with a lower representation of: *Teucrium chamaedrys*, *Dactylis glomerata*, *Galium verum*, *Briza media*, *Muscari neglectum*, *Asperula cynanchica*, *Ononis spinosa*, *Plantago lanceolata*, *Achillea millefolium*, *Trifolium pratense*, *Pimpinella saxifraga*, *Heleborus odorus*, *Helianthemum obscurum*, *Viola tricolor*, *Daucus carota* subsp. *maximus*, *Agrostis capillaris*, *Centaurea jacea*, *Lathyrus megalanthus*, *Lolium multiflorum*, *Danthonia decumbens* with a single specimens of *Quercus cerris*, *Ostrya carpinifolia*, *Crataegus monogyna*.



Photo 26. Vranještica (left bank of Drcka River)



Photo 27. Vranještica (left bank of Drcka River)



Photo 28. Miravčine

Representivity of the habitat: B-A.

Habitat cover: cca 30ha

Vulnerability and Impact of the Project: Dominant type of grassland on carbonate substrates in the continental part of Montenegro. The projected route of the road passes over meadow 6210, to avoid backfilling or delaying excavations in the habitat.

Habitat sensitivity to fragmentation: the road passes above meadow 6210.

6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

HABITAT DESCRIPTION: Wet and usually nitrified high herbaceous marginal communities, along watercourses and forest edges in lowland and mountain belts belonging to the orders *Glechometalia hederaceae* and *Convolvuletalia sepium* (*Senecion fluviatilis*, *Aegopodion podagrariae*, *Convolvulion sepium*, *Filipendulion*), herbaceous plants (tall green) of the *Betulo-Adenostyletea* class.

The vegetation covered by this widely understood habitat type is very diverse, and their only common feature is the dominance of tall herbaceous plants in very to relatively humid habitats. Communities occur on relatively deep soils that develop from marginal forest formations or around large rivers in lowland and hilly areas, as well as in the foothills and shadows of high vertical cliffs, in places where snow retains longer after melting, providing high soil moisture, or on the edge of mountain springs and streams, and in places of surface water drainage, in the mountain, subalpine and alpine zone. In floristic terms, the Balkan high greens are of special importance. Communities usually occur around the springs, and their physiognomy is mainly determined by numerous Balkan endemic species *Lactuca pancicii*, *Rumex balcanicus*, *Wulfenia bleicii*, *Cirsium wettsteinii*, *Cephalaria pastricensis* and others.

INDICATOR SPECIES: *Epilobium hirsutum*, *Senecio fluviatilis*, *Filipendula ulmaria*, *Petasites hybridus*, *Chaerophyllum hirsutum*, *Aegopodium podagraria*, *Alliaria petiolata*, *Geranium robertianum*, *Silene dioica* te: *Aconitum* spp. div., *Geranium sylvaticum*, *Trollius europaeus*, *Adenostyles alliariae*, *Cicerbita alpina*, *Digitalis grandiflora*, *Calamagrostis arundinacea*, etc. In our region, species that build tall greens can be added here, including endemic: *Lactuca pancicii*, *Rumex balcanicus*, *Ranunculus serbicus*, *Geum coccineum*, *Petasites doerfleri*, *Wulfenia bleicii*, *Cephalaria pastricensis*, but also species of wider distribution: *Petasites hybridus*, *Calamagrostis varia*, *Deschampsia cespitosa*, *Ranunculus aconitifolius*, *Thalictrum aquilegifolium*, *Telekia speciosa*, *Doronicum austriacum*, *Chaerophyllum aureum*, *Veratrum album*, *Calystegia sepium*, *Eupatorium cannabinum*, *Geranium phaeum*, *Angelica sylvestris* aggr. and others.

COMMUNITIES: *Cicerbitetum pancicii*, *Petasitetum hybridi*, *Doronicum-Wulfenietum bleicii*, *Rumicetum balcanici*, *Telekietum speciosae*, *Adenostyletum alliariae*, *Geranietum sylvatici* etc.

In the zone of influence of the construction of the Project on the location of the Grba stream (4244535N 194321E, alt. 1070 m) at the above coordinates, in addition to the coastal riparian vegetation, in the zone of beech forest (*Luzulo-Fagetum*), due to the presence of wet habitat there are fragments of tall green vegetation predominantly represented by the species *Telekia speciosa* and a significant presence of *Viola sylvestris* and *Mercurialis perennis*. In addition to the above mentioned there are present, also, *Luzula luzulina*, *Symphytum tuberosum*, *Rubus idaeus*, *Geranium robertianum*, *Lamiastrum galeobdolon*, *Geum urbanum*, *Carex sylvaticum*, *Mercurialis perennis*, *Stellaria nemorum*, *Ajuga reptans*, *Fragaria vesca*, *Sanicula europaea*, *Listera ovata*, *Anthyrium filix-femina*, *Mycelis muralis*. The habitat occupies a relatively small area (approximately 50 m²). Fragments of this type of habitat also occur along the Drcka River in Mateševo (4244488N 1937159E, alt. 1020 m) in the zone of the community *Alnetum incanae* where the basis of the habitat is *Petasites hybridus* and *Lactuca pancicii*. Also nearby (4244458N 1937179E, alt. 1020 m), in addition to *P. hybridus*, *Equietum palustre*, *Cirsium vulgare*, *Ranunculus carinthiacus*, *Taraxacum officinale*, *Rumex conglomeratus*, *Chaerophyllum* sp., *Vicia* sp.

Hydrophilic tall herbs occur in fragments along ever larger watercourses (Drcka, Rajovića Rijeka, Kraštica).



Photo 29. Grba stream in 'Komovi' RP



Photo 30. Drcka River, Bare Kraljske



Photo 31. Drcka River



Photo 32. Drcka River

Representivity of the habitat: B-A.

Habitat cover: in the area of RP Komovi (along the Grba stream) and Bare Kraljske - small areas that cannot be mapped.

Vulnerability and Impact of the Project: the projected route of the road is more than 200 m away from the Grba stream, while in Bara Kraljski it passes over the river Drcka, in whose coastal line forests this type of habitat forms a layer of herbaceous vegetation.

Habitat sensitivity to fragmentation: the route of the road passes above the habitat.

6510 Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*)

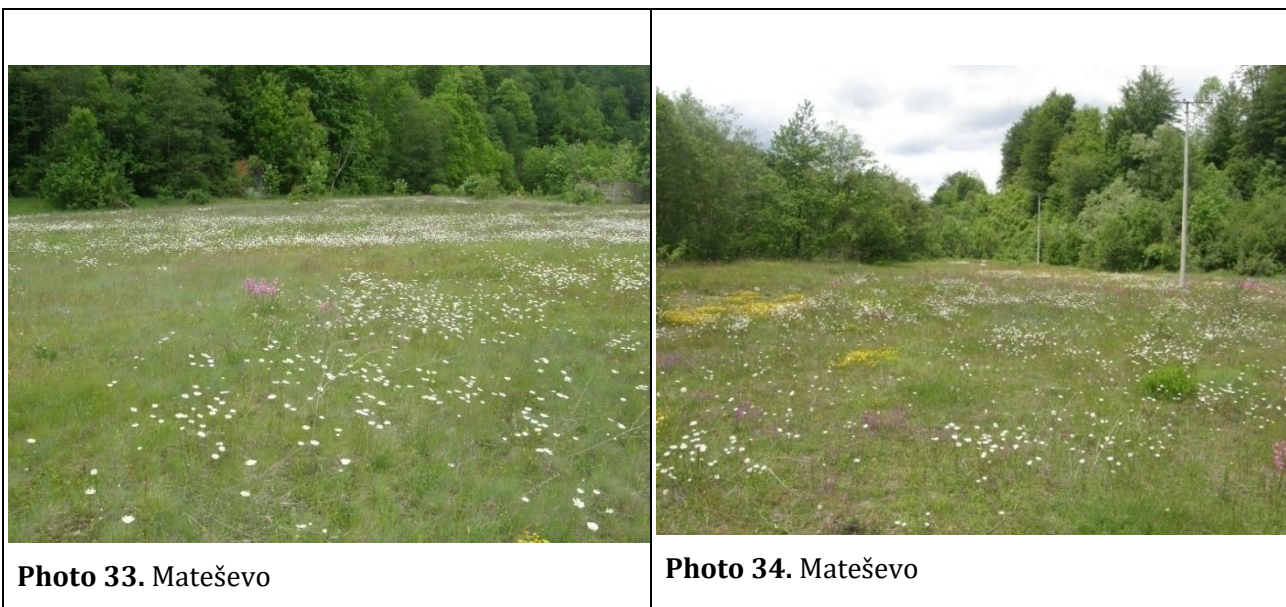
HABITAT DESCRIPTION: This type of habitat is characterized by grassland meadows, with a high diversity of plant species that develop on poorly or moderately fertile soils in the lowlands and hills and belonging to the *Arrhenatherion* alliance. This type of habitat is dominated by mesophilic grasses: *Arrhenatherum elatius* and *Alopecurus pratensis*, as well as numerous meadow species of clover (*Trifolium spp.*) and *Dactylis glomerata* (in slightly ruderalized meadows), and somewhat lower ones: *Holcus lanatus*, *Festuca rubra*, *Poa pratensis*, *Agrostis capillaris* and *Trisetum flavescens*. These last species (except *Holcus lanatus*) come regularly in mountain grasslands, so they can lead to confusion. Lowland mesophilic high meadows develop on deep soils outside the direct influence of flood and groundwater. The soils in them are mostly rich in mineral substances and have a favorable water regime during the entire vegetation season, so the production of plant mass in them is very high.

INDICATOR SPECIES: *Arrhenatherum elatius*, *Festuca pratensis*, *Alopecurus pratensis*, *Trisetum flavescens*, *Poa pratensis*, *Festuca rubra*, *Pimpinella major*, *Centaurea jacea*, *Crepis biennis*, *Knautia arvensis*, *Tragopogon pratensis*, *Daucus carota*, *Leucanthemum vulgare*, *Campanula patula*, *Leontodon hispidus*. In addition to the above, there are: *Holcus lanatus*, *Agrostis capillaris*, *Anthoxanthum odoratum*, *Dactylis glomerata*, *Achillea millefolium*, *Lotus corniculatus*, *Plantago lanceolata*, *P. media*, *Ranunculus acris*, *R. bulbosus*, *Rumex acetosa*, *Salvia pratensis*, *Trifolium pratense*, *T. repens*, *Rhinanthus minor*, *R. rumelicus* and others.

COMMUNITIES: *Arrhenatheretum elatioris*, *Festucetum pratensis*, *Alopecuretum pratensis*, *Holcetum lanati*, *Dactylidetum glomeratae*.

In the impact zone of the Project at the locality of Mateševu (4244885N 1935854E, alt. 1020 m) on the left bank of the Drcka River, in addition to coastal riparian vegetation, vegetation of lowland hay meadows, represented in this period by the following dominant species, extends: *Agrostis capillaris*, *Cynosurus cristatus*, *Dactylis glomerata*, *Briza media* and less numerous *Centaurea jacea*, *Hypericum perforatum*, *Achillea millefolium*, *Daucus carota* subsp. *maximus*, *Teucrium chamaedrys*, *Plantago media*, *Galium corrudifolium*, *Prunella laciniata*, *Prunella vulgaris*, *Bromus erectus*, *Gentiana cruciata*, *Festuca sp.*, *Poa sp.*

In addition to these species, other dominant species often occur in this habitat type, such as *Centaurea jacea* and *Festuca pratensis*, and a smaller representation of other plant species *Briza media*, *Potentilla reptans*, *Daucus carota* subsp. *maximus*, *Convolvulus arvensis*, *Achillea millefolium*, *Leontodon sp.*, *Trifolium pratense*, *Plantago media*.



In the area of Bare Kraljske (4244867N 1937171E, alt. 1095 m), vegetation of lowland meadows was predominantly represented by the species: *Centaurea jacea*, *Festuca pretensis* and *Dactylis glomerata* and, also, were present: *Galium verum*, *Briza media*, *Potentilla reptans*, *Daucus carota* subsp. *maximus*, *Convolvulus arvensis*, *Achillea millefolium*, *Leontodon* sp., *Trifolium pratense*, *Plantago media*, *Colchicum autumnale*, *Vicia* sp., *Agrostis capillaris*, *Cerastium* sp., *Hypericum perforatum*, *Knautia arvensis*



Representivity: A-B.

Habitat cover: cca 2000 ha. Lowland meadows have been recorded within the boundaries of RP Komovi between the Grba and Nesirenski streams, as well as along the Drcka on locality Mateševo and at the Đekić houses. Nevertheless, this habitat type is predominantly distributed in the eastern part of the Project Area. Lowland meadows in the village of Kralje and around Andrijevića are especially ecologically valuable and rich in flora.



Photo 37. Kralje



Photo 38. Andrijevisa

Vulnerability to Project Impacts: A common type of habitat in Montenegro in the mountain zone. This habitat type will be directly affected. The impact effect will result in the loss of this type of habitat in the Project area in the zone of this habitat type, as well as the loss of soil structure in the habitat zone, including erosion and leaching of the upper soil horizon and soil pollution from construction site waste. The overall impact associated with the loss of this habitat type during construction is considered moderate.

Sensitivity on habitat fragmentation: There will be a loss of this type of habitat in the zone located on the route of the road, however, the continuity of the habitat will be preserved. Habitat fragmentation will not significantly affect its connectivity.

6520 Mountain hay meadows

HABITAT DESCRIPTION: This habitat type represents species of rich mesophilic high meadows of mountain and, less frequently, subalpine zone (usually above 600 m above sea level) in which *Trisetum flavescens* often dominates. As with lowland and hilly grasslands, these meadows are mowed. They differ in composition and structure from the surrounding pastures and are regularly richer in species. In relation to the degree of cultivation and position on the vertical profile, in Montenegrin mountains mesophilic meadows and pastures are differentiated into: extensively cultivated meadows and mountain belts (*Cynosurion*), which are maintained by mowing, grazing and occasional manure fertilization and poorly subcultivated and poorly cultivated belt (*Pancicion*). Numerous common plant species often participate in the composition, as well as union and mountain hives, but mountain elements regularly appear (often dominate).

INDICATOR PLANT SPECIES: Important species of wide amplitude are present here: *Trisetum flavescens*, *Heracleum sphondylium*, *Salvia pratensis*, *Anthoxanthum odoratum*, *Malva moschata*, *Pimpinella major*, *Silene vulgaris*; species of tall greens: *Astrantia major*, *Polygonum bistorta*, *Silene dioica*, *Geranium phaeum*, *G. sylvaticum*, *Trollius europaeus*, *Chaerophyllum hirsutum* - which come in the marginal parts of these meadows, but some real meadow mountain plants: *Carum carvi*, *Campanula glomerata*, *Crocus albiflorus*, *Narcissus poeticus*, *Muscari botryoides*, *Viola tricolor ssp. subalpina*, *Alchemilla sp.* - as good indicator species. To these species should

be added those that are important for these baskets of our climate: *Festuca rubra ssp. fallax*, *Cynosurus cristatus*, *Poa chaixii*, *Dianthus deltoides*, *Hypericum maculatum*, *Trifolium montanum*, *Colchicum autumnale*, *Filipendula vulgaris*, *Pancicia serbica*, *Lilium bosniacum*, *Lathyrus montanus*, *Polygala major*, *Ranunculus carinthiacus*, *Silene sendtneri*, *Onobrychis montana*, *Knautia dinarica*. It should be noted that these moths come and often dominate the species that are present in lowland meadows: *Tragopogon pratensis*, *Leucanthemum vulgare aggr.*, *Agrostis capillaris*, *Rhinanthus minor*, *Trifolium pratense*, *Rumex acetosa*, *Campanula patula*, *Poa pratensis*, *Achillea millefolium*, *Dactylis glomerata*, *Knautia arvensis* etc.

COMMUNITIES: *Alchemillo-Trisetetum*, *Bromo-Cynosuteum cristati*, *Pancicetum serbicae*, *Trifolio-Polygaletum azureae*, *Pancicio-Festucetum rubrae*, *Pancicio-Lilietum bosniacae*.



Photo 39. Do Adžića



Photo 40. RP "Komovi"

Widespread habitat type in the western part of the Project. Mountain meadows are registered in the borders of RP Komovi on Mateševo, in Bare Kraljske, where they appear in mosaics with beech forests. Representative mountain meadows were recorded in the area of Crnja and Ljubaštica, as well as in the direction of the Trešnjevik pass.

At the locality Crnja on the edge of RP Komovi (4244144N 1938251E, alt. 1135 m) this type of habitat with extraordinary representativeness (A) and dominance of *Leucanthemum vulgare*, *Campanula patula*, *Rhinanthus minor*, *Trifolium pratense*, *Anthylis vulneraria*, *Trisetum flavescens*, *Ranunculus carinthiacus*, *Viola tricolor*, *Polygala comosa* and significant participation of species *Trifolium repens*, *Rumex acetosa*, *Sanguisorba minor*, *Silene sendtneri*, *Bromus racemosus*, *Trifolium campestre*, *Dactylis glomerata*, *Plantago media*, *Centaurea jacea/weldeniana*, *Anacamptis morio* (*Orchis morio*), *Briza media*, *Veronica jacquinii*, *Euphrasia rostkoviana*, *Thymus pulegioides*, *Cynosurus cristatus*, *Gentiana utriculosa*, *Achillea millefolium*, *Plantago lanceolata*. In addition to the above, they were stated *Galium verum*, *Tragopogon pratense*, *Lotus corniculatus*, *Leontodon crispus*, *Colchicum autumnale*, *Gentiana cruciata*, *Trifolium montanum*, *Achillea millefolium*, *Convulvulus arvensis*, *Neotinea ustulata* (*Orchis ustulata*), *Stellaria graminea*, *Veronica chamaedrys*, *Potentilla reptans*, *Prunella vulgaris*, *Anthoxantum odoratum*, *Alchemilla glaucescens*, *Festuca sp.* and others.



Photo 41. Crnja area and River



Photo 42. Crnja area and River

This type of habitat was found above the Ljubaštica River (4244050N 1939514E, alt. 1190 m). Here, the mountain hay meadows were predominantly represented by the following species: *Alchemilla pubescens*, *Plantago media*, *Achillea millefolium*, *Centaurea jacea*, *Hypericum maculatum*, *Knautia arvense*, *Trifolium repens*, *Galium verum*, *Trisetum flavescens*, *Agrostis capillarristus*, *Cynosurus subsp. maximus*, *Plantago lanceolata*, *Potentilla reptans*, *Potentilla sp.* In addition to the above, the following species were also present: *Bromus erectus*, *Genista sagittalis*, *Helianthemum nummularium subsp. obscurum*, *Euphrasia rostkoviana*, *Phleum pratense*, *Rhinanthus sp.*, *Birch media*, *Prunus spinosa*, *Rosa sp.*, *Aegopodium podagraria*, *Colchicum autumnale*, *Viola tricolor*, *Clinopodium vulgare*, *Polygala sp.*, *Galium verum*, *Juniperus communis* et al.



Photo 43. Ljubaštica area and River



Photo 44. Ljubaštica, *Lilium bosniacum*

In the project area impact at the locality of Trešnjevik (4244834N 1940372E, alt. 1460 m) the mountain hay meadows were presented with the following dominant species: *Festuca pretensis*, *Nardus stricta*, *Dactylis glomerata*, *Cynosurus cristatus*, *Anthoxanthum odoratum* and were present also *Briza media*, *Agrostis capillaris*, *Leucanthemum vulgare*, *Silene sendtneri*, *Genista sagittata*, *Hypericum perforatum*, *Carex leporina*, *Vicia tricolor*, *Leontodon sp.*

In addition to the above mentioned, at the locality of Trešnjevik (4244334N 1941462E, alt. 1360 m), in the mountain hay meadows, at the same zone, the following dominant species were present: *Festuca pretensis*, *Cynosurus cristatus*, followed by the species with the lower presence: *Daucus carota* subsp. *maximus*, *Dactylis glomerata*, *Potentilla argentea*, *Hypericum perforatum*, *Dianthus cruentus*, *Clinopodium vulgare*, *Poa trivialis*, *Achillea millefolium*, *Agrostis capillaris*, *Veronica chamaedrys*, *Betonica officinalis*, *Centaurea jacea*, *Potentilla montenegrina*, *Carduus acanthoides*, *Knautia arvensis*, *Briza media*, *Thymus pulegioides*, *Galium verumtenia*, *Linaria vulgaris*, *Trifolium pretense*, *Petrorhagia saxifraga*, *Genista sagittalis*, *Leucanthemum vulgare*, *Prunella laciniata*, *Campanula patula*, *Cichorium intybus*, *Silene vulgaris*, *Plantago media*, *Pilosella officinarum*, *Leontodon sp.*

Representivity: A-B.

Habitat cover: These meadows are common in all mountainous continental parts of Montenegro. This type of habitat covers a significant area cca 1500 ha.

Vulnerability to Project Impacts: this habitat type is well developed and the potential impact during construction is in terms of physical removal.

Sensitivity on habitat fragmentation: possibility of physical removal, but this type of habitat is widespread and common in the western part of the Project Area.

7230 Alkaline fens

HABITAT DESCRIPTION: Wetlands inhabited by low sedges and brown mosses that form peat and/or tufa developed on soils constantly saturated with water. Habitat type is wetted by underground (topogenic) or surface (soligenic) waters rich in bases. The upper limit of groundwater is located on the surface, either slightly above or below the surface of the substrate on which these communities develop. Peat, if formed, develops in aquatic conditions. Calciphilous low sedges (*Cyperaceae*) characteristic for *Caricion davallianae* alliance usually dominate in these communities, and the vascular flora is also very rich with narrowly specialized species.

INDICATOR PLANTS: *Carex davalliana*, *C. flava*, *C. lepidocarpa*, *C. hostiana*, *C. panicea*, *Eriophorum latifolium*, *Eleocharis quinqueflora*, *Tofieldia calyculata*, *Dactylorhiza incarnata*, *Epipactis palustris*, *Pinguicula vulgaris*, te mahovine: *Campylium stellatum*, *Drepanocladus revolvens*, *Cratoneuron commutatum*, *Acrocladium cuspidatum*, *Ctenidium molluscum*, *Bryum pseudotriquetrum*. To this list could be added: *Dactylorhiza cordigera* ssp. *bosniaca*, *Blysmus compressus*, *Parnassia palustris*, *Pinguicula balcanica*, *Bryum schleicheri*, *Philonotis calcarea* et al.

COMMUNITIES: *Junco-Caricetum hostianae*, *Carici-Eriophoretum latifoliae*, *Carici-Blysmetum compressi*.



Photo 45. Ljubaštica, Peat bog

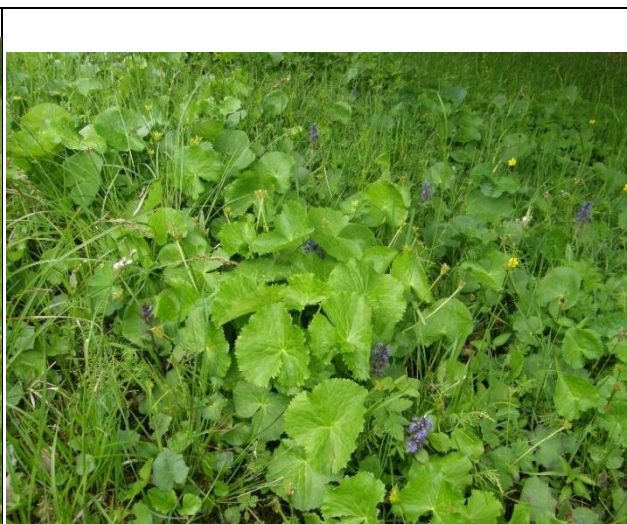


Photo 46. Ljubaštica, Peat bog,

In a wider area (4243473N 1939446E, alt. 1285 m), this type of habitat was found above the Ljubaštica river and is located in the zone of the mountain meadow moss dominated by *Trisetum flavescens*. The habitat was developed on a relatively small area (approximately 200 m²) and was predominantly represented by the following species: *Caltha palustris*, *Listera ovata*, *Pedicularis palustris*, *Eriophorum angustifolium*, *Carex sp.* There was an obvious absence here - for this type of habitat, otherwise, characteristic - moss.

Representivity of the habitat: A.

Habitat coverage: At these sites, this type of habitat covers an area of 1.5 ha.

Vulnerability and impact of the Project: Nema direktnog uticaja na stanište. This type of habitat is about 500 m away from the route and there is no potential impact during construction. Avoid possible movement of machinery or delay excavation.

Habitat sensitivity to fragmentation: Alkaline peat bogs are very sensitive to fragmentation, as they support insects, amphibians and reptiles, but due to the remoteness of the Project, this possibility has been reduced to a minimum.

8220 Siliceous rocky slopes with chasmophytic vegetation

HABITAT DESCRIPTION: Habitat includes vegetation in the cracks of continental silicate rocks with several described subtypes depending on the biogeographical region and type of geological substrate. The mountain and mountain silicate rocks of the *Asplenion septentrionalis* connection are mainly distinguished here in this particular case.

INDICATOR PLANT SPECIES: *Asplenium septentrionale*, *A. cuneifolium*, as well as some overgrown and other habitat types: *Lychnis viscaria*, *Silene saxifraga*, *Carex kitaibeliana*, *Jovibarba heuffelii*, *Polypodium vulgare*, *Sedum grisebachii*, *Juncus trifidus* et al.

COMMUNITIES: *Asplenietum septentrionalis*, *Asplenio-Polypodietum*, *Asplenietum cuneifolii*.

On the planned route of the road at the site of Bare Kraljske at coordinates 4244862N 1936714E, alt. 1070 m, on a silicate rock next to the regional road, there is a habitat with the dominance of *Asplenium septentrionale*. This habitat occurs singly and sporadically on rocks

about this part of the Bare Kraljske. In addition to *Asplenium septentrionale*, there were *Asplenium trichomanes*, *A. ruta muraria*, *Polypodium vulgare*, *Poa bulbosa*, *Tunica saxifraga*, *Minuartia verna*, *Milium effusum*, *Sedum hispanicum*, *Acinos arvensis*, *Bromus erectus*, *Silene italica*, *Fraxinus ornus*, *Geranium robertianum*, *Geranium pyrenaicum*, *Polygala comosa*.



Photo 47. Bare Kraljske



Photo 48. Bare Kraljske

Representivity of the habitat: A-B.

Habitat coverage: This habitat type was recorded at only one location outside the projected route of the road and covers a small area that could not be mapped.

Vulnerability and impact of the Project: The impact was assessed as low.

Habitat sensitivity to fragmentation: There will be no habitat fragmentation.

9110 *Luzulo-Fagetum* beech forests

HABITAT DESCRIPTION: Beech forests, and in higher areas beech and fir forests, or beech, fir and spruce, which develop on acid soils in the Central European region, with characteristic acidophilic species *Luzula luzuloides*, *Polytrichum formosum*, *Deschampsia flexuosa*, *Vaccinium myrtillus*.

This type of habitat includes both pure beech forests on acidophilic soils, and mixed deciduous-coniferous forests of beech and fir, as well as beech, fir and spruce, in which beech has a share of more than 10 %. These forests are floristically very uniform, poor in flora, and very similar in composition throughout Europe. The soil is often bare or covered with moss (*Polytrichum formosum*, *Dicranum scoparium*, *Leucobryum glaucum*, etc.), carpets of graminoid plants (*Luzula luzuloides*, *L. luzulina*, *Festuca drymeja*, *Deschampsia flexuosa*) or blueberry carpets (*Vaccinium myrtillus*) find regular acidophilic plants: *Melampyrum* sp., *Hieracium* sp., *Pyrola* sp., *Pteridium aquilinum*, *Calamagrostis villosa* and similar. Due to the dominance of these plants and the absence of characteristic basophilic and mesoneutrophilic plants common in physiognomically similar pure and mixed beech forests on carbonate substrates, which do not tolerate the acidity of the substrate, this type of habitat can be easily distinguished.

INDICATOR SPECIES that are important: *Fagus sylvatica*, *Abies alba*, *Picea abies*, *Luzula luzuloides*, *Polytrichum formosum*, and often: *Deschampsia flexuosa*, *Calamagrostis villosa*,

Vaccinium myrtillus, *Pteridium aquilinum*, *Luzula luzulina*, *L. pilosa*, *Hieracium murorum* aggr., *Melampyrum pratense*, *Veronica officinalis*.

COMMUNITIES: *Luzulo luzuloidis-Fagetum*, *Musco-Fagetum*.

This type of habitat occurs in most of the route, predominantly in the western part of the Project (Mateševsko-Trešnjevnik) (mapped!), Above the banks of the river Drcka, Bare Kraljska, Crnja, Ljubaštica, Han Drndarski and Trešnjevnik. In most parts of the project the forests do not have continuity due to felling and they alternate mosaically with mountain meadows and backyards. Points for phytocenological relevés were taken at the following localities: 1. Mateševske strane: above the right bank of the Drcka River (4245570N 1933845E, alt. 1021 m a.s.l.), 2. Mateševsko RP "Komovi", above the left bank of the river Drcka (4244892N 1934652E, alt. 1040 m); 3. Mateševsko-above Adžića do (4245324N 1933724E, alt. 1074 m); 4. Kralje-above Kraštica (4243918N 1945081E, alt. 835 m); 5. Ravni brijeg, between the rivers Crnja (4244144N 1938251E, alt. 1135 m) and Ljubaštica (4244050N 1939514E, alt. 1190 m); 6. Trešnjevnik (4244841N 1940348E, alt. 1460 m).

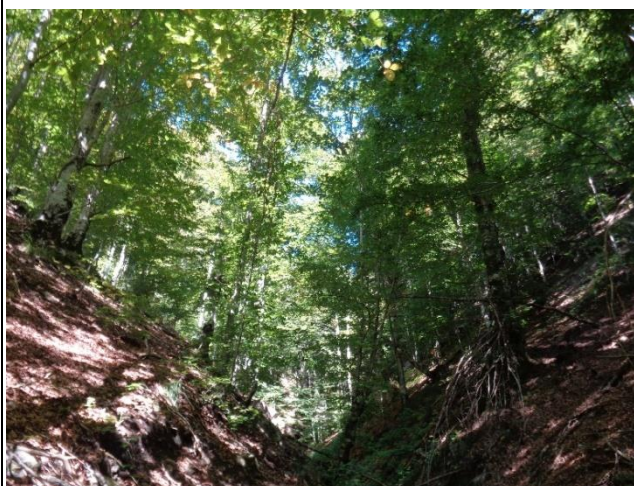


Photo 49. Mateševske strane

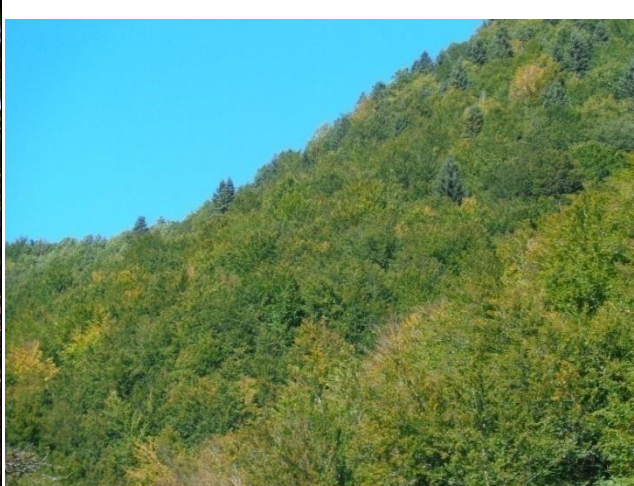


Photo 50. Mateševske strane



Photo 51. RP "Komovi", Mateševsko (Nesiren)



Photo 52. RP "Komovi", Mateševsko (Nesiren)



Photo 53. Vranještica



Photo 54. View from the road to the forests of Vranještica



Photo 55. Ravni brijeg, Crnja area

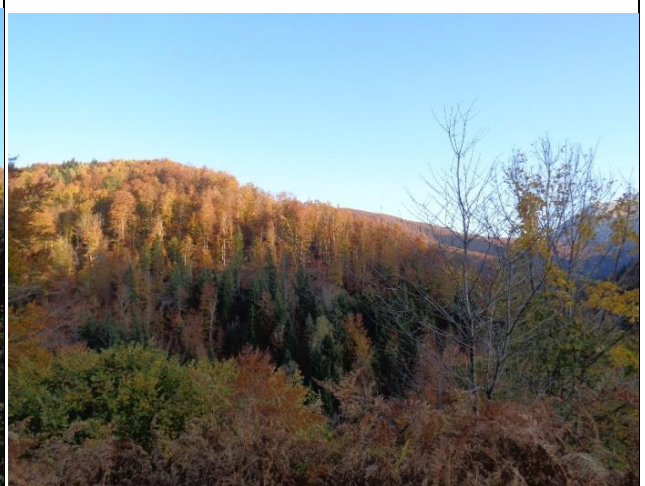


Photo 56. View on Ravni brijeg



Photo 57. Ljubaštica area



Photo 58. Beech forests above Ljubaštica area

In the 1. Mateševske strane area - above the right bank of the Drcka River the dominant participation in the community in the tree layer is beech - *Fagus sylvatica* and there are present, also, *Abies alba*, *Rhamnus frangula*, *Acer pseudoplatanus*, *Fraxinus excelsior*, *Rubus caesius*, *Sambucus ebulus*. Of the herbaceous species the following are present: *Luzula luzuloides* as characteristic species of the habitat, following by *Geum urbanum*, *Geranium robertianum*, *Dryopteris filix mas*, *Anthyrium filix-femina*, *Circaea lutetiana*, *Mycelis muralis*, *Salvia glutinosa*, *Prenanthes purpurea*, *Veronica urticaefolia*, *Galium corrudifolium*,

At the locality 2. Mateševo - above the right bank of the river Drcka, at the above coordinates, the dominant participation in the community in the floor of trees is beech - *Fagus sylvatica* but there are also *Acer pseudoplatanus*, *Rhamnus falax*, *Fraxinus excelsior*, *Corylus avellana*, *Salix caprea*, *Sambucus nigra*. Of the herbaceous species significant participation has *Luzula luzuloides* and there are also present *Anthyrium filix-femina*, *Stellaria media*, *Poa sylvicola*, *Geranium robertianum*, *Silene alba*, *Bellis perennis*, *Ajuga reptans*, *Sanguisorba minor*, *Veronica urticaefolia*, *Geum urbanum*, *Plantago lanceolata*, *Ranunculus sp.* and others.

At the locality 3. Adžića do, *Fagus sylvatica* is also dominant, while there are also present *Acer pseudoplatanus*, *Alnus incana*, *Fraxinus excelsior*, *Rubus idaeus*, *Clematis vitalba*, *Rhamnus falax*, *Telekia speciosa*, *Euphorbia amygdaloides*, *Mercurialis perennis*, *Aruncus sylvestris*, *Salvia glutinosa*, *Geranium robertianum*, *Veronica urticifolia*, *Athyrium filix-femina*, *Scrophularia nodosa*, *Brachypodium sylvaticum*, *Epilobium montanum*, *Laserpitium siler*, *Clinopodium vulgare*, *Oxalis acetosella*, *Agrostis capillaris*, *Ranunculus neapolitanus*, *Tanacetum corymbosum*.

At the locality 4. Kralje - above Kraštica, at a slightly lower altitude above Kraštica river, together with beech - *Fagus sylvatica* - there are also present *Ostrya carpinifolia*, *Corylus avellana*, *Clematis vitalba*, *Rubus ulmifolius*, *Alnus incana*, *Urtica dioica*, *Tussilago farfara*, *Dryopteris filix mas*, *Polystichum aculeatum*, *Anthyrium filix-femina*, *Mycelis muralis*, *Euphorbia amygdaloides*.

At locality 5. Ravni brijeg, between the rivers Crnja and Ljubaštica, there are well-developed beech forests. In addition to *Fagus sylvatica* from woody species, *Picea abies* has a significant participation and there are present *Salix caprea*, *Rubus idaeus*, *Corylus avellana*, *Acer pseudoplatanus*, *Rhamnus falax* are also present; *Betula pendula* also appears on the gaps. Of the herbaceous plants present are: *Aruncus dioicus*, *Dryopteris filix mas*, *Polystichum setiferum*, *Oxalis acetosella*, *Geranium robertianum*, *Epilobium montanum*, *Asarum europaeum*, *Veronica urticaefolia*, *Tussilago farfara* and the less common species *Asplenium viride*.

The locality 6. Trešnjevik - at the above mentioned coordinates together with the beech (*Fagus sylvatica*), a significant participation in community building has, also, fir (*Abies alba*) and characteristic species of this type of habitat - *Luzula luzuloides*; in addition to these there were, also: *Pteridium aquilinum*, *Dryopteris filix-femina*, *Prunella vulgaris*, *Geranium robertianum*, *Lamium galeobdolon*, *Aegopodium podagraria*, *Mycelis muralis*, *Geranium reflexum*, *Epilobium montanum*, *Prenanthes purpurea*, *Dactylis glomerata*, *Dactylorhiza maculata*, *Acer pseudoplatanus*, *Geum urbanum*, *Carex sylvatica*.

Representivity: B-D. Acidophilic beech forests are well preserved and developed in the area of Mateševo (Mateševske strane), in Crnja and Ljubaštica. Fragments of these forests occur in the western part of the Project Area above the right bank of the Drcka and are mostly devastated by logging. Above the left bank of the Drcka, this type of habitat is of better quality, but still under anthropogenic influence.

Habitat cover: This habitat covers a significant area measured in cca 9000 ha.

Vulnerability to Project Impacts: The impact effect will result in the loss of this type of habitat in the Project area, as well as the loss of soil structure, including erosion of the upper soil

horizon, as well as leaching and soil pollution. Impacts associated with the loss of this habitat type during construction are considered moderate.

Beech forests on the Mateševski sides, as well as forests between Crnja and Ljubaštica (variant 1) are particularly sensitive.

Sensitivity on habitat fragmentation: Habitat fragmentation can potentially endanger corridors for large mammals (bear, wolf, fox), small mammals, bats, amphibians and reptiles that inhabit this type of habitat or use it in the passage to the watercourses Crnja, Ljubaštica, Crni potok, Čestogaz. In addition, these forests are nesting places for birds. Therefore, it is necessary to preserve tall and old trees that are potentially inhabited by bats. Deforestation should be carried out at the time when the birds finish nesting (August-October).

91E0 *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

This is a Priority Habitat Type (*) in terms of the Habitat Directive, ie NATURA 2000.

HABITAT DESCRIPTION: This habitat type includes several different subtypes: coastal forests of black alder (*Alnus glutinosa*) and ash (*Fraxinus excelsior*) in temperate lowland and mountainous areas (*Alno-Padion*); riparian (coastal) woody alders (*Alnus incana*) along mountain streams and rivers (*Alnion incanae*) and strip galleries of tall willows (*Salix alba*, *S. fragilis*) and poplars (*Populus nigra*, *P. alba*) along river courses in lowland, submontan and montan areas of the temperate zone (*Salicion albae*). All habitat types occur on heavy, periodically flooded soils, which are poorly aerated during high water levels, while on the contrary, during low water levels they are well drained and aerated. The herbaceous plant includes many tall plants such as: *Filipendula ulmaria*, *Angelica sylvestris*, *Cardamine sp.*, *Rumex sanguineus*, *Carex sp.*, with which different spring plants occur: *Ficaria verna*, *Anemone nemorosa*, *A. ranunculoides*, *Corydalis solida*. These forests are present in almost all continental parts of Montenegro, both along large rivers and along occasional or permanent streams to the upper mountain belt.

INDICATOR SPECIES: *Alnus glutinosa*, *A. incana*, *Fraxinus excelsior*, *Populus nigra*, *Salix alba*, *S. fragilis*, *S. triandra*, *Angelica sylvestris*, *Cardamine amara*, *C. pratensis*, *Carex acutiformis*, *C. remota*, *C. pendula*, *C. sylvatica*, *Cirsium oleraceum*, *Equisetum spp.* (*E. arvense*, *E. hyemale*, *E. telmateia*), *Filipendula ulmaria*, *Geum rivale*, *Rumex sanguineus*, *Stellaria nemorum*, *Urtica dioica*.

COMMUNITIES: *Alnetum glutinosae*, *Alnetum incanae*, *Alnetum glutinosae-incanae*, *Salici-Populetum*, *Salicetum fragilis*, *Salicetum albae*, *Salicetum albo-fragilis*.

Habitat occurs throughout most of the Project route, generally along the Drcka River (mapped!) and along the Rajovića potok. We present the three most interesting phytocenological recordings taken in the area of Mateševo along the banks of the Drcka River: Mateševo I (4245481N 1933922E, alt. 1005 m), Mateševo II (4244885N 1935854E, alt. 1020 m) and along Rajovića potok (4244885N 1935854E, alt. 1020 m).

At the above coordinates for three localities, the habitat is represented by a community of gray alder and wood sorrel (*Oxali-Alnetum incanae*).

1. At the locality of Mateševo I, along the Drck River habitat is predominantly represented with *Alnus incana*, following by *Frangula alnus*, *Fraxinus excelsior*, *Acer pseudoplatanus*, *Clematis vitalba*, *Rubus ulmifolius*, *Crataegus laevigata*, *Corylus avellana*, *Agrostis capillaris*, *Brachypodium sylvaticum*, *Salvia glutinosa*. The **representativity** of the habitat at the Mateševo

I locality can be assessed with B. This is a relatively well-developed habitat with a well-developed ground layer.



Photo 59. Drcka River, Mateševu



Photo 60. Drcka River, Bare Kraljske



Photo 61. Drcka River, Vranještica



Photo 62. Drcka River near the mouth to Vranještica



Photo 63. Crnja River



Photo 64. Ljubaštica River

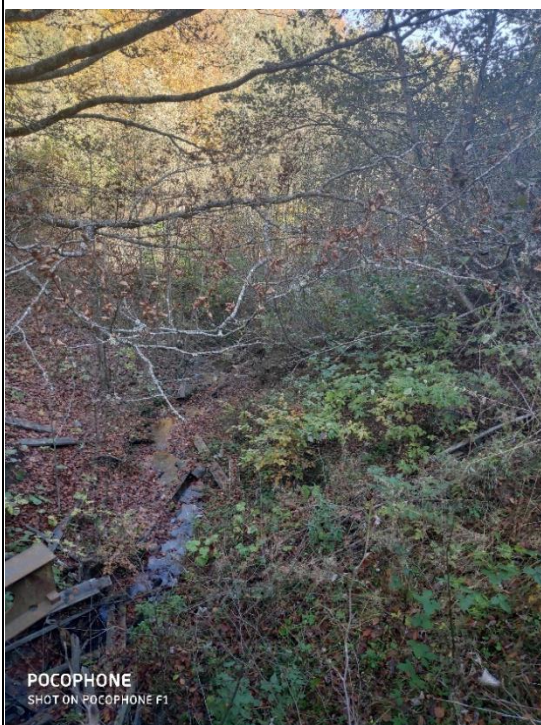


Photo 65. Novovića potok stream

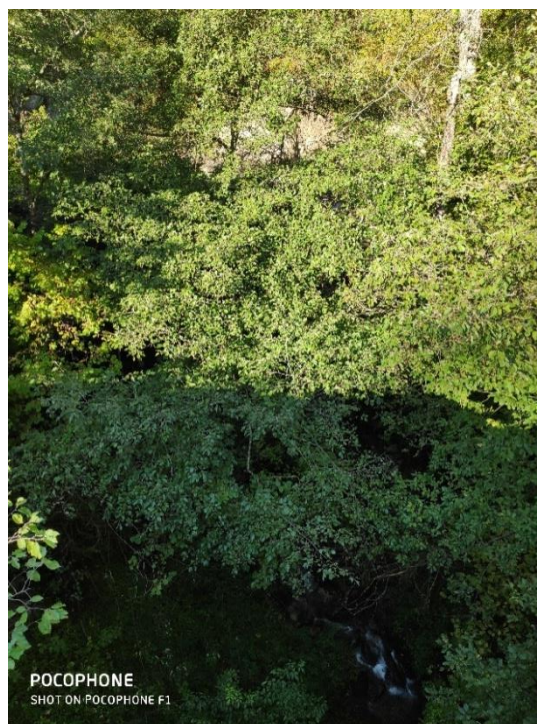


Photo 66. Dubokalj (stream)

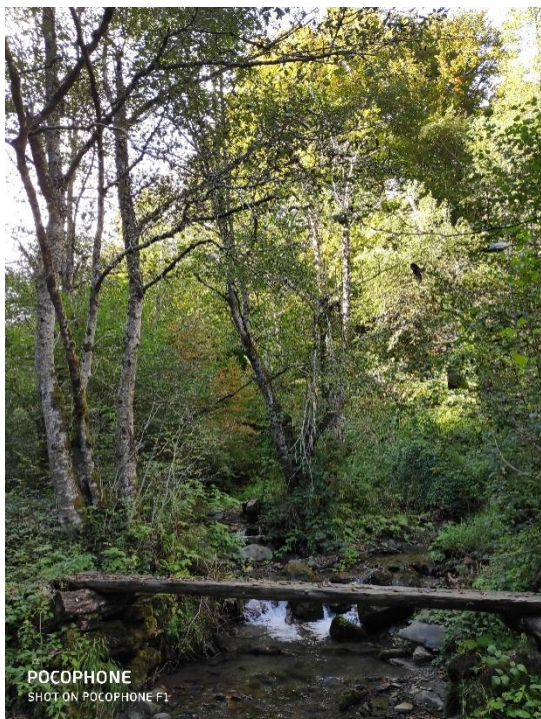


Photo 67. Rajovića rijeka River

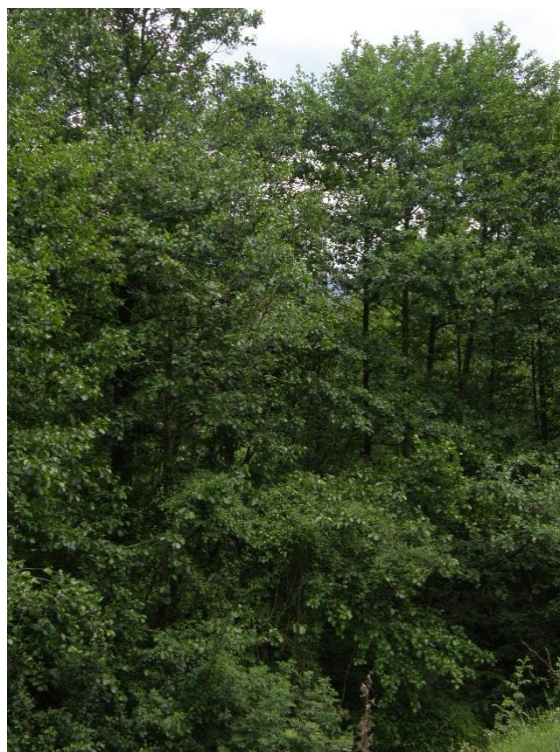


Photo 68. Zona Lima (stream)

2. At the locality of Mateševo II, along the Drck River habitat is predominantly represented with *Alnus incana*, following by the other tree species: *Salix eleagnos*, *Salix grandifolia*, *Acer pseudoplatanus*, *Viburnum opulus*, *Fraxinus excelsior*, *Prunus spinosa*. In the ground layer of shrubs and herbaceous species, *Rubus hrubyi* was the dominant species; from the other species from this layer there were, also, *Tamus communis*, *Rosa sp.*, *Evonymus verrucosa*, *Clematis vitalba*, *Brachypodium sylvaticum*, *Aegopodium podagraria*, *Geranium robertianum*, *Tussilago farfara*, *Senecio sp.*, *Viola odorata*, *Myrrhis odorata*, *Lysimachia nummularia*, *Equisetum pratense*. The **representativity** of the habitat at the Mateševo II site can be assessed with A. This is an extremely well-developed habitat (with a slightly larger width than in the rest of the area) with an extremely well-developed ground layer.

3. At the locality of Rajovića potok, the habitat is predominantly represented with the species *Alnus incana* and *Rubus caesius*; from the other tree species there were present: *Fraxinus excelsior*, *Clematis vitalba*, *Acer pseudoplatanus*, *Salix caprea*, *Crataegus oxycantha*, *Corylus avellana*, *Tamus communis*, *Evonymus europaeus*, *Stellaria media*, *Lamium orvala*, *Oxalis acetosella*, *Brachypodium sylvaticum*, *Urtica dioica*, *Mycelis muralis*, *Tussilago farfara*, *Agrostis capillaris*, *Equisetum arvense*, *Polypodium vulgare*, *Myrrhis odorata*, *Plantago intermedia*, *Polygonum mite*, *Laserpitium siler*, *Sayifraga rotundifolia*, *Athyrium filix-femina*, *Dryopteris filix-mas*, *Myosotis scorpioides*, *Galeopsis speciosa*, *Pteridium aquilinum*, *Aquilegia grata*, *Aegopodium podagraria*, *Lysimachia nummularia*, *Stachys sylvatica*, *Mentha sp.* The **representativity** of the habitat at the locality of Rajovića potok can be assessed with A, primarily due to the exceptional floristic diversity.

4. At the site Sitna Luka - above the river Lim there are very representative stands of this type of habitat with the dominance of very tall black alder trees (*Alnus glutinosa*) and a significant share of species *Alnus incana*, *Juglans regia*, *Salix alba*, *Populus nigra*, *Prunus avium*, *Pyrus communis* and others. In the ground layer of this community near the Black Alder, there are habitats with a predominance of *Petasites hybridus*. The **representativeness** of the habitat at the Sitna Luka site can be assessed with A, primarily due to the exceptional floristic diversity and the presence of tall black alder trees and other woody species.

Representivity: A-C. Representative stands of this habitat type were recorded along the Drcka River at the Mateševo, Bare Kraljske and Jasenova klada localities, along the Rajovića River, the Dubokalj stream and on the Lim River. However, this habitat type has been recorded along most rivers in the continental part of Montenegro.

Habitat cover: This type of habitat covers a significant area measured in cca 600 ha.

Vulnerability to Project Impacts: Highly sensitive habitat type. Linear coastal forests will be removed at the locations where Drcka river is bridged, as well as at locations above Lim river where representative stands of *Alnetum* are located.

Habitat sensitivity to fragmentation: Riparian forests are an important component of river health and their ecological function. This type of habitat acts as a protection zone between the uplands and the waters of rivers and streams, helping to filter pollutants, such as nutrients and sediment. It also prevents coastal erosion. Riparian vegetation provides shade which lowers the water temperature. Lower temperatures support a higher amount of oxygen, which is important for the survival of fish, amphibians and invertebrates. This habitat type is highly sensitive to fragmentation as a plant community, but also as a habitat that supports significant species (bats, birds, reptiles).

91L0 Illyrian oak-hornbeam forests (*Erythronio-Carpinion*)

HABITAT DESCRIPTION: The habitat includes forests of pedunculate oak (*Quercus robur*) or sessile oak (*Q. petraea*), sometimes *Q. cerris*, with hornbeam (*Carpinus betulus*) on a carbonate or silicate substrate, on deep neutral to slightly acidic brown forest soils. The climate is much more continental than in the sub-Mediterranean region, and much warmer than in Central Europe. These forests are floristically much richer than Central European oak-hornbeam forests.

INDICATOR PLANT SPECIES: *Quercus robur*, *Q. petraea*, *Q. cerris*, *Carpinus betulus*, *Acer tataricum*, *Tilia argentea*, *Castanea sativa*, *Euonymus verrucosus*, *Lonicera caprifolium*, *Adoxa moschatellina*, *Cyclamen purpurascens*, *Epimedium alpinum*, *Erythronium dens-canis*, *Knautia drymeja*, *Asperula taurina*, *Lathyrus venetus*, *Potentilla micrantha*, *Dianthus barbatus*, *Luzula forsteri*, *Primula vulgaris*, *Ruscus aculeatus*, *Tamus communis*. The following species can be added to this habitat type: *Prunus avium*, *Acer campestre*, *Sorbus torminalis*, *Clematis vitalba*, *Crocus heuffelianus*, *Stellaria holostea*, *Galanthus nivalis*, *Symphytum tuberosum*, *Euphorbia amygdaloides* et al.

COMMUNITIES: *Carpinetum betuli*, *Querco-Carpinetum betuli*.

This habitat type appears as a fragment at the Peovac locality.

At the Peovac site, the habitat is predominantly represented by the species *Carpinus betulus* (*Carpinetum betuli* comm). In addition to the hornbeam (*Carpinus betulus*), the presence of beech (*Fagus sylvatica*) and turkey oak (*Quercus cerris*) is also significant; of the other species here are present: *Acer pseudoplatanus*, *Fraxinus excelsior*, *Corylus avelana*, *Clematis vitalba*, *Pirus piraster*, *Euonymus verrucosus*, *Stellaria holostea*, *Asarum europeum*, *Mercurialis perennis*,

Aremonia agrimonioides, *Lonicera caprifolium*, *Helleborus odoratus*, *Lamium luteum*, *Euphorbia amygdaloides*.

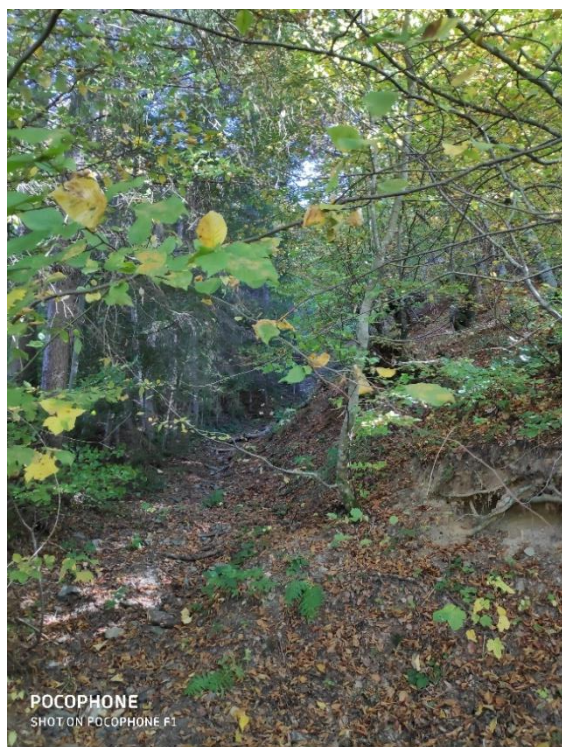


Photo 69. Peovac (outside of impact zone)

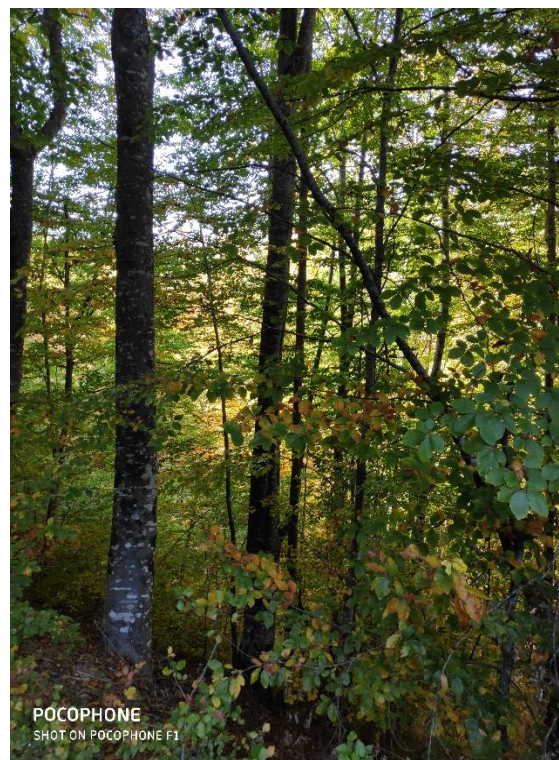


Photo 70. Peovac (outside of impact zone)

Representivity: A-B.

Habitat cover: A small area (cca 0,1ha) that alternates mosaically with beech forests.

Vulnerability to Project Impacts: There is no potential impact during construction because it is quite far from the route of the road.

Sensitivity on habitat fragmentation: it does not exist.

91M0 Pannonian-Balkan turkey oak - sessile oak forests

HABITAT DESCRIPTION: The habitat includes subcontinental thermoxerophilous forests of turkey oak (*Quercus cerris*), sessile oak (*Q. petraea*) and malt (*Q. frainetto*) and related deciduous oaks, locally large-leaved honeysuckle (*Q. virgiliana*), developed in the area from the Pannonian lowlands. of the southern Balkans. Habitat is widespread between 250 and 600 (800) m above sea level, and occurs on different types of substrates: limestone, andesite, basalt, loess, sand, etc., on slightly acidified deep brown forest soils. This type of habitat includes practically all thermophilic oak forests of Montenegro, with the exception of *Quercus pubescens*,

which occupy large areas in the Mediterranean and sub-Mediterranean part of Montenegro (not important for the EU), but also appear extrazonal deeper in the continent on the southernmost slopes of gorges.

INDICATOR PLANT SPECIES: These forests are rich in species. Important indicator species are: *Quercus petraea*, *Q. cerris*, *Q. frainetto*, *Acer tataricum*, *Carpinus orientalis*, *Fraxinus ornus*, *Tilia argentea*, *Ligustrum vulgare*, *Euonymus europaeus*, *Festuca heterophylla*, *Carex montana*, *Poa nemoralis*, *Potentilla micrantha*, *Tanacetum corymbosum*, *Campanula persicifolia*, *Digitalis grandiflora*, *Viscaria vulgaris*, *Lychnis coronaria*, *Silene nutans*, *S. viridiflora*, *Hieracium racemosum*, *H. sabaudum*, *Galium schultesii*, *Lathyrus niger*, *Veratrum nigrum*, *Peucedanum oreoselinum*, *Helleborus odorus*, *Luzula forsteri*, *Pulmonaria mollis*, *Melittis melissophyllum*, *Glechoma hirsuta*, *Geum urbanum*, *Genista tinctoria*, *G. pilosa*, *Chamaecytisus hirsutus*, *Lithospermum purpureocaeruleum*, *Iris graminea* et al.

COMMUNITIES: *Quercetum cerridis*, *Quercetum farnetto-cerridis*, *Quercetum frainetto*, *Quercetum petraeae*. *Quercetum petraeae-cerridis*.

This habitat type occurs continuously on one part of the Project route - on a large area, on a stretch along the old route of the road near Andrijevisa (4244228N 1945816E, alt. 855 m). The Turkey oak forests occur along the entire route of the road in the eastern part of the Project Area, but are not representative. Better stands are developed in the villages around Andrijevisa, above the left and right banks of the Lim River (Prisoja, Slatina, Guvno...).

At the locality near to Andrijevisa, the habitat is predominantly represented by the species *Quercus cerris*. The ground layer of herbaceous plants is dominated by *Lathyrus nigra* and from the other species there were also present: *Pteridium aquilinum*, *Brachypodium sylvaticum*, *Veronica chamaedrys*, *Trifolium pratense*, *Campanula trachelium*, *Helleborus odorus*, *Aegopodium podagraria*, *Galium corrudifolium*, *Agrostis capillaris*, *Dactylis glomerata*, *Dorycnium herbaceum*, *Crataegus monogyna*, *Hieracium sylvaticum*, *Viola odorata* etc.

Representivity: A-B.

Habitat cover: This type of habitat covers a significant area cca 1050 ha. It is a common habitat type in Montenegro.

Vulnerability to Project Impacts: The route of the road passes through the edge of the turkey oak forests on very steep slopes. The impact of the Project is direct and will lead to the removal of vegetation, but not to the extent of endangering the habitat. However, erosion is possible due to the slope of the terrain, and it is necessary to afforest the bare slopes with the turkey oak after the completion of the works.

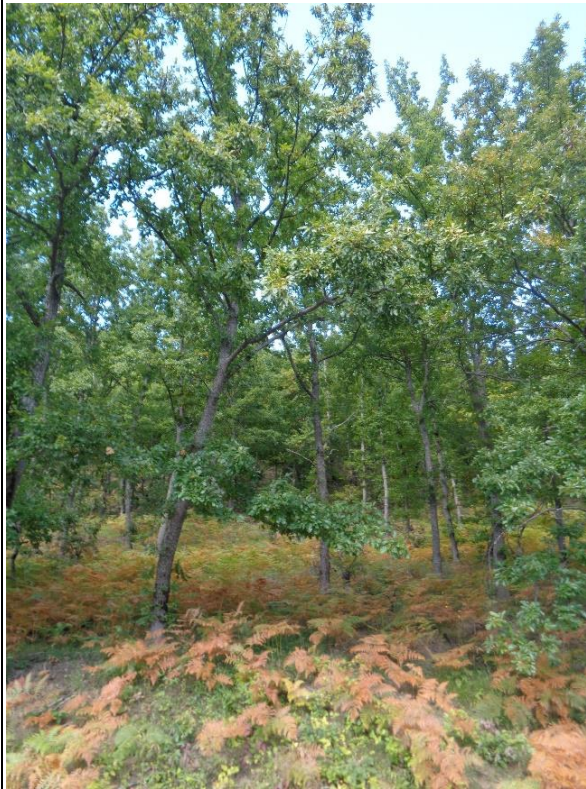


Photo 71. Između Kralja i Salevića



Photo 72. *Quercetum cerridis*



Photo 73. Brdo između Kralja i Andrijevice



Photo 74. *Quercetum cerridis* iznad Gnjllog potoka

Sensitivity on habitat fragmentation: Habitat continuity will be preserved. Potentially the turkey oak trees can be a habitat for nesting birds and bats, so it is necessary to preserve such a tree from felling. The fragmentation will be of low magnitude and will not significantly affect habitat connectivity.

9410 Acidophilous *Picea* forests of the montane to alpine level (*Vaccinio-Piceetea*)

HABITAT DESCRIPTION: Habitat type includes dark coniferous forests of spruce (*Picea abies*), which occur in the subalpine zone, less often in cold places of the mountain belt, which are unfavorable for the development of beech and fir. These cold and mostly dark coniferous forests, in the area of Montenegro and the wider area of the Dinarides, in addition to pure acidophilic spruce forests, include a number of other subtypes. Among them are pure dark and acidophilic stands of white pine, as well as mixed stands of white pine and spruce, but also mesonetrophilous coniferous fir forests, mixed stands of fir and spruce, and open basophilic fir forests on limestone blocks, as well as very similar spruce forests. on a similar broken relief.

INDICATOR PLANT SPECIES: *Picea abies* and species of the genus *Vaccinium*, of which *V. myrtillus* and *V. vitis-idaea* are found in Montenegro (the latter quite rarely). Some species characteristic of acidophilic spruces and/or white pine forests (*Maianthemum bifolium*, *Moneses uniflora*, *Pyrola chlorantha*, *P. minor*, *Orthilia secunda*, *Listera cordata*, *Corallorhiza trifida*, *Homogyne alpina*) appear in them singly and rarely, but only *Galium rotundifolium*, *Luzula luzulina*, *Melampyrum sylvaticum* and the mentioned blueberry are fairly regular elements. Mesoneutrophilic fir forests (*Abies alba*) and mixed fir and spruce forests, developed to deeper and only surface acidified soil on limestone, are rich in beech forest species: *Aremonia agrimonoides*, *Lamium galeobdolon*, *Hieracium murorum* aggr., *Lactuca muralis asclepiadea*, *Rubus hirtus*, *Rosa pendulina*, *Anemone nemorosa*, *Acer heldreichii*, *Prenanthes purpurea*, *Sanicula europaea*, *Oxalis acetosella* and many others. In basic forests on stone blocks, the following are often found with fir or spruce: *Calamagrostis varia*, *Juniperus communis* ssp. *alpina*, *Rubus saxatilis*, *V. montana*, *Sorbus aria*, *Solidago virgaurea*, *Hypericum richeri*, *Polystichum lonchitis* and many other species of rocks and cracks.

COMMUNITIES: *Piceetum abietis* (*montanum* i *subalpinum*), *Pinetum sylvestris* (tamne acidofilne sastojine), *Abietetum albae*, *Piceo-Pinetum sylvestris*, *Abieti-Piceetum abietis*

In the area of Ljubaštica, at the Turirog locality, smaller stands of spruce (*Picea abies*) (N, E) were recorded. Along with spruce, *Abies alba*, *Fagus sylvatica*, *Vaccinium myrtillus*, *Hieracium murorum* and other species also occur. This type of habitat occurs on one part of the Project route - on a large area, on a stretch at the Trešnjevik locality.

Representivity: A-B.

Habitat coverage: Small areas (cca 0,5 ha) that alternate with mosaic-beech-spruce forests, where the share of beech is above 10%.

Vulnerability and impact of the Project: there is no danger of potential negative impact during construction in terms of physical removal because in this part a tunnel is planned in both variants, and the habitat will be bypassed.

Habitat sensitivity to fragmentation: no danger of physical fragmentation.

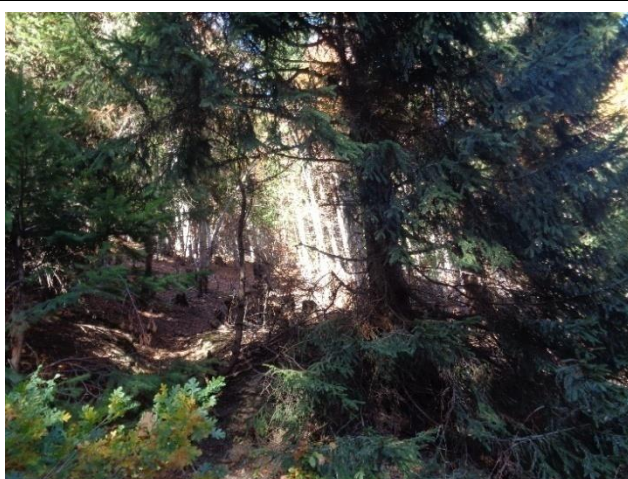


Photo 75. Smrčeve šume



Photo 76. Turirog, Ljubaštica

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Milanović Đ., Caković D., Hadžiablahović S., Vuksanović S., Mačić V., Stešević D., Lakušić D. 2020. Priručnik za identifikaciju tipova staništa Crne Gore od značaja za Evropsku uniju sa obrađenim glavnim indikatorskim vrstama. Podgorica - Banja Luka - Beograd./Manual for identification of habitat types of Montenegro of importance for the European Union with processed main indicator species. Podgorica- Banja Luka - Beograd.