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Gap Analysis & ESIA Disclosure Pack

WB20-BiH-TRA-02 Component 1

Volume 2: Technical Annexes to the ESIA

Annex A: Habitats, vegetation and invasive species

October 2023

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Western Balkans Investment Framework (WBIF)

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1 Introduction

1.1 Project Background

In August 2020, ENOVA was commissioned to conduct an environmental and social impact assessment referring to the Corridor Vc section Konjic (Ovcari) - Prenj Tunnel - Mostar North. The results of the previous biodiversity gap analysis indicated that additional information on biodiversity would be needed for an informed assessment of sensitive habitats and ecological characteristics. Additional information was obtained through field research and analysis of available literature and project documentation. The following field research has been done and is to be included in Annexes to the final Environmental and Social Impact Assessment Report:

- Annex A: Habitats, vegetation and invasive species
- Annex B: Invertebrates
- Annex C: Vertebrates
  - Annex C-1: Ichthyofauna
  - Annex C-2: Herpetofauna (amphibians and reptiles)
  - Annex C-3: Ornithofauna
  - Annex C-4: Mammals (Bats)
  - Annex C-5: Mammals (Large mammals).

This report provides the results of field surveys of flora, habitats, vegetation and invasive plant species.

1.2 Site Locations

This subproject includes three subsections between Konjic (Ovcari) and Mostar North along motorway Vc. According to the ToR, the subproject starts with the Konjic Intersection in Ovcari and ends with the Mostar North Interchange and the total length is 35.26 km, has six bridges and nine viaducts.

The motorway subsection Konjic (Ovcari) - Prenj Tunnel - Mostar North (Vrapcici) starts in settlement Ovcari with an interchange which will enable connection of the motorway and the existing main road M17. At the northern entrance to the City of Konjic, after the interchange, the motorway crosses the Sipad industrial zone. Further ahead, the subsection passes through the slopes where steep cuts are envisaged and where the Viaduct 3 over river Tresanica was designed to cross to the opposite side of the M17. Immediately after the end of Viaduct 3, the route enters the slope which passes through tunnels - Tunnel T1 and Tunnel T2.

After exiting the Tunnel T2, the route crosses over the Neretva River and the local road with Viaduct 4. Crossing to the opposite side, the motorway continues along the slopes at the rear of the settlement Bijela up to the settlement Mladeskovici, where the Konjic South interchange is positioned. Further on, the

motorway route is laid at the foot of the slope above the settlements of Bijela and Gornja Bijela all the way to the end of the section. The route further runs along the slopes parallel to the Rakov Laz shooting range, continues through the uninhabited green landscape to the slopes of Prenj Mountain, where the tunnel under Prenj (Tunnel T3) begins and terminates in the territory of the City of Mostar.

After exiting the tunnel through the Prenj mountain, the motorway route traverses mountain curves towards the south and the City of Mostar, through a system of cuts and bridges through uninhabited mountain areas. At the exit from the Prenj mountain range, the road crosses the valley on 300 m long embankment and enter the Klenova Draga Tunnel (Tunnel T3A) on the western cliffs of the gorge.

After the Klenova Draga Tunnel the next viaduct of approx. 800 m begins and turns into approx. 640 m long Tunnel T4. The viaduct over Badnjena Draga near Seliste, which stretches parallel to the settlement begins here.

The route continues northeast of the settlement and extends along the edges of the hill north of Podgorani, where the bridge over Seocka Draga begins and leads the route to Dolac, north of Humlisani. Further, the route continues in a slight semicircle around the settlement of Humilisani along the slopes of Porim. Below Humilisani, the route runs south and under Sljemen, it enters the 2,200-meter-long Tunnel T5, and exits into the Kuti area, the point where the Mostar (north) exit ramp has been envisaged.

The south connection to main road M17 (hereinafter: Konjic Bypass) is also a subject of this ESIA. Konjic bypass will connect the motorway at Ovcari Interchange with the M17 to Jablanica. This bypass will allow for M17 traffic to access the motorway directly without entering the urban area of Konjic. Konjic Bypass begins by turning off the motorway via the Ovcari Interchange. After that, motorway passes the next 100 m in an embankment and reach the first 80-meter-long viaduct. After the viaduct, it enters an 800-meter-long tunnel. After exiting the tunnel, the route goes for approx. 500 m through embankments and another 500 m through a cut with the highest point of approx. 30 m. The next 200 m of the route passes through embankments and cuts and reaches a 350-meter-long bridge that crosses the existing Sarajevo-Capljina railway, the Neretva River, and the main road M17. After 200 m, Konjic Bypass connects to M17.

1.3 Report Aim and Objectives

The main purpose of this task is to prepare a written report to serve as basis for Environmental and Social Impact Assessment (ESIA) Disclosure Package and the Biodiversity Management Plan (BMP). For this purpose to be met, this report has been written in accordance with the following objectives:

- Provide field survey methodology and results;

- Assess the respective project and impact areas for the potential presence of sensitive species and species of conservation importance;
- Recommend mitigation measures and/or monitoring if necessary.

2 Methodology

2.1 Survey Background

Field research was conducted in the following periods: 28.09 - 01.10.2020, 24.10 - 25.10.2020, on multiple occasions in the period from March to June 2021 and in June 2022.

The weather conditions were favourable for conducting floristic research and were planned to cover the flowering periods of different groups of plants.

2.2 Survey Methodology

Prior to the field survey commencemend, an extensive desk study was conducted in order to adequately plan field research. In the wider research area, a number of floristic and vegetation researches have been performed so far (Murbeck, 1891; Beck-Mannageta, 1891, 1886, 1888, 1903-1924, 1927; Maly, 1910, 1912, 1917, 1919, 1920, 1923, 1928, 1933, 1940; Horvat, 1933, 1936, 1952, 1959; ProDan, 1910, 1918; Simonovic, 1926; Bosnjak, 1936; Fukarek, 1941a, 1941b, 1942, 1947, 1949a, 1949b, 1955, 1957a, 1957b, 1964/1965, 1966a, 1966b, 1970b, 1970c, 1970d, 1957, Beck-Mannagetta & Maly, 1950; Riter-Studnicka, 1956, 1967; Simunovic, 1958; Fukarek & Vidakovic, 1965; Beck-Mannagetta et al., 1967, 1974; Curic, 1967; Silic, 1967, 1970, 1978, 1979, 1990b; Fukarek et al., 1967; Lakusic, 1967, 1969, 1973a, 1975, 1981, 1984, 1989, 2003; Lakusic & Kutlesa, 1971; Bjelcic & Silic, 1971; Misic & Lakusic, 1974; Bjelcic et al., 1975; Lakusic et al., 1978, 1980, 1982; Misic, 1991; Stefanovic et al., 1983; Stefanovic, 1986; Silic & Abadzic, 1989, 1991; Redzic, 1999a, 1999b, 2003, 2008a, 2008b, 2011, Redzic et al., 2008, 2010, 2011; Redzic & Dug, 2008 etc.); however, there is very little data regarding the narrow area around the motorway route itself (buffer zone of 500 m).

Plant species were determined in the field, while only a small portion of specimens was collected and photographed for subsequent determination and verification. Identification keys and plant iconography were used for species identification: Hayek (1924-1927, 1928-1931, 1932-1933), Tutin et al. (1964-1980, 1993), Horvatic (1967), Josifovic (1970-1977), Trinajstic 1975-1986), Pignatti (1982), Jávorka and Csapody (1991), Domac (1994), Nikolic (2003, 2019a), and Rothmaler (2009). The nomenclature is mainly in line with the Data of Flora Europaea, i.e. its revision which is performed by publishing the Atlas of Flora Europa (Jalas et al, 1972-2013) and Euro + MedPlantBase (2006-2021) and Flora Hrvatske (Nikolic, 2021). These sources are deviated from in the event that in the meantime modern revisions of some genera have been issued (Bigazzi et al., 1997; Frajman & Oxelman, 2007; Koopman, 2011), which were reflected either by deviations in the nomenclature or distinguished independent

species/subspecies, which in the mentioned crucial works are most often treated as lower systematic categories such as variety or form.

The assessment of the floristic diversity of the vascular flora was performed at selected site locations within the proposed motorway route. Representative areas on which vascular flora research was performed were identified in advance. The definition and understanding of basic vegetation units - syntaxons, was performed according to the Code of Phytocenological Nomenclature (Webber et al., 2000). According to the same Code, vegetation is organized through associations (basic units), alliances (several related associations), orders (several related alliances) and classes (which include several floristically and ecologically related orders). Each of the units has its own characteristic extension. The nomenclature of vegetation units is given according to "Prodromus of plant communities of BiH" (Lakusic et al., 1978), and on the basis of "The Diversity of European Vegetation" (Rodwell et al., 2002).
The research of flora and vegetation was performed on a total of 6 macro sample points, which included 58 micro sample points (Table 1). Systematic field research was preceded by a collection of available literature data, followed by a review of the author's field notes, herbarium material and extensive photo documentation of the expert who lived in this area during the previous 15 years. All collected information on the vascular flora of the study area was incorporated into a newly created database organized in the software program Microsoft Office Excel - version 2010.

Table 1: Overview of site locations where flora and vegetation analysis was performed

Wider site location	Narrower site location	Coordinates
Kuti-Livac	Dubrava	43°23'12.23"N 17°53'7.00"E
	Dubrava_2	43°23'19.66"N 17°52'37.04"E
	Komic	43°22'51.79"N 17°53'43.17"E
	Budevci	43°22'56.75"N 17°53'26.37"E
	Susica	43°23'9.90"N 17°53'36.95"E
	Kuti	43°23'17.51"N 17°54'18.64"E
	Kuti_1	43°23'26.17"N 17°53'57.87"E
	Kuti_3	43°23'3.77"N 17°54'8.72"E
	Kutilivac	43°23'41.53"N 17°53'45.98"E
	Livac	43°24'11.60"N 17°53'26.72"E
	Orlov kuk	43°24'4.56"N 17°53'35.69"E
	Orlov kuk_2	43°24'47.91"N 17°53'48.07"E
Koritna draga	Koritna draga	43°23'22.56"N 17°54'42.32"E
	Orlinka	43°23'10.89"N 17°54'34.94"E
	Dobrusa	43°23'39.39"N 17°54'44.95"E
	Dobrusa_2	43°23'51.11"N 17°54'51.32"E
	Kuti_2	43°23'35.71"N 17°54'26.74"E
	Dobrusa_3	43°23'28.11"N 17°54'54.83"E

Wider site location	Narrower site location	Coordinates
	Dobrusa_4	43°23'46.15"N 17°54'42.90"E
Humi	Lisani	43°25'29.40"N 17°54'1.86"E
	Lisani_2	43°25'6.15"N 17°54'38.46"E
	Lisani_3	43°25'26.69"N 17°54'27.95"E
	Lisani_4	43°25'39.85"N 17°54'56.20"E
	Lisani_5	43°25'43.99"N 17°54'23.48"E
	Humi	43°26'7.13"N 17°53'49.68"E
	Humi_2	43°26'30.84"N 17°54'2.85"E
	Humi_3	43°26'9.90"N 17°54'32.64"E
	Humi_4	43°26'6.12"N 17°54'54.02"E
	Humi_5	43°26'21.12"N 17°54'45.37"E
	Humi_6	43°26'39.65"N 17°54'47.16"E
	Humi_7	43°26'47.87"N 17°54'25.54"E
Podgorani	Dolac	43°27'26.05"N 17°54'23.79"E
	Dolac_2	43°27'14.55"N 17°54'2.50"E
	Dolac_3	43°27'33.70"N 17°54'2.55"E
	Podgorani	43°27'34.23"N 17°53'20.29"E
	Podgorani_2	43°27'39.50"N 17°53'34.03"E
	Podgorani_3	43°27'46.95"N 17°53'45.20"E
	Podgorani_4	43°27'52.48"N 17°53'43.47"E
	Podgorani_5	43°27'54.06"N 17°53'11.79"E
	Podgorani_6	43°28'4.82"N 17°52'58.37"E
	Podgorani_7	43°28'22.39"N 17°52'59.06"E
	Podgorani_8	43°28'4.42"N 17°53'18.78"E
	Podgorani_9	43°28'4.99"N 17°53'34.78"E
Ovcari	Ovcari_1	43°40'1.35"N 17°59'11.77"E
	Ovcari_2	43°40'11.43"N 17°58'49.51"E
	Ovcari_3	43°40'2.52"N 17°58'58.34"E
	Ovcari_4	43°39'42.07"N 17°58'26.06"E
Polje Bijela	Polje_Bijela_1	43°38'5.64"N 17°58'55.69"E
	Polje_Bijela_2	43°38'7.04"N 17°58'23.60"E
	Polje_Bijela_3	43°37'43.89"N 17°58'16.12"E
	Polje_Bijela_4	43°37'17.71"N 17°58'22.78"E
	Rakov_laz	43°34'14.25"N 17°55'38.71"E
Zlatar	Zlatar_1	43°38'55.67" N 17°58'13.09" E
	Zlatar_2	43°38'55.82" N 17°58'57.09" E
Konjic bypass	Repovica_1	43°39'54.18"N 17°58'9.18"E
	Repovica_2	43°39'45.39"N 17°57'36.19"E

Wider site location	Narrower site location	Coordinates
	Donje Selo	43°39'39.44"N 17°57'4.55"E
	Drecelj	43°39'43.85"N 17°56'35.58"E

The analysis of habitats and endangered inventoried flora was conducted according to the following:

- Annexes I, II and IV of the Habitats Directive - Council of the European Union. (2013). Council Directive 2013/17 / EU of 13 May 2013. Official Journal of the European Union L158: 193–229; and
- IUCN Red List of Threatened Species (http://www.iucnredlist.org/);
- *Red List of Wild Species and Subspecies of Plants, Animals and Fungi*[1];

IUCN, the International Union for the Conservation of Nature, was founded in 1948 and brings together about 10,000 experts and scientists from countries around the world. It aims to use natural resources on a scientific basis, and to protect rare and endangered species, as well as their habitats (IUCN/SSC, 2003). The IUCN Red List categories and their standard abbreviations were used in this report:

- CR – Critically Endangered
- EN – Endangered
- VU – Vulnerable
- NT – Near Threatened
- LC – Least Concern
- DD – Data Deficient
- NE – Not Evaluated

Also, a list of invasive species was made in accordance with the publication on invasive species in FBiH (Djug et al., 2019) with the corresponding invasive code:

- A0 - the species is not present in FBiH;
- A1 - the species has a high risk to the environment and is present in the form of isolated populations;
- A2 - the species has a high risk to the environment and has a limited range of distribution;
- A3 - the species has a high risk to the environment and is widespread;
- B1 - the species has a moderate risk and is present in the form of isolated populations;
- B2 - species has a moderate risk to the environment and has a limited range of distribution and
- B3 - the species has a moderate risk to the environment and is widespread.

The classification of habitat types has been developing in Europe for about twenty years, and intensive work on this issue has begun precisely for the purpose of enacting regulations in nature protection. Within this study, the CLC

[1] Official Gazette of FBiH, No. 7/14

land classification, EUNIS habitat classification and Natura 2000 habitat classification were performed as well.

2.3 Assumptions and Limitations

During desk study and field research, the existence of minefields was determined, where detailed floristic research could not be performed, but the research was conducted from a safe distance. Additionally, there were private properties where access was prohibited.

The conservation status of part of the species has been assessed and published within The Red List of Flora of FBiH in 2013. The assessment for the FBiH Red List has been determined based on the outdated literature data for most species. Although the categories used to determine the endangered status of species are complaint with the IUCN Red List categories, they were not adequately considered in accordance with the IUCN Red List Criteria or IUCN guidelines during development of the Red List of FBiH, due to the lack of spatial distribution of species and the status of the populations of species. This issue has been recognized by the local authorities, and Federal Ministry of Environment and Protection has adopted the *Decision on Initiating the Public Procurement Procedure for Revision of the Red List of Flora, Fauna and Fungi of the Federation of Bosnia and Herzegovina* in September 2019.[2] During November 2019, an intensive Red List Assessor training workshop was conducted in Sarajevo, Bosnia and Herzegovina. The workshop was organized by UN Environment Programme in the frames of the GEF-6 MSP project "Achieving biodiversity conservation through creation, effective management and spatial designation of protected areas and capacity building" in Bosnia and Herzegovina, including the Revision and establishment of the Red List Index(es) in the country.

2.4 Project Area of Influence

With regard to the project area of influence, a buffer of 500 m on each side of the road is sufficient given the impact of the planned works on flora and vegetation, as most natural habitats are already degraded and taking into account that direct impacts of the project will be limited to the motorway route.

Area of influence was generally deemed enough for field surveys and observation of direct impacts to a particular species; however, biodiversity aspects must take biology of species and integrity of ecosystems as whole into consideration. This is done so that "wider distribution of potentially affected biodiversity features and the ecological patterns, processes and functions that are necessary for maintaining them throughout this distribution" (EIB Guidance

[2] Web site of the Federal Ministry of Environment and Tourism, available https://www.fmoit.gov.ba/bs/javne-nabavke/odluke/odluka-o-pokretanju-postupka-javne-nabavke-revizija-crvenih-lista (last accessed on February 22, 2023)

Note for Standard 3 on Biodiversity and Ecosystems, 2018) are included. Project's AOI was a basis for baseline surveys which was modified in a way that reflects ecological characteristics of the area and biology of found species. Output of said modification is ecologically appropriate area of analysis (EAAA). The methodology for ecologically EAAA was applied on the basis of field research, confirmed and expected species, characteristics of surrounding habitats and ecosystems, literature data, expert opinion and, later, IUCN estimated extent of occurrence (EOO) and the area of occupation (AOO) for each individual species. Initial AOI was expanded to include distribution of registered habitats and flora species in the wider area so that the most adequate baseline for subsequent impact assessment and mitigation measures is ensured. Further evaluation of EAAA was done with regard to EOO based on IUCN data (if available) and expert inputs to facilitate critical habitat assessment (CHA). Critical habitat assessment for this Project is done separately and it is presented in the Annex D of the ESIA Study.

3 Results

3.1 Habitats

3.1.1 Motorway

Syntaxonomic Review of Associations/Ecosystems

The local EIA from 2016 provides information on the dominant species that can be found in the general area of Konjic and Mostar. According to the 2016 EIA, vegetation in Ovcari is represented in the form of the degraded black pine with *Erica* class *Erico-Pinetea* Ht. 59, vegetation on rocky class *Thero-Brachypodietea* Br-Bl. 1947 and vegetation of rock crevices class *Asplenietea rupestris* (H. Meier) Br-Bl. on the right bank of the river Tresanica. Edificator species in this area are: *Pinus nigra*, *Erica carnea*, *Sedum album*, *Melissophylum mellitus*, *Campanula rotundifolia*, *Carex digtata* and others. Ruderal community classes *Plantaginetea maioris* and order *Bidentetalia tripartite*, with typical species: *Inula viscosa*, *Bidens subalternans*, *Foeniculum vulgare*, *Chenopodium* sp., *Rumex* sp., *Solanum* sp. *Datura stramonium*, et al. In the area of the interchange Ovcari - Borovci, vegetation is represented in the form of the class *Erico-Pinetea* Ht. 1959 dominated by black pine (*Pinus nigra*) and vegetation on rocky class *Thero-Brachypodietea* Br-Bl.47.

Local EIA also point out that drastic degradation of thermophilic leafy deciduous forest of oak streaked with stands of pine on dolomite is present on the part of section around Konjic. Moving toward the Neretva river, Herzegovinian forests of Hungarian oak and Turkey oak (*Quercetum confertaecerris hercegovinicum*) are present as well as including *Oxytro-pidion prenje*, *Carici-Dianthetum freynii*, *Gentianetum dinaricae hercegovinicum*, *Seslerietum juncifoliae hercegovinicum*, *Amphoricarpi-Campanuletum hercegovinae*, *Elyno-Edraianthetum serpyllifolii-hercegovinicum*, *Festucetum pungentis hercegovinicum*, *Saxifragetum prenjae hercegovinicum* and others. In the sub-section Prenj Tunnel-Mostar South, the

route enters the sub-Mediterranean part leaning on association Ostryo-Carpinion characterized by communities of Downy oak and Oriental hornbeam (*Querco-Carpinetum orientalis*). Community of *Scorzonera* and golden beard grass (order *Scorzonero-Chrysopogonetalia*) are related to the sub-Mediterranean and Mediterranean-mountain belt i.e. the area occupied by Downy oak. Also in this section community of *Seslerio-Ostryetum carpinifoliae* is significantly present.

Survey done as a part of this ESIA study had similar results. Vegetation within the wider study area is presented with a large number of plant associations that build different ecosystems. Below is an overview of the most important ecosystems registered during the 2020/21 surveys and their basic characteristics.

Ecosystems in rock crevices

Ecosystems in rock crevices represent an extremely important and significant part of the specific biodiversity of BiH, which give uniqueness to this area (Figure 1). In the surveyed area, they occur on a vertical profile from 250 to 2,200 m above sea level. The main characteristic of this vegetation is the carbonate geological base (limestones, dolomites and dolomitic limestones), a very prominent slope of the terrain and shallow soils. Syntaxonomic vegetation is quite complex and is represented by the class *Asplenitea trichomanis* (Br.-Bl. In Meier et Br.-Bl. 1936) Oberd 1977 which includes a large number of orders: *Pontetilletalia caulescentis* Br.-Bl. 1926, *Moltkeetalia petraeae* Lakusic 1968, Amphoricarpetalia Lakusic 1968, *Potentilletalia speciosae* Quézel 1964, etc. Due to its exceptional diversity and uniqueness, it is necessary to pay special attention to prevent damage to this ecosystem.

Figure 1: Ecosystems in rock crevices - habitats of great importance

Scree ecosystems

Scree ecosystems are azonal and develop from foothills of mountain massifs to the very tops. The main features of these ecosystems are vegetation that is adapted to extreme ecological conditions, constant displacements of the geological base, shallow soils and variable ecoclimatic characteristics. In

general, the phytocenosis of screes include a small number of species with low cover value (Figure 2), but a large number of them are endemic (Dinaric and Balkan endemics) and relict. Syntaxonomically, this vegetation is represented by the class *Thlaspietea rotundifolii* Br.-Bl. 1948, which includes the orders: *Arabidetalia flavescentis* Lakusic 1968 and *Drypeetalia spinosae* Quézel 1964, with alliances: *Saxifragion prenjae* Lakusic 1968, *Bunion alpini* Lakusic 1968, *Peltarion alliaceae* Horvatic (1958) 1968 and *Silenion asginija saginim* Lakusic.

Figure 2: "Living" scree habitats of many endemic and endangered plant species

Ecosystems of thermophilic meadows and dry grasslands

In the hilly and mountainous belt, in the habitats of the former forests and shrubs, various thermophilic associations of meadows and dry grasslands are developed, which are characterized by shallow soils (Figure 3). This habitat type is relatively rich in species and is represented by the class *Festuco Brometea* Br.-Bl. et R.Tx. in Br.-Bl. 1943, and order *Brometalia erecti* (W. Koch 1926) Br, -Bl. 1936 and alliance *Bromion erecti* W. Koch 1926.

Figure 3: Ecosystems of thermophilic meadows and dry grasslands

Ecosystems of Mediterranean-sub-Mediterranean dry grasslands and meadows

In the zone of thermophilic forests and shrublands of the order *Quercetalia pubescentis* and *Ostryo-Carpinetalia orientalis*, thermophilic associations of Mediterranean and sub-Mediterranean dry grasslands and meadows are developed (Figure 4). In syntaxonomy, they are very complex and are included in the class *Thero-Brachypodietea ramosi* No.-Bl. 1947 and *Scorsoneretalia villosae* Horvatic 1975, with a large number of alliances.

Figure 4: Ecosystems of Mediterranean-sub-Mediterranean dry grasslands and meadows

Heathland ecosystems

Heathland ecosystems within the study area are present on carbonate shallow soils. These are associations dominated by species of the genus *Juniperus* L. (Figure 5). Syntaxonomically, these ecosystems belong to the class *Loiseleurio-Vaccinietea* Eggler ex Schubert 1960 and the order *Rhododendro-Vaccinietalia* Br.-Bl. in Br.-Bl. & Jenny 1926 and alliance *Juniperion nanae* No.-Bl. et al. 1939. Association *Juniperetum communis-intermediae* Stefanovic 1974 is present in the mountain belt of the Bosnian pine.

Figure 5: Heathland ecosystems dominated by species of the genus Juniperus *L.*

Ecosystems of mesophilic deciduous forests and shrublands

Deciduous forests and shrubs within the study area occupy the belt up to the subalpine low beech forests (*Fagetum subalpinum*) (Figure 6). In syntaxonomic terms they belong to the class of *Querco-Fagetea* No. et Vlieg. 1937, and the most numerous order is *Fagetalia sylvaticae* Pawlowski in Pawloski et al. 1928. In the mountain belt in the wider study area, associations of beech and silver fir *Abieti Fagetum* (Fukarek & Stefanovic) Fukarek 1969, and associations of the order *Rhamnetalia fallacis* Fukarek 1969, are present on limestone blocks and shallow chernozem. The thermophilic associations of beech and black hornbeam *Ostryo-Fagion* Borhidi in 1963 are of particular value.

Figure 6: Beech forests in the mountain and mediterranean-montane belt build distinctive associations Fagetum mediterraneo-montanum Redzic et al. 1984

Ecosystems of thermophilic deciduous forests and shrublands

In warmer habitats from the lowest altitudes all the way to the mountain climatic zone, forests and shrublands of white hornbeam, downy oak, Austrian oak, Hungarian oak, black hornbeam and Dalmatian Laburnum are developed. Syntaxonomically, these ecosystems are represented by the class *Querco-Fagetea* No.-Bl. et Vlieg. 1937 and the orders *Fraxino orni-Cotinetalia* Jakucs 1961, *Quercetalia pubescenti-petraeae* Br.-Bl. 1931 and *Ostryo-Carpinetalia orientalis* Lakusic, Pavlovic, Redzic 1972. Within the buffer zone south of Podgorani to Mostar, there is mainly a thermophilic forest that belongs to the climatogenic association of the white hornbeam forest (*Carpinetum orientalis*). The association *Rusco-Carpinetum orientalis* Blecic et Lakusic, 1966, which is a typical climatogenic association of the low coastal inland, i.e. in our case, low central Herzegovina, has the greatest significance and distribution. In the layeer of trees and shrubs we find the following species: *Paliurus spina-christi* Mill., *Petteria ramentacea* (Sieb.) C. Presl., *Asparagus acutifolius* L., *Cornus mas* L., *Colutea arborescens* L, etc., and in the layer of herbaceous plants: *Teucrium chamary* L., *Sedum acre* L., *Hypericum perforatum* L., *Arum italicum* Mill. and many others. Within this area, there is also an endemic species *Petteria ramentacea* (Sieber) C. Presl (Figure 7) which builds entire subassociations, and the species is protected by the Law on Forests of FBiH.

Figure 7: Endemic and NT species Petteria ramentacea *(Sieber) C. Presl. represents an extremely valuable gene pool in the flora of Bosnia and Herzegovina*

Ecosystems of relict pine forests

Ecosystems of relict pine forests are common on dolomites and dolomitic limestones, and therefore have the role of refugium of tertiary flora and vegetation. Syntaxonomically, these ecosystems are included in the class *Erico-Pinetea* Horvat 1959, and the orders: *Erico-Pinetalia* (Oberdorfer 1949) em. Horvat 1959, *Pinetalia heldeichii-nigrae* Lakusic 1972 and *Rhododendro hirsuti-Ericetalia carneae* Grabherr, Greimler & Mucina 1993. Apart from the accociations of the Illyrian black pine *Pinion nigrae* Lakusic 1972, the forests of the subendemic Balkan pine munika *Pinion heldreichii* Horvat 1950 give uniqueness to this area (Figure 8).

Figure 8: Forests of subendemic Bosnian pine Pinus heldreichii *Christ. give a special vegetation and biogeographic stamp to this area*

Tertiary vegetation ecosystems

In some areas, the impact of the anthropogenic factor was so expressed that it led to the conversion of not only the primary into the secondary but also the secondary into even less organized associations - tertiary associations. They occur on arable land, abandoned habitats, along houses, roads, trampled places, etc. (Figure 9). Soils, regardless of their original nature and type, are generally nitrified and disturbed. Syntaxonomically, these ecosystems are most often represented by the classes: *Stellarietea mediae* R. Tx., Lohmeyer & Preising in R. Tx. ex von Rochow 1951, *Plantaginetea majoris* Tüxen & Preising in Tüxen 1950, *Chenopodietea* Br.-Bl. 1951 and *Artemisietea vulgaris* Lohmeyer et al. ex von Rochow 1951.

Figure 9: Tertiary vegetation ecosystems

Corine Land Cover

The CORINE (Coordination of Information on the Environment) land cover or CLC database provides significant support in activities related to ecosystem protection, stopping biodiversity loss, monitoring the effects of climate change, assessing agricultural development and implementing the EU Water Framework Directive.

The CLC is a significant set of data for the implementation of the key priorities of the sixth Environment Action Program of the European Community. CLC 2000 can, for example, show where landscape fragmentation is deteriorating due to the construction of roads or other infrastructure, and thus increases the risk of a particular ecosystem losing contact with other ecosystems, which may threaten the survival of flora and fauna. Based on the performed analysis within the surveyed area of 1 km around the motorway zone in relation to the database of CLC Balkan 2018, a total of 18 types of habitat types were recorded (Table 2).

Table 2: Classification overview of basic CLC codes

CLC code	Habitat name
112	Discontinuous urban fabric
121	Industrial or commercial units
131	Mineral extraction sites
221	Vineyards
231	Pastures
242	Complex cultivation patterns
243	Land principally occupied by agriculture, with significant areas of natural vegetation
311	Broad-leaved forest
312	Coniferous forests
313	Mixed forests
321	Natural grasslands
322	Moors and heathland
323	Sclerophyllous vegetation
324	Transitional woodland-shrub
332	Bare rocks
333	Sparsely vegetated areas
334	Burnt areas
511	Water courses

EUNIS Habitat Classification

Based on the available literature data and field research, 14 habitat types have been defined within the study area (Table 3). Concerning Prenj Tunnel, the habitats found south of the northern portal and north of the southern portal of the tunnel in the AoI were included on the list. The survey did not include habitats at the high altitudes of Mt. Prenj, due to the fact that no impacts caused by the motorway construction and operation are expected at elevations above 1,000 m[3]. The spatial distribution of identified habitats is shown in Figure 21 and Figure 22.

Table 3: Classification overview of registered EUNIS codes

EUNIS code	Description
C1	Surface standing waters
C2	Surface running waters
E1.5	Eastern sub-Mediterranean dry grassland
E4.1	Vegetated snow-patch
E5.2	Thermophile woodland fringes
F5	Maquis, arborescent matorral and thermo-Mediterranean brushes
FB.4	Vineyards
G1	Broadleaved deciduous woodland
G2.1	Mediterranean evergreen *Quercus* forest
G3	Coniferous woodland
G4	Mixed deciduous and coniferous woodland
H2	Screes
H5.5	Burnt areas with very sparse or no vegetation
I1	Arable land and market gardens
I1.3	Arable land with unmixed crops grown by low-intensity agricultural methods
I2.2.2.	Subsistence garden areas
J1	Buildings of cities, towns and villages
J1.2	Residential buildings of villages and urban peripheries
J2.3	Rural industrial and commercial sites still in active use
J3	Extractive industrial sites

Out of the 170.50 ha, which is the land permanently taken by the project construction (project footprint), 58.14 ha is under EUNIS habitat type G1 (Broadleaved deciduous woodland), 50.04 ha is EUNIS habitat type E5.2 (Thermophile woodland fringes), and 17.28 ha is EUNIS habitat type I1 (Arable

[3] Typical EUNIS habitats found at higher altitudes of Mt. Prenj are E1.5 Mediterranean montane grassland, F2 Arctic, alpine and subalpine scrub and F7 Spiny Mediterranean heaths

land and market gardens). The construction of the motorway will also directly affect approx. 1.58 ha of Coniferous woodland (G3) and 5.03 ha of Mixed deciduous and coniferous woodland (G4), which are, along with E5.2, the most valuable and best-preserved vegetation types in the area. The full list is given in Table 4. An additional area of 9,483.46 ha (size of all analysed EAAAs) will potentially be indirectly affected, and possibly prone to the invasion of alien plant species as a consequence of the disturbance caused by construction works and later use of the motorway.

Table 4: Area under specific habitat types directly and indirectly affected by the project (all values are in ha)

EUNIS code	Direct	Indirect	Total
C1	0.52	1,271.18	1,271.7
C2	0.00	20.47	20.47
E1.5	2.44	23.74	58.82
E4.1	8.19	116.04	298.56
E5.2	56.04	1,808.98	1,865.02
F5	0.97	60.17	61.14
FB.4	1.23	78.59	79.82
G1	58.14	3,858.52	3,916.66
G2.1	0.90	28.27	29.17
G3	1.58	60.03	61.61
G4	5.03	747.59	752.62
H2	2.60	67.14	69.2
H5.5	0.00	1.36	1.36
I1	17.28	789.14	806.42
I1.3	0.00	13.81	13.81
I2.2.2.	6.46	309.19	315.65
J1	5.45	160.91	166.36
J1.2	0.00	0.41	0.41
J2.3	0.99	45.35	46.34
J3	2.68	22.57	25.25
Total	**170.50**	**9,483.46**	**9,653.96**

Natura 2000 Habitats

The detailed historical scientific research with regard to habitats has not been done in the project area. Local EIA prepared in 2016[4] identifies five priority habitats from Habitat Directive:

[4] Zagrebinspekt "ZGI" d.o.o. Mostar. (2016). Environmental Impact Study. Section: Konjic (loop Ovcari) - Mostar North, L = 36.50 km. Mostar.

- 4070 Bushes with *Pinus mugo* and *Rhododendron hirsutum*
- 6110 Rupicolous calcareous or basophilic grasslands of the *Alysso-Sedion albi*
- *9180 *Tilio-Acerion* forests of slopes, screes and ravines
- *91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)
- 9530 (Sub-)Mediterranean pine forests with endemic black pines.

It is assumed that the list was made based on the literature review and data presented in the reports made in the framework of the project *Support to the Implementation of the Birds and Habitat Directives in BiH* (Federal Ministry of Environment and Tourism, 2012-2014) for the potential Prenj-Cvrsnica-Cabulja Natura 2000 site. Some of the listed habitats are unlikely to be found in the project area due to climate conditions. In addition to the priority habitats, local EIA briefly lists different types of habitats that may be of importance for the protection of biodiversity near the project area: meadows, rocky, habitat inland waters, forests, bushes, underground habitats, cultivated non-forest areas and habitats with ruderal vegetation and constructed and industrial habitats (villages and towns).

Habitat diversity of the project area for the purposes of this ESIA was developed on the basis of information provided in the *Field Guide to Natura 2000 habitat types of BiH according to the EU Habitats Directive* (Milanovic et al., 2015), as well as on the basis of knowledge gained from conducted field research. Based on the overall analysis of available literature data and field research, the potential presence of 19 Natura 2000 habitat types in surveyed area was identified (Table 5).

Table 5: Overview of habitats of European importance found in surveyed area

Code	Habitat name
3240	Alpine rivers and their ligneous vegetation with *Salix elaeagnos*
4030	European dry heaths
5130	*Juniperus communis* formations on heaths or calcareous grasslands
***6220**	Pseudo-steppe with grasses and annuals of the *Thero-Brachypodietea*
***6110**	Rupicolous calcareous or basophilic grasslands of the *Alysso-Sedion albi*
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*)
62A0	Eastern sub-Mediterranean dry grasslands (*Scorzoneratalia villosae*)
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
8140	Eastern Mediterranean screes *Drypidetalia spinosae*
8210	Calcareous rocky slopes with chasmophytic vegetation
8310	Caves not open to the public
9140	Medio-European subalpine beech woods with *Acer* and *Rumex arifolius*
***9180**	*Tilio-Acerion* forests of slopes, screes and ravines
91K0	Illyrian Fagus sylvatica forests (*Aremonio-Fagion*)

Code	Habitat name
91R0	Dinaric dolomite Scots pine forests (*Genisto januensis-Pinetum*)
***91E0**	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)
9250	Quercus trojana woods
95A0	High oro-Mediterranean pine forests
***9530**	(Sub-) Mediterranean pine forests with endemic black pines

* denotes priority habitats according to the Habitats Directive

It is important to note that a number of habitats was registered as potentially present on Mt. Prenj (a vast mountain massif) but were excluded in subsequent analysis of impacts and mitigation measures due to occupying areas at altitudes of at least 1000 m above Prenj Tunnel. These ruled out habitats include: *4070 Bushes with *Pinus mugo*, 4060 Alpine and boreal heaths, 4080 Sub-Arctic *Salix sp.* scrub, 6170 Alpine and subalpine calcareous grasslands and 8120 Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*).

Out of 19 possibly present habitat types, six were confirmed during extensive field surveys carried out in both AoI and EAAA, of which two are (*)priority habitats listed in Annex I of Habitats Directive:

- Freshwater habitat types:
  - 3240 Alpine rivers and their ligneous vegetation (*Salix eleagnos*) found in only one locality north of Bijela, spatial coverage of this habitat type is approx. 0.59 km^2 in surveyed area.

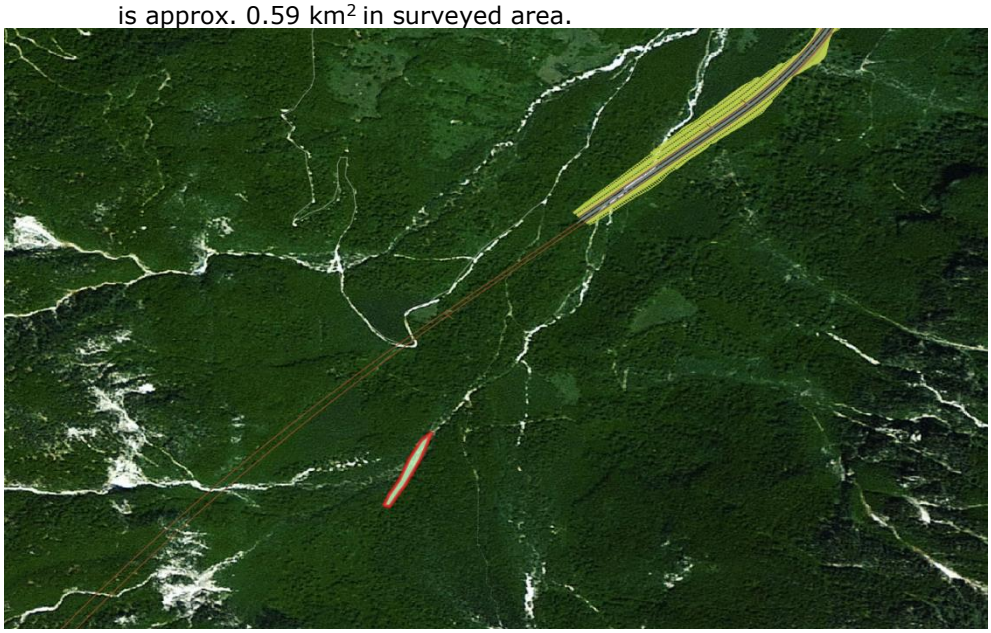

Figure 10: Habitat type 3240 in relation to the motorway route

- Natural and semi-natural grassland formations:
  - *6220 Pseudo-steppe with grasses and annuals of the Thero-Brachypodietea – found around Mostar and Ovcari, spatial coverage of this habitat type is approx. 2.77 km^2 in surveyed area,

*Figure 11: Habitat type *6220 in relation to the start of the motorway section in Ovcari*

*Figure 12: Habitat type *6220 in relation to the motorway route (Kutilivac)*

- 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates – present within the area around Konjic (Ovcari). The spatial coverage of this habitat type is approx. 0.83 km^2 in surveyed area,

Figure 13: Habitat type 6210 in relation to the motorway route

- 62A0 Eastern sub-Mediterranean dry grasslands – present in a number of localities within the study area: south of Podgorani and in the area around Konjic. The spatial coverage of this habitat type is approx. 3.45 km^2 in surveyed area.

Figure 14: Habitat type 62A0 in relation to the motorway route (Podgorani)

Figure 15: Habitat type 62A0 in relation to the motorway route (Kutilivac)

- Forest habitat types:
  - 95A0 High oro-Mediterranean pine forests – valuable forests of Bosnian pine (*Pinus heldreichii*) present at higher altitudes of Mt. Prenj but have marginal presence east of the section prior Prenj tunnel, spatial coverage of this habitat type is approx. 17.30 km^2 in surveyed area,

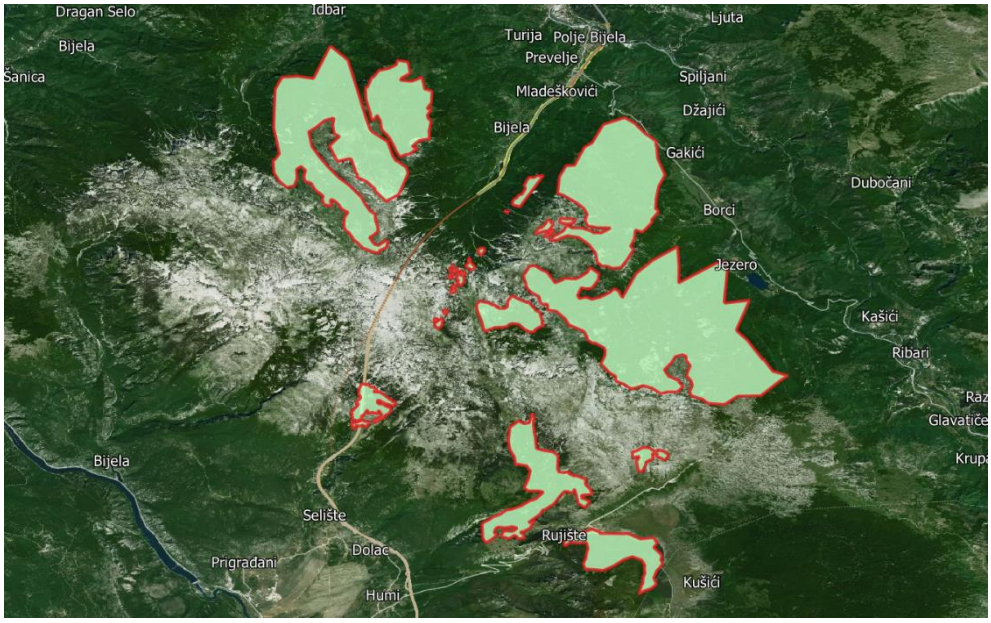

Figure 16: Habitat type 95A0 on Prenj mountain

- *9530 (Sub-) Mediterranean pine forests with endemic black pines – present in northern part of the planned motorway, spatial coverage of this habitat type is about 3.27 km^2 in surveyed area.

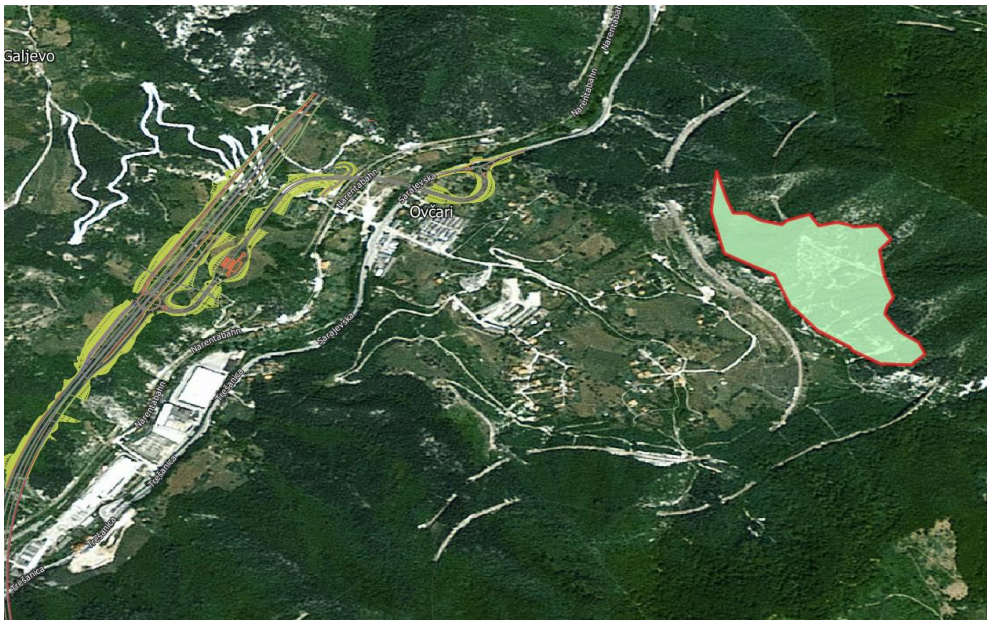

*Figure 17: Habitat type *9530 in relation to the motorway route (Ovcari)*

3.1.2 Konjic bypass

The methodology for habitat surveys for the Konjic bypass area was the same as for the motorway layout; therefore, it will not be further elaborated in this chapter. A total of eight EUNIS habitat types were registered along the Konjic bypass. Surveyed area included bypass footprint and 1 km-wide buffer zone around it. The registered habitat types are shown in table below.

Table 6: EUNIS habitat types registered along the Konjic bypass

EUNIS code	Habitat name
C1	Surface standing waters
C2.2	Permanent non-tidal, fast, turbulent watercourses
G1.6	Beech (*Fagus*) woodland
G2.1	Mediterranean evergreen *Quercus* woodland
G5.2	Small broad-leaved deciduous anthropogenic forests
I1.3	Arable land with unmixed crops growing under low-intensity agricultural methods
I2.1	Large-scale ornamental garden areas
J1.2	Residential buildings of villages and urban peripheries

C1 Surface standing waters are non-coastal above-ground open water bodies of fresh and brackish stagnant water, including dune pools, with natural or semi-natural benthic, submerged, floating and planktonic communities. These habitats can also be seasonally dry (temporary or occasional ponds and lakes), with the dry period lasting less than six months.

C2.2 Permanent non-tidal, fast, turbulent watercourses develop at the bottom of fast moving streams in clear oligotrophic water. Due to the speed of the water, there are no conditions for the lush development of a large number of plant species. In addition to a small number of representatives of different groups of algae: Chlorophyta, Cyanophyta, Rhodopyta, the main representatives of these habitats are invertebrates from the groups: Ephemeroptera, Plecoptera, Trichptera, Amiphipoda, etc. Creeping mosses are often represented, e.g. *Fontinalis antipyretica, Calliergon cordifolius, Scapania undulata* etc.

G1.6 *Fagus* woodland are tall forests dominated by different species of beech. Beech forests can vary in their floristic composition and structure. Beech forests occupy terrains with different slopes and all exposures. Depending on the type of the substrate, these forests develop on different types of automorphic soils. Depending on the slope of the terrain, the age of the stands and anthropogenic influences, the soils under mountain beech forests can be very deep (60-90, but up to 120 cm). The most common companions of beech in these forests among woody species are: *Acer campestre* L., *Acer obtusatum* Willd., *Carpinus orientalis* Mill., *Cornus mas* L., *Corylus colurna* L., *Cotinus coggygria* Scop., *Crataegus monogyna* Jacq., *Fraxinus ornus* L., *Juglans regia* L., *Prunus avium* (L.) L., *Rubus idaeus* L., *Sambucus nigra* L., *Ruscus aculeatus* L., *Arum maculatum* L., *Anemone nemorosa* L., *Asarum europaeum* L. etc.
G2.1 Mediterranean evergreen *Quercus* woodland is dominated by deciduous trees (pubescent oak, black hornbeam, black ash, white hornbeam). The tree canopy in this type of habitat can be up to 15m, although it is often lower. The most commonly found species are: *Quercus pubescens* Willd, Cornus mas L., *Crataegus monogyna* Jacq., *Fraxinus ornus* L., *Fraxinus excelsior* L., *Ostrya carpinifolia* Scop., *Prunus avium* (L.) L., *Rubus idaeus* L., *Ruscus aculeatus* L., *Teucrium chamaedrys* L. etc.

G5.2 Small broad-leaved deciduous anthropogenic forests are natural or artificial habitats with an area usually less than 0.5 ha, with crown coverage usually higher than 10% and tree height usually higher than 5 m, under strong human influence through maintenance and damage (small, intensively managed forests and small forests strongly influenced by anthropogenic activities, plantations of young trees with a potential canopy cover greater than 10%, groves; rows of mature trees, such as avenues and windbreaks).

I1.3 Arable land with unmixed crops growing under low-intensity agricultural methods encompasses land used for commercial agriculture or horticulture, usually of large area (often more than 25 ha, rarely around 1 ha) with few or no buildings. These habitat types are dominated by weedy and segetal plant species such as: Amaranthus retroflexus L. Linaria genistifolia (L.) Mill., Veronica agrestis L. etc.

I2.1 Large-scale ornamental garden areas include cultivated areas dominated by ornamental plants, and invasive alien species occupy a significant place among them.

J1.2 Residential buildings of villages and urban peripheries include primarily human settlements, more or less densely distributed buildings with accompanying infrastructure, on smaller or larger areas, and with a smaller or very large number of inhabitants.

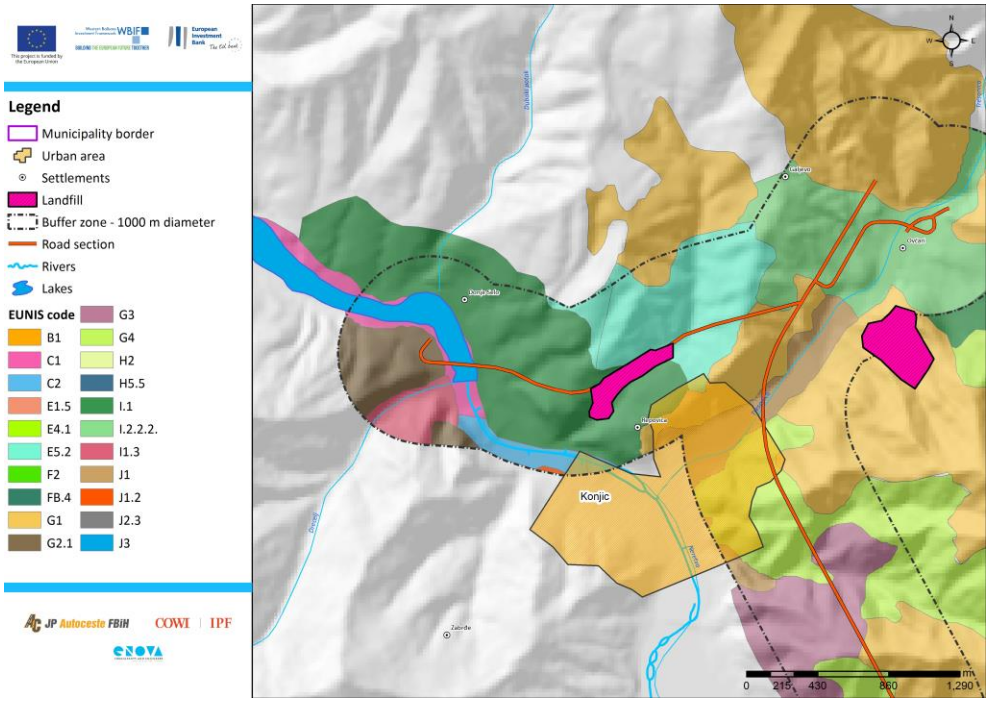

Figure 18: EUNIS habitat types in relation to the buffer zone of the surveyed area around Konjic bypass

The recorded EUNIS habitat types themselves have analogues in other classifications i.e. Habitats Directive and Bern Convention; however, the habitats present in the surveyed area do not meet the criteria as they are degraded and

under significant anthropogenic pressure. Therefore, there are no Habitats Directive/Bern Convention in the Konjic bypass area.

3.2 Flora

3.2.1 Motorway

A total of 452 vascular plant species were identified by reviewing available literature data and field survey. Number of species confirmed during field work is 444. Alphabetical list of species and subspecies with site locations and associated data: endangered status based on the Red List of Flora of the Federation of Bosnia and Herzegovina (Djug et al., 2013), endemism status (Silic, 1990a; Lubarda, 2013; Lubarda et al., 2014), the protection status at the level of the Federation of Bosnia and Herzegovina (Anonymous, 2020) and invasive species codes in the Federation of Bosnia and Herzegovina (Djug et al., 2019) are shown in Table 7. Due to many of these species not being widespread in Europe, they were not evaluated by the IUCN nor do they have English names.

Table 7: Overview of vascular plants found within the study area

No.	Scientific name	Conservation status	Survey Finding - was species found?	Locality	Reference
1.	*Acanthus spinosissimus* Pers.	FBiH LC	Yes	Koritna Draga, Humi	
2.	*Acer campestre* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
3.	*Acer monspessulanum* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Simunovic (1958)
4.	*Acer negundo* L.		Yes	Kuti-Livac, Humi	
5.	*Acer platanoides* L.		Yes	Podgorani	Beck (1903-1927)
6.	*Acer pseudoplatanus* L.		Yes	Podgorani	Beck (1903-1927)
7.	*Achillea millefolium* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
8.	*Achillea nobilis* L.		Yes	Kuti-Livac, Koritna Draga, Humi	
9.	*Achillea virescens* (Fenzl) Heimerl		Yes	Koritna Draga, Humi, Podgorani	
10.	*Acinos arvensis* (Lam.) Yesndy		Yes	Kuti-Livac, Koritna Draga	
11.	*Aegilops geniculata* Roth		Yes	Kuti-Livac, Koritna Draga, Podgorani	
12.	*Aegilops neglecta* Req. ex Bertol		Yes	Kuti-Livac, Koritna Draga, Podgorani	
13.	*Aegilops triunicialis* L.		Yes	Kuti-Livac, Koritna Draga	
14.	*Aethionema saxatile* (L.) R.Br.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
15.	*Agrostis castellana* Boiss. et Reut.		Yes	Humi, Podgorani	Simunovic (1958)
16.	*Ailanthus altisima* (Mill.) Sw		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	

No.	Scientific name	Conservation status	Survey Finding - was species found?	Locality	Reference
17.	*Ajuga chamaepitys* (L.) Schreb.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari	
18.	*Ajuga genevensis* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
19.	*Ajuga reptans* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari	
20.	*Alliaria petiolata* (M.Bieb.) Cavara & Grande		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
21.	*Allium ampeloprasum* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
22.	*Allium cepa* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
23.	*Allium flavum* L. subsp. *flavum*		Yes	Koritna Draga, Podgorani	
24.	*Allium guttatum* Steven subsp. *sardoum* (Moris) Stearn		Yes	Kuti-Livac, Humi	
25.	*Allium porrum* L.		Yes	Koritna Draga, Humi, Podgorani	
26.	*Allium roseum* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
27.	*Allium rotundum* L.		Yes	Koritna Draga, Humi	
28.	*Allium sativum* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
29.	*Allium saxatile* M. Bieb.	IUCN LC, FBiH NT	Yes	Koritna Draga	Beck (1903-1927)
30.	*Allium sphaerocephalon* L. subsp. *sphaerocephalon*		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
31.	*Althaea cannabina* L.		Yes	Kuti-Livac, Koritna Draga	
32.	*Alyssoides utriculata* (L.) Medik.		Yes	Koritna Draga	

No.	Scientific name	Conservation status	Survey Finding - was species found?	Locality	Reference
33.	*Alyssum alyssoides* (L.) L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
34.	*Alyssum hirsutum* M. Bieb.		Yes	Koritna Draga	
35.	*Alyssum montanum* L. subsp. *molliusculum* (Rchb.) Jáv.		Yes	Humi	
36.	*Alyssum murale* Waldst. et Kit.		Yes	Koritna Draga, Humi, Podgorani	
37.	*Amaranthus albus* L.		Yes	Kuti-Livac, Koritna Draga, Humi	
38.	*Amaranthus deflexsus* L.		Yes	Kuti-Livac, Humi	
39.	*Amaranthus hybridus* L.		Yes	Kuti-Livac, Koritna Draga, Podgorani	
40.	*Amaranthus retroflexus* L.		Yes	Kuti-Livac, Humi, Podgorani, Polje Bijela	
41.	*Ambrosia artemisifolia* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Polje Bijela	
42.	*Amelanchier ovalis* Medik.		Yes	Koritna Draga	
43.	*Anacamptis pyramidalis* (L.) Rich.	IUCN LC, FBiH NT	Yes	Podgorani, Ovcari	Beck (1903-1927)
44.	*Anagallis arvensis* L.		Yes	Humi	
45.	*Anagallis coerulea* Schreb.		Yes	Koritna Draga	
46.	*Anchusa arvensis* (L.) M.Bieb.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
47.	*Anchusa cretica* Mill.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
48.	*Anchusa italica* Retz.		Yes	Kuti-Livac, Koritna Draga, Podgorani	
49.	*Anchusa officinalis* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	

No.	Scientific name	Conservation status	Survey Finding - was species found?	Locality	Reference
50.	*Anemone hortensis* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari	
51.	*Anemone nemorosa* L.		Yes	Ovcari, Polje Bijela	Beck (1903-1927)
52.	*Anthemis arvensis* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
53.	*Anthemis segetalis* Ten.		Yes	Kuti-Livac, Koritna Draga, Podgorani	
54.	*Anthoxanthum odoratum* L.		Yes	Kuti-Livac, Koritna Draga, Podgorani	
55.	*Anthyllis vulneraria* L. subsp. *alpestris* (Kit. ex Schult) Asch. et Graebn.	FBiH LC	Yes	Ovcari	
56.	*Anthyllis vulneraria* L. subsp. *praepropera* Bornm.	FBiH CR	Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
57.	*Antirrhinum majus* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
58.	*Arabidopsis thaliana* (L.) Heynh.		Yes	Koritna Draga	
59.	*Arabis hirsuta* (L.) Scop.		Yes	Koritna Draga, Humi	
60.	*Arabis turrita* L.		Yes	Humi	Beck (1903-1927)
61.	*Arctium minus* Bernh.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
62.	*Arenaria leptoclados* (Reichenb.) Guss.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
63.	*Aristolochia clematitis* L.		Yes		
64.	*Artemisia absinthium* L.		Yes	Kuti-Livac, Koritna Draga, Humi	
65.	*Artemisia annua* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Polje Bijela	

No.	Scientific name	Conservation status	Survey Finding - was species found?	Locality	Reference
66.	*Artemisia vulgaris* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
67.	*Arum italicum* Miller		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari	
68.	*Arum maculatum* L.		Yes	Ovcari, Polje, Bijela	
69.	*Arum nigrum* Schott	FBiH VU	Yes	Koritna Draga	
70.	*Asparagus acutifolius* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
71.	*Asperula aristata* L.f.		Yes	Koritna Draga, Humi, Podgorani	
72.	*Asphodeline liburnica* (Scop.) Reich.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
73.	*Asphodeline lutea* (L.) Rchb.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
74.	*Asphodelus fistulosus* L.	FBiH CR	Yes	Koritna Draga	
75.	*Asplenium adiantum-nigrum* L.		Yes	Polje Bijela	Maly (1928)
76.	*Asplenium onopteris* L.		Yes	Kuti-Livac, Koritna Draga, Humi	
77.	*Asplenium ruta – muraria* L.		Yes	Koritna Draga	
78.	*Asplenium scolopendrium* L.		Yes	Polje Bijela	Maly (1928)
79.	*Asplenium trichomanes* L. subsp. *quadrivalens* D.E.Mey.		Yes	Koritna Draga, Humi, Podgorani	
80.	*Aster squamatus* (Spreng.) Heiron		Yes	Kuti-Livac	
81.	*Asterolinon linum-stellatum* (L.) Duby		Yes	Kuti-Livac, Koritna Draga, Podgorani	
82.	*Astragalus monspessulanus* L. subsp.	FBiH NT	Yes	Koritna Draga, Humi, Podgorani, Ovcari	Simunovic (1958)

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	illyricus (Bernhardt) Chater				
83.	*Atriplex patula* L.		Yes	Kuti-Livac, Koritna Draga, Humi	
84.	*Aurinia petraea* (Ard.) Schur		Yes	Humi	Beck (1903-1927)
85.	*Avena barbata* Pott. ex Link.		Yes	Kuti-Livac, Humi, Podgorani	
86.	*Avena sterilis* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
87.	*Ballota nigra* L. subsp. *foetida* (Lam.) Hay.		Yes	Koritna Draga, Podgorani	
88.	*Ballota rupestris* (Biv.) Vis.		Yes	Koritna Draga, Humi, Podgorani	
89.	*Berteroa incana* (L.) DC		Yes	Kuti-Livac, Koritna Draga	
90.	*Berteroa mutabilis* (Vent.) DC.		Yes	Koritna Draga	
91.	*Betonica officinalis* L.		Yes	Kuti-Livac, Koritna Draga, Podgorani,	
92.	*Bidens subalternans* DC.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
93.	*Biscutella cichoriifolia* Loisel.		Yes	Kuti-Livac, Koritna Draga, Humi	
94.	*Brachypodium distachyon* (L.) P. Beauv.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
95.	*Brachypodium pinnatum* (L.) Beauv.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
96.	*Briza maxima* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari	
97.	*Bromus erectus* Hudson subsp. *erectus*		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	Simunovic (1958)

No.	Scientific name	Conservation status	Survey Finding - was species found?	Locality	Reference
98.	*Bromus hordeaceus* L. subsp. *hordeaceus*		Yes	Kortna Draga, Podgorani, Ovcari	
99.	*Bromus inermis* Leyss		Yes	Humi, Podgorani	
100.	*Bromus madritensis* L.		Yes	Koritna Draga	
101.	*Bromus squarrosus* L.		Yes	Humi, Podgorani	
102.	*Broussonetia papyrifera* L`Herit ex Vent.		Yes	Kuti-Livac, Koritna Draga, Podgorani	
103.	*Bunias erucago* L.		Yes	Koritna Draga	
104.	*Bupleurum praealtum* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
105.	*Bupleurum veronense* Turra		Yes	Humi	
106.	*Calamintha glandulosa* (Req.) Benth.		Yes	Koritna Draga, Humi	
107.	*Calamintha sylvatica* Bromf.		Yes	Koritna Draga, Humi, Podgorani	
108.	*Calepina irregularis* (Asso) Thell.		Yes	Koritna Draga	
109.	*Campanula bononiensis* L.		Yes	Kuti-Livac, Koritna Draga	
110.	*Capsella bursa – pastoris* (L.) Med.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
111.	*Capsella rubella* Reut		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
112.	*Cardamine hirsuta* L.		Yes	Koritna Draga, Humi, Podgorani	
113.	*Carduus micropterus* (Borbás) Teyber		Yes	Humi, Podgorani	
114.	*Carduus nutans* L.		Yes	Kuti-Livac, Koritna Draga	

No.	Scientific name	Conservation status	Survey Finding - was species found?	Locality	Reference
115.	*Carduus pycnocephalus* L.		Yes	Humi, Podgorani	
116.	*Carex caryophyllea* Latourr.		Yes	Kuti-Livac, Humi, Podgorani	
117.	*Carex distachya* Desf.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
118.	*Carex divulsa* Stokes subsp. *divulsa*		Yes	Kuti-Livac, Koritna Draga, Humi	
119.	*Carex flacca* Schreber		Yes	Kuti-Livac, Koritna Draga, Humi	
120.	*Carex hallerana* Asso		Yes	Koritna Draga	Beck (1903-1927)
121.	*Carex humilis* Leyss.		Yes	Podgorani, Ovcari	Simunovic (1958)
122.	*Carex spicata* Huds.		Yes	Kuti-Livac, Koritna Draga, Podgorani	
123.	*Carlina corymbosa* L.		Yes	Kuti-Livac, Koritna Draga, Humi	
124.	*Carpinus orientalis* Mill		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Simunovic (1958)
125.	*Carthamus lanatus* L. subsp. *lanatus*		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
126.	*Caucalis platycarpos* L.		Yes	Koritna Draga, Humi, Podgorani	
127.	*Celtis australis* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Simunovic (1958)
128.	*Centaurea calcitrapa* L.		Yes	Koritna Draga	
129.	*Centaurea deusta* Ten. subsp. *concolor* (DC.) Hayek		Yes	Humi, Podgorani	
130.	*Centaurea jacea* L.		Yes	Humi, Podgorani	
131.	*Centaurea scabiosa* L.		Yes	Kuti-Livac, Koritna Draga, Podgorani	
132.	*Centaurea solstitialis* L. subsp. *solstialis*		Yes	Humi	

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133.	*Cephalaria leucantha* (L.) Roemer & Schultes		Yes	Humi, Podgorani	
134.	*Cerastium brachypetalum* Pers. subsp. *brachypetalum*		Yes	Koritna Draga	
135.	*Cerastium glomeratum* Thuill.		Yes	Humi	
136.	*Cerastium ligusticum* Viv. subsp. *trichogynum* (Moschl) P.D.Sell. et Whitehead		Yes	Kuti-Livac, Humi, Podgorani	
137.	*Cerastium semidecandrum* L.		Yes	Kuti-Livac, Humi	
138.	*Cerinthe minor* L. subsp. *auriculata* (Ten.) Domac		Yes	Koritna Draga, Humi	
139.	*Chaerophyllum coloratum* L.		Yes	Koritna Draga	
140.	*Chelidonium majus* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
141.	*Chenopodium album* L.		Yes	Kuti-Livac, Humi, Podgorani	
142.	*Chondrilla juncea* L.		Yes	Kuti-Livac, Podgorani	
143.	*Chrysopogon gryllus* (L.) Trin.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Simunovic (1958)
144.	*Cichorium intybus* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Polje Bijela	
145.	*Circaea lutetiana* L.		Yes	Polje Bijela	Maly (1933)
146.	*Cirsium vulgare* (Savi) Ten.		Yes	Kuti-Livac, Koritna Draga	
147.	*Citrullus lanatus* (Thunb.) Mansf		Yes	Kuti-Livac, Humi, Podgorani	

No.	Scientific name	Conservation status	Survey Finding - was species found?	Locality	Reference
148.	*Cleistogenes serotina* (L.) Keng.		Yes	Kuti-Livac, Koritna Draga, Podgorani	
149.	*Clematis flammula* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Beck (1903-1927)
150.	*Clematis vitalba* L.		Yes	Kuti-Livac, , Humi, Podgorani	
151.	*Clematis viticella* L.		Yes	Koritna Draga, Humi, Podgorani, OvcariPolje Bijela	Beck (1903-1927)
152.	*Clinopodium vulgare* L.		Yes	Kuti-Livac, Koritna Draga, Podgorani	
153.	*Clypeola jonthlaspi* L.		Yes	Kuti-Livac, Koritna Draga	
154.	*Colchicum autumnale* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
155.	*Colchicum hungaricum* Janka		Yes	Kuti-Livac, Koritna Draga, Podgorani	
156.	*Colutea arborescens* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
157.	*Consolida regalis* S.F.Gray		Yes	Koritna Draga, Humi, Podgorani	
158.	*Convolvulus arvensis* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
159.	*Convolvulus cantabrica* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
160.	*Conyza bonariensis (L.) Cronquist;*		Yes	Kuti-Livac, Humi	
161.	*Conyza canadensis* (L.) Cronq.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
162.	*Cornus mas* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
163.	*Coronilla emerus* L. subsp. *emeroides* (Boiss. & Spruner) Hayek.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Simunovic (1958)
164.	*Coronilla scorpioides* (L.)		Yes	Kuti-Livac, Koritna Draga	

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	W.D.J.Koch.				
165.	*Coronilla varia* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
166.	*Corydalis solida* (L.) Sw.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
167.	*Cotinus coggygria* Scop.		Yes	Koritna Draga, Podgorani	Simunovic (1958)
168.	*Crataegus monogyna* Jacqu.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	Simunovic (1958)
169.	*Crepis capillaris* (L.) Wallr.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
170.	*Crepis foetida* L. subsp. *foetida*		Yes	Koritna Draga, Humi	
171.	*Crepis neglecta* L.		Yes	Kuti-Livac, Humi, Podgorani	
172.	*Crepis sancta* (L.) Babc.		Yes	Humi, Podgorani	
173.	*Crepis setosa* Haller f.		Yes	Kuti-Livac, Koritna Draga	
174.	*Crepis vesicaria* L. subsp. *vesicaria*		Yes	Kuti-Livac, Koritna Draga, Humi	
175.	*Crocus dalmaticus* Vis.	IUCN LC, FBiH EN	Yes	Podgorani	Beck (1903-1924, 1927); Bjelcic and Silic (1971)
176.	*Crocus reticulatus* Steven ex Adams		Yes	Koritna Draga, Humi, Podgorani	
177.	*Cruciata laevipes* Opiz.		Yes	Kuti-Livac, Koritna Draga, Podgorani, Ovcari, Polje Bijela	
178.	*Crupina crupinastrum* (Moris) Vis.		Yes	Koritna Draga	
179.	*Cupressus sempervirens* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	

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180.	*Cuscuta epithymum* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
181.	*Cyclamen hederifolium* Aiton.	IUCN LC, FBiH CR	Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
182.	*Cyclamen purpurascens* Mill.	IUCN LC, FBiH LC	Yes	Podgorani	Maly (1928)
183.	*Cynodon dasctylon* (L.) Pers.		Yes	Kuti-Livac, Humi, Podgorani	
184.	*Cynoglossum columnae* Ten.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
185.	*Cynoglossum creticum* Mill.		Yes	Kuti-Livac, Koritna Draga	
186.	*Cynosurus echinatus* L.		Yes	Humi, Podgorani	
187.	*Dactylis glomerata* L. subsp. *glomerata*		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
188.	*Dactylis glomerata* L. subsp. *hispanica* (Roth.) Nyman		Yes	Koritna Draga, Humi, Podgorani	Simunovic (1958)
189.	*Daphne laureola* L.		Yes	Polje Bijela	Maly (1928)
190.	*Dasypyrum villosum* (L.) P.Candargy		Yes	Kuti-Livac, Koritna Draga	
191.	*Datura stramonium* L.		Yes	Kuti-Livac, Koritna Draga, Podgorani	
192.	*Daucus carota* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
193.	*Dianthus sylvestris* Wulfen in Jacq. subsp. *sylvestris*		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
194.	*Dianthus sylvestris* Wulfen in Jacq. subsp. *tergestinus* (Reichenb.)		Yes	Koritna Draga, Humi	

No.	Scientific name	Conservation status	Survey Finding - was species found?	Locality	Reference
	Hayek				
195.	*Dichanthium ischaemum* (L.) Roberty		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
196.	*Dictamnus albus* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Simunovic (1958)
197.	*Dorycnium herbaceum* Vill.		Yes	Kuti-Livac, Koritna Draga, Humi	Simunovic (1958)
198.	*Echinochloa crus – galli* (L) P. Beauv.		Yes	Kuti-Livac, Koritna Draga	
199.	*Echium italicum* L.		Yes	Humi, Podgorani	
200.	*Echium vulgare* L.		Yes	Kuti-Livac, Koritna Draga, Podgorani	
201.	*Eleusine indica* (L.) Gaertn.		Yes	Kuti-Livac, Humi, Podgorani	
202.	*Elymus hispidus* (Opiz.) Melderis		Yes	Koritna Draga, Podgorani	
203.	*Elymus repens* (L.) Gould		Yes	Koritna Draga, Humi	
204.	*Ephedra fragilis* Desf. subsp. *campylopoda*(C. A. Mayer) Asch. et Graeb.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
205.	*Epilobium dodonaei* Vill.		Yes	Humi, Podgorani	
206.	*Erigeron annuus* (L.) Pers. subsp. *annuus*		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
207.	*Erodium acaule* (L.) Becherer et Thell.		Yes	Kuti-Livac, Humi, Podgorani	
208.	*Erodium cicutarium* (L.) L.Her		Yes	Kuti-Livac, Humi	
209.	*Erophila verna* (L.) Chevall.		Yes	Podgorani	Beck (1903-1927)

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210.	*Erophila verna* (L.) Chevall. subsp. *praecox* (Steven) Walters		Yes	Kuti-Livac, Koritna Draga	
211.	*Erophila verna* (L.) Chevall. subsp. *verna*		Yes	Kuti-Livac, Koritna Draga, Podgorani	
212.	*Eryngium amethystinum* L.		Yes	Kuti-Livac, Koritna Draga, Podgorani	
213.	*Eryngium campestre* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
214.	*Erysimum linariifolium* Tausch		Yes	Koritna Draga	
215.	*Erysimum odoratum* Ehrh		Yes	Humi	
216.	*Erythronium dens-canis* L.	FBiH LC	Yes	Polje Bijela	
217.	*Euphorbia characias L.* subsp. *wulfenii* (Hoppe ex W. D. J. Koch) Radcl.-Sm.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
218.	*Euphorbia cyparissias* L.		Yes	Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
219.	*Euphorbia falcata* L.		Yes	Kuti-Livac, Koritna Draga, Podgorani	
220.	*Euphorbia helioscopia* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
221.	*Euphorbia spinosa* L.		Yes	Koritna Draga, Humi, Podgorani	
222.	*Euphorbia tauriNonsis* All.		Yes	Kuti-Livac, Koritna Draga, Humi	
223.	*Euphrasia pectinata* Ten.		Yes	Humi, Podgorani	
224.	*Fagus sylvatica* L.		Yes	Polje, Bijela	
225.	*Fallopia convolvulus* (L.) A. Löve		Yes	Kuti-Livac, Koritna Draga, Podgorani	

No.	Scientific name	Conservation status	Survey Finding - was species found?	Locality	Reference
226.	*Ferulago campestris* (Besser) Grecescu		Yes	Kuti-Livac	
227.	*Festuca valesiaca* Schleich. ex Gaudin		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Simunovic (1958)
228.	*Ficus carica* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
229.	*Foeniculum vugare* Miller		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari	
230.	*Forsythia x intermedia*		Yes	Polje Bijela	
231.	*Fragaria vesca* Ehrh		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
232.	*Frangula rupestris* (Scop.) Schur		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Beck (1903-1927); Simunovic (1958)
233.	*Fraxinus ornus* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Simunovic (1958)
234.	*Fumana ericoides* (Cav.) Gdgr.		Yes	Kuti-Livac, Koritna Draga, Podgorani	
235.	*Fumana procumbens* (Dunal) Gren. & Godr.		Yes	Kuti-Livac, Koritna Draga, Humi	
236.	*Fumaria officinalis* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
237.	*Fumaria parviflora* Lam.		Yes	Kuti-Livac, Koritna Draga, Humi	
238.	*Gagea villosa* (M.Bieb.) Sweet		Yes	Kuti-Livac, Koritna Draga, Podgorani	
239.	*Galanthus nivalis* L.	IUCN NT, FBiH LC	Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
240.	*Galium aparine* L.		Yes	Koritna Draga, Humi	

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241.	*Galium corrudifolium* Vill.		Yes	Kuti-Livac, Koritna DragaKoritna Draga, Podgorani	
242.	*Geranium columbinum* L.		Yes	Koritna Draga, Podgorani	
243.	*Geranium molle* L. subsp. *molle*		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
244.	*Geranium pyrenaicum* Burm. f.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
245.	*Geranium robertianum* L.		Yes	Kuti-Livac, Koritna Draga, Podgorani, Ovcari	
246.	*Geranium rotundifolium* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
247.	*Gladiolus illyricus* W. D. J. Koch	FBiH NT	Yes	Podgorani	Beck (1903-1927)
248.	*Glechoma hirsuta* Waldst. et Kit.		Yes	Ovcari, Polje Bijela	
249.	*Globularia cordifolia* L. subsp. *cordifolia*		Yes	Koritna Draga	
250.	*Haplophyllum patavinum* (L.) G.Don		Yes	Kuti-Livac, Koritna Draga, Podgorani	
251.	*Hedera helix* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
252.	*Helianthemum nummularium* (L.) Mill. subsp. nu*mmularium*		Yes	Koritna Draga, Podgorani	
253.	*Helianthus tuberosus* L.		Yes	Kuti-Livac, Polje Bijela	
254.	*Helichrysum italicum* (Roth) Mill. Corr. Guss.		Yes	Koritna Draga	
255.	*Helleborus* sp.		Yes	Ovcari, Polje Bijela	
256.	*Herniaria hirsuta* L.		Yes	Kuti-Livac, Koritna Draga, Humi	

No.	Scientific name	Conservation status	Survey Finding - was species found?	Locality	Reference
257.	*Hesperis laciniata* All.		Yes	Kuti-Livac, Koritna Draga, Humi	
258.	*Hieracium pavichii* Heuff.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
259.	*Hieracium piloselloides* Vill.		Yes	Humi, Podgorani	
260.	*Hieracium x ruprechtii* Boiss.		Yes	Polje Bijela	Maly and Zahn (1929)
261.	*Hippocrepis commosa* L.		Yes	Koritna Draga, Podgorani, Ovcari, Polje Bijela	
262.	*Hordeum murinum* L. subsp. *leporinum* (Link) Arcang		Yes	Kuti-Livac, Koritna Draga, Podgorani	
263.	*Hornungia petraea* (L.) Rchb.		Yes	Koritna Draga, Podgorani	Beck (1903-1927)
264.	*Hypericum perforatum* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
265.	*Inula conyza* DC.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Maly (1928)
266.	*Inula ensifolia* L.		Yes	Koritna Draga, Podgorani	
267.	*Inula spiraeifolia* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
268.	*Inula verbascifolia* (Willd.) Hausskn.		Yes	Kuti-Livac, Koritna Draga, Podgorani	
269.	*Isatis tinctoria* L.		Yes	Kuti-Livac, Koritna Draga	
270.	*Juniperus oxycedrus* L. subsp. *oxycedrus*		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Simunovic (1958)
271.	*Koeleria splendens* C. Presl		Yes	Humi, Podgorani	Simunovic (1958)
272.	*Lactuca serriola* L.		Yes	Kuti-Livac, Koritna Draga, Humi	
273.	*Lactuca viminea* (L.) J.Presl &		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	

No.	Scientific name	Conservation status	Survey Finding - was species found?	Locality	Reference
	C.Presl				
274.	*Lamium amplexicaule* L.		Yes	Koritna Draga, Humi, Podgorani	
275.	*Lamium maculatum* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
276.	*Lamium purpureum* L.		Yes	Kuti-Livac, Koritna Draga, Podgorani, Ovcari, Polje Bijela	
277.	*Lappula squarrosa* (Retz.) Dumort. subsp. *squarrosa*		Yes	Koritna Draga, Humi	
278.	*Lathyrus aphaca* L.		Yes	Koritna Draga	
279.	*Lathyrus latifolius* L.		Yes	Humi, Podgorani	
280.	*Lathyrus setifolius* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
281.	*Lathyrus sphaericus* Retz.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
282.	*Leontodon crispus* Vill.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
283.	*Lepidium graminifolium* L.		Yes	Koritna Draga, Podgorani	
284.	*Lepidium virginicum* L.		Yes	Koritna Draga, Podgorani	
285.	*Linaria vulgaris* Miller.		Yes	Kuti-Livac, Koritna Draga, Podgorani	
286.	*Lithospermum arvense* L.		Yes	Kuti-Livac, Koritna Draga, Hum	
287.	*Lolium multiflorum* Lam.		Yes	Kuti-Livac, Humi, Podgorani	
288.	*Lolium perenne* L.		Yes	Humi, Podgorani	
289.	*Lophochloa cristata* (L.) Hyl.		Yes	Koritna Draga, Podgorani	

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290.	*Lotus corniculatus* L. subsp. *hirsutus* Rothm		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
291.	*Malva sylvestris* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
292.	*Medicago arabica* (L.) Huds.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
293.	*Medicago lupulina* L.		Yes	Koritna Draga, Humi	
294.	*Medicago minima* (L.) Bartal		Yes	Humi, Podgorani	
295.	*Medicago orbicularis* (L.) Bartal		Yes	Koritna Draga, Humi	
296.	*Medicago sativa* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
297.	*Melica ciliata* L. subsp. *ciliata*		Yes	Kuti-Livac, Koritna Draga	
298.	*Melilotus albus* Medik		Yes	Koritna Draga	
299.	*Melissa officinalis* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
300.	*Mercurialis annua* L.		Yes	Kuti-Livac, Koritna Draga	
301.	*Micromeria juliana* (L.) Benth. ex Rchb.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
302.	*Morus alba* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
303.	*Muscari comosum* (L.) Mill.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
304.	*Myosotis arvensis* (L.) Hill		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
305.	*Nigella damascena* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Beck (1903-1927)
306.	*Ononis antiquorum* (L.) Arcang.		Yes	Kuti-Livac, Koritna Draga, Humi	
307.	*Onosma javorkae* Simonk.		Yes	Podgorani	Simunovic (1958)

No.	Scientific name	Conservation status	Survey Finding - was species found?	Locality	Reference
308.	*Ophrys scolopax* Cav. subsp. *cornuta* (Steven) E.G.Camus		Yes	Kuti-Livac, Koritna Draga, Podgorani	
309.	*Opopanax chironium* (L.) W.D.J.Koch	FBiH EN	Yes	Koritna Draga	
310.	*Orchis morio* L.		Yes	Podgorani	
311.	*Oxalis corniculata* L.		Yes	Kuti-Livac, Humi	
312.	*Paliurus spina – christi* Mill.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Simunovic (1958)
313.	*Panicum miliaceum* L.		Yes	Kuti-Livac, Koritna Draga, Podgorani	
314.	*Papaver rhoeas* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
315.	*Parietaria judaica* L.		Yes	Kuti-Livac, Koritna Draga, Podgorani	
316.	*Parietaria officinalis* L.		Yes	Polje Bijela	Maly (1928)
317.	*Parthenocissus quinquefolia* (L.) Planchon		Yes	Kuti-Livac	
318.	*Paspalum distichum* L.		Yes	Kuti-Livac	
319.	*Petrorhagia saxifraga* (L.) Link		Yes	Koritna Draga, Kumi, Podgorani	
320.	*Petteria ramentacea* (Sieber) C. Presl	IUCN LC, FBiH NT	Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Beck (1903-1927); Simunovic (1958); Bjelcic and Silic (1971); Boskailo (2012)
321.	*Phillyrea media* L.		Yes	Koritna Draga, Humi, Podgorani	Simunovic (1958)
322.	*Phleum subulatum* (Savi) Asch. &		Yes	Kuti-Livac, Koritna Draga, Humi	

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	Graebn.				
323.	*Picnomon acarna* (L.) Cass.		Yes	Kuti-Livac, Koritna Draga, Humi	
324.	*Picris hieracioides* L.		Yes	Koritna Draga, Podgorani	
325.	*Pilosella hoppeana* subsp. *testimonialis* (Peter) P. D. Sell & C. West		Yes	Polje Bijela	Maly and Zahn (1929)
326.	*Pimpinella peregrina* L.		Yes	Koritna Draga	
327.	*Pinus halepensis* Mill.		Yes	Koritna Draga	
328.	*Pinus heldreichii* Christ	IUCN LC, FBiH LC	Yes	Polje Bijela	Beck (1903-1927)
329.	*Pinus nigra* J. F. Arnold		Yes	Ovcari	
330.	*Piptatherum miliaceum* (L.) Coss. subsp. *thomasii* (Duby) Soják		Yes	Koritna Draga	
331.	*Pistacia terebinthus* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Simunovic (1958)
332.	*Plantago lanceolata* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
333.	*Plantago major* L. subsp. *major*		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
334.	*Plantago media* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
335.	*Poa annua* L.		Yes	Kuti-Livac, Koritna Draga, Podgorani	
336.	*Poa bulbosa* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	

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337.	*Poa compressa* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
338.	*Poa pratensis* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Polje Bijela	
339.	*Polycnemum arvense* L.		Yes	Kuti-Livac, Koritna Draga	
340.	*Polygonum aviculare* L.		Yes	Koritna Draga, Humi, Podgorani	
341.	*Polystichum aculeatum* (L.) Roth		Yes	Podgorani	Beck (1903-1927)
342.	*Polystichum lonchitis* (L.) Roth		Yes	Podgorani, Polje Bijela	Beck (1903-1927); Maly (1928)
343.	*Potentilla recta* L.		Yes	Koritna Draga, Podgorani	
344.	*Primula veris* L. subsp. *columnae* (Ten.) Lüdi		Yes	Humi, Podgorani, Ovcari, Polje Bijela	
345.	*Primula vulgaris* Huds.		Yes	Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
346.	*Prunella grandiflora* (L.) Scholler		Yes	Podgorani	
347.	*Prunus avium* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
348.	*Prunus cerasifera* Ehrh.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
349.	*Prunus dulcis* (Mill.) D.A.Webb		Yes	Kuti-Livac, Koritna Draga	
350.	*Prunus mahaleb* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Simunovic (1958)
351.	*Prunus spinosa* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	

No.	Scientific name	Conservation status	Survey Finding - was species found?	Locality	Reference
352.	*Punica granatum* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	Simunovic (1958)
353.	*Pyrus amygdaliformis* Vill.		Yes	Humi, Podgorani	Simunovic (1958)
354.	*Quercus cerris* L.		Yes	Podgorani, Ovcari	Simunovic (1958)
355.	*Quercus pubescens* Willd.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Simunovic (1958)
356.	*Ranunculus acris* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
357.	*Ranunculus ficaria* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari	
358.	*Ranunculus millefoliatus* Vahl		Yes	Ovcari, Polje Bijela	Beck (1903-1927)
359.	*Reseda phyteuma* L.		Yes	Koritna Draga	
360.	*Robinia pseudoacacia* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
361.	*Rorippa lippizensis* (Wulfen) Rchb.		Yes	Humi, Podgorani	Beck (1903-1927)
362.	*Rosa canina* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
363.	*Rubus caesius* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
364.	*Rubus idaeus* L.		Yes	Polje Bijela	
365.	*Rubus ulmifolius* Schott.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
366.	*Rumex acetosa* L.		Yes	Kuti-Livac, Koritna Draga, Humi	
367.	*Rumex conglomeratus* Murray		Yes	Koritna Draga	
368.	*Rumex crispus* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	

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369.	*Rumex pulcher* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
370.	*Ruscus aculeatus* L.	IUCN LC, FBiH VU	Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
371.	*Ruta graveolens* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Beck (1903-1927)
372.	*Salix eleagnos* Scop.		Yes	Polje Bijela	
373.	*Salvia officinalis* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Simunovic (1958)
374.	*Salvia verticillata* L.		Yes	Kuti-Livac, Koritna Draga, Humi	
375.	*Sambucus ebulus* L.		Yes	Polje Bijela	Maly (1928)
376.	*Sanguisorba minor* Scop. subsp. *minor*		Yes	Koritna Draga, Humi	
377.	*Saponaria officinalis* L.		Yes	Ovcari, Polje Bijela	
378.	*Satureja montana* L. subsp. *montana*		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
379.	*Saxifraga rotundifolia* L.		Yes	Humi, Podgorani	Beck (1903-1927)
380.	*Scabiosa silenifolia* Waldst. et Kit.	FBiH LC	Yes	Podgorani	
381.	*Scabiosa triandra* L.		Yes	Koritna Draga, Humi	
382.	*Scandix pecten – veneris* L.		Yes	Koritna Draga, Humi	
383.	*Scilla autumnalis* L.		Yes	Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
384.	*Scleranthus annuus* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
385.	*Scolymus hispanicus* L.		Yes	Koritna Draga, Humi, Podgorani	

No.	Scientific name	Conservation status	Survey Finding - was species found?	Locality	Reference
386.	*Scrophularia canina* L. subsp. *bicolor* (Sibth. et Sm.) Greuter		Yes	Koritna Draga	
387.	*Sedum acre* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari	
388.	*Sedum album* L.		Yes	Koritna Draga, Podgorani	
389.	*Sedum hispanicum* L.		Yes	Koritna Draga, Humi, Podgorani	
390.	*Senecio vulgaris* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
391.	*Sesleria autumnalis* (Scop.) F.W.Schultz.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Simunovic (1958)
392.	*Sesleria robusta* Schott, Nyman et Kotschy		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Beck (1903-1927)
393.	*Setaria viridis (*L.) P. Beauv.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
394.	*Sherardia arvensis* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
395.	*Sideritis romana* L. subsp. *romana*		Yes	Kuti-Livac, Koritna Draga, Humi	
396.	*Silene latifolia* Poir. subsp. *alba* (Mill.) Greuter et Bourdet		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
397.	*Silene otites* (L.) Wibel		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
398.	*Silene vulgaris* (Moench) Garcke		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
399.	*Smyrnium perfoliatum* L.		Yes	Kuti-Livac, Koritna Draga, Humi	
400.	*Sorbus domestica* L.		Yes	Koritna Draga, Humi, Podgorani	
401.	*Spiranthes spiralis* (L.) Chevall.	IUCN LC, FBiH	Yes	Humi	

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		EN			
402.	*Stachys cretica* L. subsp. *salviifolia* (Ten.) Rech. f.		Yes	Kuti-Livac, Humi	
403.	*Stellaria media* (L.) Vill. subsp. *media*		Yes	Kuti-Livac, Koritna Draga, Humi	
404.	*Stipa pennata* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Beck (1903-1927); Simunovic (1958)
405.	*Tamus communis* L.		Yes	Koritna Draga, Humi	
406.	*Tanacetum cinerariifolium* (Trev.) Schultz Bip.	IUCN LC, FBiH VU	Yes	Podgorani	
407.	*Taraxacum officinale* Webber		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
408.	*Teucrium chamaedrys* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	Simunovic (1958)
409.	*Teucrium montanum* L.		Yes	Podgorani	
410.	*Teucrium polium* L.		Yes	Kuti-Livac, Koritna Draga, Podgorani	Simunovic (1958)
411.	*Thlaspi perfoliatum* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
412.	*Thlaspi praecox* Wulf.		Yes	Koritna Draga	
413.	*Thymus longicaulis* C.Presl.		Yes	Ovcari, Polje Bijela	
414.	*Thymus pulegioides* L.		Yes	Koritna Draga	
415.	*Tordylium apulum* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
416.	*Tordylium maximum* L.		Yes	Koritna Draga, Humi, Podgorani	

No.	Scientific name	Conservation status	Survey Finding - was species found?	Locality	Reference
417.	*Tragopogon porrifolius* L.		Yes	Koritna Draga, Humi, Podgorani	
418.	*Tribulus terrestis* L.		Yes	Kuti-Livac, Koritna Draga	
419.	*Trifolium angustifolium* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
420.	*Trifolium arvense* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
421.	*Trifolium campestre* Schreb.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
422.	*Trifolium incarnatum* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
423.	*Trifolium incarnatum* L. subsp. *molinerii* (Balb. ex Hornem) Syme		Yes	Koritna Draga	
424.	*Trifolium ochroleucum* Huds.		Yes	Koritna Draga	
425.	*Trifolium pallidum* Waldst. et Kit.		Yes	Koritna Draga	
426.	*Trigonella esculenta* Willd.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
427.	*Ulmus minor* Mill.		Yes	Koritna Draga, Humi, Podgorani	
428.	*Umbilicus horizontalis* (Guss.) DC.		Yes	Koritna Draga	
429.	*Valantia muralis* L.		Yes	Koritna Draga	
430.	*Valeriana tuberosa* L.		Yes	Koritna Draga, Humi, Podgorani	
431.	*Verbascum densiflorum* Bertol.		Yes	Koritna Draga	
432.	*Verbascum pulverulentum* Vill.		Yes	Kuti-Livac, Koritna Draga, Humi	
433.	*Verbena officinalis* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
434.	*Veronica arvensis* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	

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435.	*Veronica cymbalaria* Bod.		Yes	Kuti-Livac, Koritna Draga, Humi	
436.	*Veronica persica* Poir.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
437.	*Vicia villosa* Roth subsp. *varia* (Host) Corb		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
438.	*Viola alba* Besser		Yes	Kuti-Livac, Koritna Draga, Humi	
439.	*Viola odorata* L.		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani, Ovcari, Polje Bijela	
440.	*Viscum album* L. subsp. *album*		Yes	Ovcari, Polje Bijela	
441.	*Vulpia myuros* (L.) C. C. Gmel.		Yes	Ovcari	
442.	*Xanthium spinosum* L.		Yes	Podgorani	
443.	*Xanthium strumarium* L. subsp. *italicum* (Moretti) D.Löve		Yes	Kuti-Livac, Koritna Draga, Humi, Podgorani	
444.	*Zea mays* L.		Yes	Kuti-Livac, Humi, Podgorani, Ovcari	
445.	*Arenaria gracilis* Waldst. et Kit.	FBiH LC	No	Podgorani	Beck (1903-1927)
446.	*Hieracium barbatum* Tausch		No	Polje Bijela	Maly and Zahn (1928)
447.	*Ilex aquifolium* L.	IUCN LC, FBiH VU	No	Polje Bijela	Maly (1928)
448.	*Nigritella rhellicani* Teppner et Klein	IUCN LC, FBiH NT	No	Podgorani	Beck (1903-1927)
449.	*Senecio thapsoides* DC. subsp.	FBiH CR	No	Polje Bijela	Maly (1928)

No.	Scientific name	Conservation status	Survey Finding - was species found?	Locality	Reference
	visianianus (Vis.) Vandas				
450.	*Silene* reichenbachii Vis.	FBiH NT	No	Polje Bijela	Beck (1903-1927)
451.	*Sorbus aucuparia* L.		No	Polje Bijela	Maly (1928)
452.	*Thesium alpinum* L.		No	Polje Bijela	Beck (1903-1927)

3.2.2 Konjic Bypass

The plant species were determined directly in the field, while only a small part of the plant material was collected and photographed for subsequent determination and verification. For species determination, standard keys and iconographies were used: Hayek (1924-1927, 1928-1931, 1932-1933), Tutin et al (1964-1980, 1993), Horvatic (1967), Josifovic (1970-1977), Trinajstic (1975-1986), Pignatti (1982), Jávorka and Csapody (1991), Domac (1994), Nikolic (2003, 2019a). The nomenclature is mostly harmonized with the data of Flora Europaea, i.e. its revision, which is carried out with the publication of the Atlas of the Flora of Europe (Jalas et al, 1972-2013) and Euro+MedPlantBase (2006-2022) and the Flora of Croatia (Nikolic 2022). These sources were deviated from in the event that in the meantime modern revisions of some genera were issued (Bigazzi et al, 1997; Frajman & Oxelman, 2007; Koopman, 2011),

Based on field research, the presence of a total of 178 vascular plant taxa was established. Alphabetical list of species and subspecies with associated data: endangered status based on the Red List of Flora of the Federation of Bosnia and Herzegovina (Djug et al., 2013), endemism status (Silic, 1990; Lubarda, 2013; Lubarda et al., 2014), protection status at the level of the Federation of Bosnia and Herzegovina (Anonymus, 2020) and invasiveness code in the Federation of Bosnia and Herzegovina (Djug et al., 2019) is shown in Table 8.

Based on field research, the presence of a total of 178 vascular plant taxa was established.

A total of eight invasive species were recorded, which is expected for areas under anthropogenic pressure.

Table 8: Flora species recorded along the Konjic bypass

No.	Taxon name	Conservation status	Endemic	Law-protected species and subspecies[5]	Invasive
1.	*Acer campestre* L.				
2.	*Acer monspessulanum* L.				
3.	*Achillea millefolium* L.				
4.	*Aegilops geniculate* Roth				
5.	*Aegilops neglecta* Req. ex Bertol				
6.	*Aethionema saxatile* (L.) R.No.				
7.	*Agrostis castellana* Boiss. et Reut.				
8.	*Ailanthus altisima* (Mill.)				A3

[5] Species protected by the law of the Federation of Bosnia and Herzegovina: SZV - Strictly protected wild species and subspecies, ZV - Protected wild species and subspecies

No.	Taxon name	Conservation status	Endemic	Law-protected species and subspecies[5]	Invasive
	Sw				
9.	*Ajuga chamaepitys* (L.) Schreb.				
10.	*Ajuga reptans* L.				
11.	*Allium cepa* L.				
12.	*Allium flavum* L. subsp. flavum				
13.	*Allium porrum* L.				
14.	*Allium roseum* L.				
15.	*Allium sativum* L.				
16.	*Allium sphaerocephalon* L. subsp. sphaerocephalon				
17.	*Amaranthus albus* L.				
18.	*Amaranthus retroflexus* L.				A3
19.	*Ambrosia artemisifolia* L.				A3
20.	*Anacamptis pyramidalis* (L.) Rich.	NT			
21.	*Anchusa arvensis* (L.) M.Bieb.				
22.	*Anchusa cretica* Mill.				
23.	*Anchusa italica* Retz.				
24.	*Anemone nemorosa* L.				
25.	*Anthemis arvensis* L.				
26.	*Aristolochia clematis* L.				
27.	*Artemisia annua* L.				
28.	*Artemisia vulgaris* L.				
29.	*Arum maculatum* L.				
30.	*Asarum europaeum* L.				
31.	*Asparagus acutifolius* L.				
32.	*Avena sterilis* L.				
33.	*Maximum care* L.				
34.	*Bromus erectus* Hudson subsp. *erectus*				
35.	*Bromus hordeaceus* L. subsp. *hordeaceus*				
36.	*Campanula trachelium* L.				
37.	*Capsella bursa – pastoris* (L.) Med.				
38.	*Carduus sp.*				
39.	*Carex distachya* Desf.				
40.	*Carex sp.*				
41.	*Carpinus betulus* L.				
42.	*Carpinus orientalis* Mill.				
43.	*Centaurium erythraea* Rafn				

No.	Taxon name	Conservation status	Endemic	Law-protected species and subspecies[5]	Invasive
44.	*Cerastium brachypetalum* Pers.				
45.	*Chelidonium majus* L.				
46.	*Chenopodium album* L.				
47.	*Chrysopogon gryllus* (L.) Trin.				
48.	*Cichorium intybus* L.				
49.	*Circaea lutetiana* L.				
50.	*Clematis viticella* L.				
51.	*Colchicum autumnale* L.				
52.	*Conyza canadensis* (L.) Cronq.				
53.	*Cornus mas* L.				
54.	*Cornus sanguinea* L.				
55.	*Coronilla emerus* L. subsp. *emeroides* (Boiss. & Spruner) Hayek.				
56.	*Cotinus coggygria* Scop.				
57.	*Crepis sancta* (L.) Bornm.				
58.	*Crataegus monogyna* Jack.				
59.	*Crepis neglecta* L.				
60.	*Cruciata laevipes* description				
61.	*Cyclamen purpurascens* Mill.	LC		SZV	
62.	*Cynoglossum columnae* Tan.				
63.	*Dactylis glomerata* L. subsp. *glomerata*				
64.	*Dactylis glomerata* L. subsp. *hispanica* (Roth.) Nyman				
65.	*Daucus carota* L.				
66.	*Dictamnus albus* L.				
67.	*Echium italicum* L.				
68.	*Echium vulgare* L.				
69.	*Edraianthus tenuifolius* (Waldst. et Kit.) A. DC.	LC	end		
70.	*Erigeron annuus* (L.) Pers. subsp. *annuus*				A3
71.	*Euphorbia amygdaloides* L.				
72.	*Euphorbia cyparissias* L.				
73.	*Euphorbia helioscopia* L.				

No.	Taxon name	Conservation status	Endemic	Law-protected species and subspecies[5]	Invasive
74.	*Fagus sylvatica* L.				
75.	*Foeniculum vulgare* Miller				
76.	*Fragaria vesca* Ehrh				
77.	*Frangula rupestris* (Scop.) Schur				
78.	*Fraxinus ornus* L.				
79.	*Fumaria sp.*				
80.	*Genista sylvestris* Scop. subsp. *dalmatica* (Bartl.) H. Lindb.	LC	end		
81.	*Geranium robertianum* L.				
82.	*Glechoma hirsute* Waldst. et Kit.				
83.	*Hedera helix* L.				
84.	*Helianthemum nummularium* (L.) Mill. subsp. *nummularium*				
85.	*Helichrysum italicum* (Roth) Mill. Corr. Guss.				
86.	*Helleborus sp.*				
87.	*Hieracium barbatum* Tausch				
88.	*Hippocrepis commosa* L.				
89.	*Hypericum perforatum* L.				
90.	*Inula conyza* DC.				
91.	*Inula ensifolia* L.				
92.	*Lamium maculatum* L.				
93.	*Lamium purpureum* L.				
94.	*Lathyrus vernus* (L.) Bernh.				
95.	*Leontodon sp.*				
96.	*Ligustrum vulgare* L.				
97.	*Linum capitatum* Schult.				
98.	*Lithospermum purpurocaeruleum* L.				
99.	*Malva sylvestris* L.				
100.	*Medicago arabica* (L.) Huds.				
101.	*Medicago lupulina* L.				
102.	*Medicago minima* (L.) Bartal				
103.	*Medicago sativa* L.				B3
104.	*Melissa officinalis* L.				
105.	*Muscari comosum* (L.) Mill.				

No.	Taxon name	Conservation status	Endemic	Law-protected species and subspecies[5]	Invasive
106.	*Oenothera biennis* L.				B1
107.	*Ononis spinosa* L.				
108.	*Ostrya carpinifolia* Scop.				
109.	*Papaver rhoeas* L.				
110.	*Parietaria officinalis* L.				
111.	*Plantago lanceolata* L.				
112.	*Plantago major* L. subsp. major				
113.	*Plantago media* L.				
114.	*Poa compressa* L.				
115.	*Poa pratensis* L.				
116.	*Polystichum lonchitis* (L.) Roth				
117.	*Potentilla sp.*				
118.	*Primula veris* L. subsp. *columnae* (Ten.) Lüdi				
119.	*Primula vulgaris* Hoods.				
120.	*Prunella grandiflora* (L.) Scholler				
121.	*Prunus avium* L.				
122.	*Prunus cerasifera* Ehrh.				
123.	*Prunus spinosa* L.				
124.	*Punica granatum* L.				
125.	*Ptilostemon strictus* (Ten.) Greuter				
126.	*Quercus cerris* L.				
127.	*Quercus petraea* (Matt.) Liebl.				
128.	*Quercus pubescens*Willd.				
129.	*Ranunculus millefoliatus* Vahl				
130.	*Ranunculus ficaria* L.				
131.	*Robinia pseudoacacia* L.				A3
132.	*Rosa canina* L.				
133.	*Rubus idaeus* L.				
134.	*Rubus ulmifolius* Schott.				
135.	*Rumex crispus* L.				
136.	*Rumex pulcher* L.				
137.	*Ruscus aculeatus* L.	VU			
138.	*Ruta graveolens* L.				
139.	*Salix eleagnos* Scop.				
140.	*Salvia officinalis* L.				
141.	*Salvia verticillate* L.				
142.	*Sambucus ebulus* L.				
143.	*Saponaria officinalis* L.				

No.	Taxon name	Conservation status	Endemic	Law-protected species and subspecies[5]	Invasive
144.	*Sorbus aucuparia* L.				
145.	*Satureia montana* L. subsp. *montana*				
146.	*Scilla autumnalis* L.				
147.	*Seven acres* L.				
148.	*Seven albums* L.				
149.	*Senecio vulgaris* L.				
150.	*Sesleria robusta* Schott, Nyman et Kotschy				
151.	*Sherardia arvensis* L.				
152.	*Silene sp.*				
153.	*Silene vulgaris* (Moench) Garcke				
154.	*Sonchus oleraceus* L.				
155.	*Stellaria holostea* L.				
156.	*Stipe pennate* L.				
157.	*Tamus communis* L.				
158.	*Taraxacum officinale* Webber				
159.	*Teucrium chamaedrys* L.				
160.	*Teucrium montanum* L.				
161.	*Thymus sp.*				
162.	*Tordylium apulum* L.				
163.	*Trifolium arvense* L.				
164.	*Trifolium campestre* Schreb.				
165.	*Trifolium incarnatum* L.				
166.	*Tussilago farfara* L.				
167.	*Ulmus minor* Mill.				
168.	*Nettle part* L.				
169.	*Verbascum thapsus* L.				
170.	*Verbena officinalis* L.				
171.	*Veronica arvensis* L.				
172.	*Veronica cymbalaria* Point.				
173.	*Veronica persica* Poir.				A3
174.	*Vicia villosa* Roth subsp. *varies* (Host) Corb				
175.	*Viola odorata* L.				
176.	*Viscum album* L. subsp. *album*				
177.	*Vulpia myuros* (L.) CC Gmel.				
178.	*Zea mays* L.				

4 Discussions and Recommendations

4.1 Summary of Main Findings

4.1.1 Sensitive Habitats

The diversity of sensitive habitats in the project area was developed on the basis of information provided in the Field Guide to Natura 2000 habitat types of BiH according to the EU Habitats Directive (Milanovic et al., 2015), as well as on the basis of knowledge gained from field research. Table 9 provides an overview and descriptions of found habitats. EAAA assessment is done and will be elaborated in Annex D: Criticial Habitat Assessment. Mapping of habitat types was carried out on the basis of available literature data, field surveys on satellite images.

Table 9: Description of habitats of European importance registered during field surveys

Habitat type	Code – habitat type	Habitat description
Freshwater	3240 Alpine rivers and their ligneous vegetation (*Salix eleagnos*)	The habitat covers associations developed on different types of alluvial deposits along fast rivers and streams where specific shrubery formations grow. Under the prevalent conditions, rapid streams form deposits around their banks, whose particle size ranges from coarser sands to medium-sized pebbles, where associations of gray willow develop covered in alliance *Salicion incanae* Aichinger 1933. Characteristic species of this habitat are: *Salix incana, Salix purpurea, Mentha aquatica, Ranunculus repens, Rubus caesius, Tussilago farfara* etc.
Natural and semi-natural grassland formations	*6220 Pseudo-steppe with grasses and annuals of the *Thero-Brachypodietea*	This habitat type includes mesomediterranean and thermomediterranean xerophilous open and low grasslands that are predominantly covered with annual plants (with emphasis on the *Poaceae* and *Fabaceae* families) of the order *Thero-Brachypodietea* Braun-Blanquet 194. Characteristic plant species are: *Brachypodium distachyum* i *Brachypodium retusum*. They occur mainly along the Mediterranean and along the eastern Adriatic coast. They were formed as the final regressive stage of evergreen forests of pine or holm oak due to burning of the forest or macchia and washing after deforestation.
	6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates	This habitat type includes dry to semi-dry limestone grasslands of the class *Festuco-Brometea* No.-Bl. et Tüxen 1943. Characteristic plant species of this habitat are: *Anthyllis vulneraria, Arabi hirsuta, Brachypodium pinnatum, Bromus inermis, Bromus erectus, Campanula glomerata, Carlina vulgaris, Koeleria pyramidata, Leontodon hispidus, Globularia punctata, Primula veris, Sanguisorba minor, Veronica prostrata, Veronica teucrium* etc.
	62A0 Eastern sub-Mediterranean dry	This habitat type includes dry grasslands *Scorzoneretalia villosae* of the sub-Mediterranean

Habitat type	Code – habitat type	Habitat description
	grasslands	zone, develops in a less expressed continental climate and includes many Mediterranean elements, and characteristic species of this habitat type are: *Carex humilis*, *Bromus erectus*, *Leucanthemum liburnicum*, *Jurinea mololia*, *Centaurea rupestris* etc.
Forests	95A0 High oro-Mediterranean pine forests	Endemic and relict forests of Bosnian pine (*Pinus heldreichii* Christ) occur in high mountains of Herzegovina, at altitudes from 1,400 to 1800 m above sea level, but also descend to lower altitudes. Characteristic species are: *Pinus heldreichii, Sorbus graeca, Viburnum maculatum, Amelanchier ovalis, Berberis vulgaris, Teucrium montanum, Brachypodium pinnatum, Arctostaphyllos uva-ursi, Betonica serotina, Cardamine glauca, Erythronium dens-canis, Orchis provincialis* etc.
	*9530 (Sub-) Mediterranean pine forests with endemic black pines	The habitat type is comprised of black pine forests on dolomites and steep slopes. These are mainly monodominant, bright coniferous forests, with species ecologically adapted to the high content of magnesium in the soil solution (dolomitophytes). They appear in two variants: the Dinaric and Herzegovina forests. Herzegovinian forests extend over a smaller range, within an altitude range of 300 to 1000 m above sea level. Dalmatian subspecies of black pine, and a high presence of Mediterranean flora elements can been found in the latter forests. In the area around Konjic, it also occurs within the endemic association *Orchido zlatari-Pinetum* Rt.-St. 1976. Characteristic species of this habitat type are: *Pinus nigra* subsp. *nigra*, *Pinus nigra* subsp. *dalmatica*, *Ostrya carpinifolia, Fraxinus ornus, Sorbus aria*, *Cotoneaster tomentosa, Amelanchier ovalis, Erica carnea, Daphne blagayana* etc.

4.1.2 Sensitive Species

The analysis of the conservation status of the inventoried flora was conducted according to the Red List of the Federation of Bosnia and Herzegovina, the global IUCN list and the Habitats Directive.

The Red List of Flora of the Federation of Bosnia and Herzegovina (Djug et al, 2013) and the Global IUCN List (https://www.iucnredlist.org/) are listed in accordance with the IUCN categories: Extinct (EX), Extint in the wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), Least Concern (LC), Data deficient (DD) and Not evaluated (NE). Based on the given analysis, a total of 14 confirmed and four taxa from literature with some level of endangerment were determined in the area of the Motorway. Analyzing the confirmed species, five are NT, three are VU, three are endangered and three are critically endangered. Additionally, 13 taxa are listed

in the global IUCN list of which 12 have LC status and one (*Galanthus nivalis*) has NT status.

The Konjic bypass area is characterized by low diversity of flora, dominated by species common and widespread in BiH, region and Europe. A very small number of species of low conservation concern were recorded: the pyramidal orchid *Anacamptis pyramidalis* (FBiH NT), European cyclamen *Cyclamen purpurascens* (strictly protected in FBiH), *Edraianthus tenuifolius* (endemic), *Genista sylvestris* subsp. *dalmatica* (endemic), Butcher's broom *Ruscus aculeatus* (VU in FBiH).

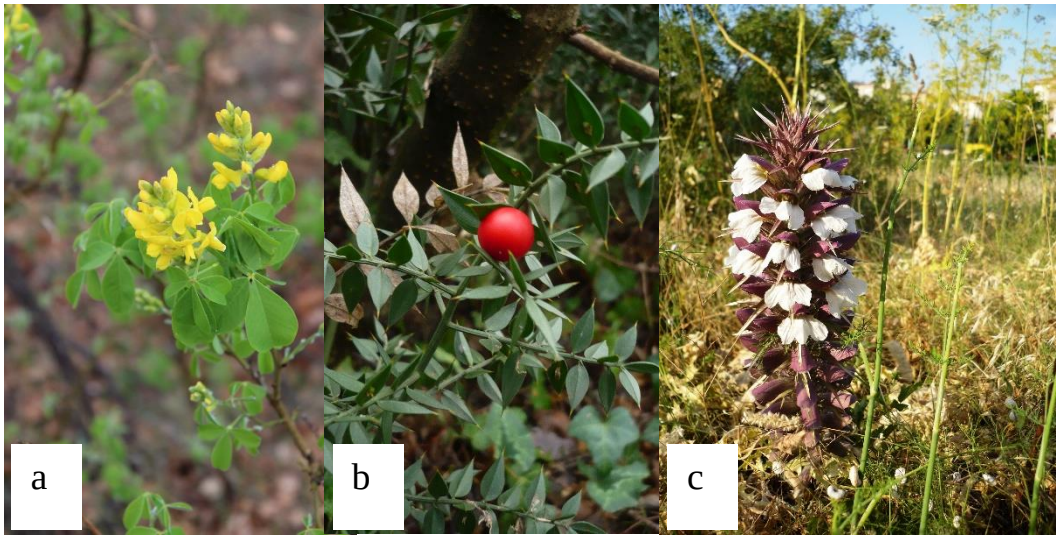

Figure 19: Part of plant species within the studied area: ***a.*** Petteria ramentacea *(Sieb) Presl.,* ***b.*** Ruscus aculeatus *L.,* **c.** Acanthus spinosissimus *Pers.*

4.1.3 Invasive Species

The term alien plant (exotic plant, non-native plant, non-indigenous plant) represents a species, subspecies or lower taxonomic category that is introduced intentionally or unintentionally outside its natural range, and which is capable to survive there and reproduce (IUCN, 2000).

The first project on invasive alien species was implemented in FBiH recently (Djug et al., 2019). The criteria used to determine the status of invasiveness in this study are given according to the cited publication.

Based on the conducted field surveys, a total of 20 invasive species from 9 families were determined (Table 10; Figure 20) within the Motorway study area. The largest number of invasive species was found around roads, human settlements and arable land. The largest number of identified taxa belongs to the family Compositae - 9 taxa (45.00%), families Amaranthaceae, Fabaceae and Poaceae with 2 taxa each (10.00%), while the presence of other families is characterized by one taxon (5.00%).

In terms of geographical origin, the largest number of invasive plant species is native to North America - 9 taxa (45.00%), 3 taxa are native to South America (15.00%), 2 taxa each are native to Asia, East Asia and West Asia (10.00%), and 1 taxon each is native to Central America and Central and North America (5.00%).

Regarding Konjic bypass, a total of eight invasive species were recorded, which is expected for areas under anthropogenic pressure.

Table 10: Overview of invasive plant species within the study area with baseline data, invasive status in FBiH and localities

Species English name	Scientific name	Family	Origin[6]	Site location	Invasive code
Boxelder maple	*Acer negundo* L.	Compositae	Am-C&N	Koritna draga (Kuti_2), Humi (Humi)	A2
Tree of heaven	*Ailanthus altisima* (Mill.) Sw.	Simaroubaceae	As-E	Kuti-Livac (Kuti_1, Kutilivac, Susica), Koritna draga (Kuti_2), Humi (Humi, Humi_2, Humi_7), Podgorani (Podgorani, Podgorani_2, Podgorani_3, Podgorani_6), Konjic bypass	A3
Redroot pigweed	*Amaranthus retroflexus* L.	Amaranthaceae	Am-N	Kuti-Livac (Dubrava, Dubrava_2, Kutilivac), Humi (Humi_2, Humi_7, Lisani, Lisani_3), Podgorani (Podgorani, Podgorani_6), Polje Bijela (Polje_Bijela_2, Polje_Bijela_3), Konjic bypass	A3
Annual ragweed	*Ambrosia artemisifolia* L.	Amaranthaceae	Am-N	Kuti-Livac (Dubrava, Dubrava_2, Kutilivac, Kuti_1), Koritna draga (Kuti, Kuti_2), Humi (Humi_2, Humi_7, Lisani, Lisani_3), Podgorani (Podgorani, Podgorani_6), Polje Bijela (Polje_Bijela_2, Polje_Bijela_3), Konjic bypass	A3
Annual saltmarsh aster	*Aster squamatus* (Spreng.) Heiron	Compositae	Am-S	Kuti-Livac (Dubrava_1)	B1
Greater Beggar's Ticks	*Bidens subalternans* DC.	Compositae	Am-S	Kuti-Livac (Dubrava_2, Kuti_1), Koritna draga (Kuti, Kuti_2), Humi (Humi_2, Lisani, Lisani_3), Podgorani (Podgorani_6)	B2
Paper mulberry	*Broussonetia papyrifera* L`Herit ex Vent.	Moraceae	As-E	Kuti-Livac (Kutilivac), Koritna draga (Kuti), Podgorani (Podgorani, Podgorani_6)	A2
Flax-leaf fleabane	*Conyza bonariensis* (L.) Cronquist	Compositae	Am-C	Kuti-Livac (Dubrava), Humi (Humi, Humi_2, Humi_7. Lisani_5)	B2
Horseweed	*Conyza canadensis* (L.) Cronq.	Compositae	Am-N	Kuti-Livac (Dubrava), Koritna draga (Kuti_3), Humi (Humi, Humi_2, Humi_7. Lisani_5), Podgorani (Podgorani_2, Podgorani_6), Ovcari (Ovcari_1, Ovcari_2, Ovcari_3), Polje Bijela (Polje_Bijela_2, Polje_Bijela_3)	A3

[6] Geographical origin: Am-C – Central America; Am-N – North America; Am-S – South America; Am-C&N – Central and North America; As – Asia; As-E –East Asia; As-W – West Asia

Species English name	Scientific name	Family	Origin[6]	Site location	Invasive code
Jimsonweed	*Datura stramonium* L.	Solanaceae	Am-N	Kuti-Livac (Dubrava), Koritna draga (Kuti), Podgorani (Podgorani_6)	A3
Indian goosegrass	*Eleusine indica* (L.) Gaertn.	Poaceae	As	Kuti-Livac (Dubrava), Humi (Humi, Humi_2, Humi_6, Humi_7, Lisani_3, Lisani_5), Podgorani (Podgorani, Podgorani_6)	A2
Annual fleabane	*Erigeron annuus* (L.) Pers. subsp. *annuus*	Compositae	Am-N	Kuti-Livac (Dubrava), Koritna drga (Kuti), Humi (Humi, Humi_2, Humi_6, Humi_7, Lisani, Lisani_3, Lisani_5), Podgorani (Podgorani, Podgorani_6), Ovcari (Ovcari_1, Ovcari_2, Ovcari_3), Polje Bijela (Polje_Bijela_2, Polje_Bijela_3), Konjic bypass	A3
Jerusalem artichoke	*Helianthus tuberosus* L.	Compositae	Am-N	Kuti-Livac (Dubrava)	A3
Alfalfa	*Medicago sativa* L.	Fabaceae	As	Kuti-Livac (Dubrava), Koritna drga (Kuti), Humi (Humi, Humi_2, Humi_6, Humi_7, Lisani, Lisani_3, Lisani_5), Podgorani (Podgorani, Podgorani_6), Polje Bijela (Polje_Bijela_3), Konjic bypass	B3
Common evening-primrose	*Oenothera biennis* L.	Onagraceae	Am-N	Konjic bypass	B1
Virginia creeper	*Parthenocissus quinquefolia* (L.) Planchon	Vitaceae	Am-N	Kuti-Livac (Dubrava)	B2
Knotgrass	*Paspalum distichum* L.	Poaceae	Am-N	Kuti-Livac (Dubrava)	B2
Black locust	*Robinia pseudoacacia* L.	Fabaceae	Am-N	Kuti-Livac (Kutilivac, Kuti_1, Susica,), Koritna draga (Kuti, Kuti_3), Humi (Humi, Lisani), Podgorani (Podgorani, Podgorani_2), Ovcari (Ovcari_1, Ovcari_3), Polje_Bijela (Polje_Bijela_2, Polje_Bijela_3), Konjic bypass	A3
Persian speedwell	*Veronica persica* Poir.	Plantaginaceae	As-W	Kuti-Livac (Kutilivac, Dubrava, Dubrava_2), Koritna draga (Kuti, Kuti_3), Humi (Humi, Humi_2, Humi_7, Lisani, Lisani_3, Lisani_5), Podgorani (Podgorani, Podgorani_2, Podgorani_6), Ovcari (Ovcari_1, Ovcari_2, Ovcari_3, Ovcari_4), Polje_Bijela (Polje_Bijela_2, Polje_Bijela_3, Polje_Bijela_4), Konjic bypass	A3
Rough cocklebur	*Xanthium strumarium* L. subsp.	Compositae	As-W	Kuti-Livac (Dubrava), Humi (Humi_2, Humi_7, Lisani,	A3

Species English name	Scientific name	Family	Origin[6]	Site location	Invasive code
	italicum (Moretti) D.Löve			Lisani_5), Podgorani (Podgorani_6)	
Spiny cocklebur	*Xanthium spinosum* L.	Compositae	Am-S	Podgorani (Podgorani_2)	A2

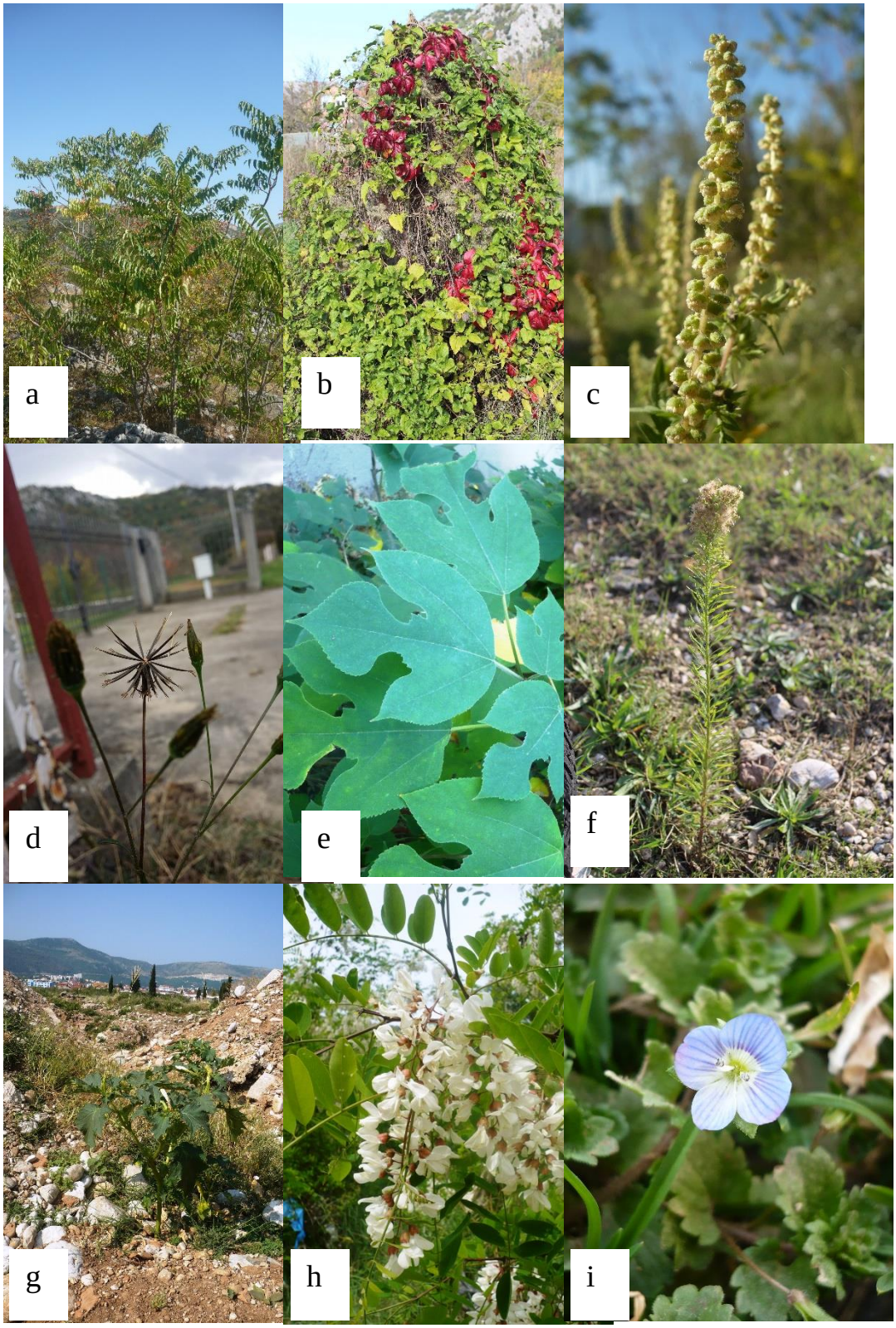

*Figure 20: Part of invasive plant species within the study area: **a.** Ailanthus altissima (Mill.) Sw.; **b.** Parthenocissus quinquefolia (L.) Planchon; **c.** Ambrosia artemisifolia L.; **d.** Bidens subalternans DC.; **e.** Broussonetia papyrifera L`Herit ex Vent.; **f.** Conyza canadensis (L.) Cronq.; **g.** Datura stramonium L.; **h.** Robinia pseudoacacia L.; **i.** Veronica persica Poir.*

4.2 Mitigation Measures

4.2.1 Preconstruction Phase

Include the requirement for habitat revitalization after the completion of construction by planting native plant species characteristic for this area (e.g. Dalmatian Laburnum, Bosnian pine, etc.) and to prevent the growth and spread of invasive species.

Prepare the manual for construction workers and other personnel on important species (endemic and endangered) and habitats (including invasive alien species) and their identification, as well and guidelines for their preservation and actions if encountered during their work.

Prepare an Invasive Species Management Plan with measures to control the spread of invasive species (with special emphasis on species with codes A2 and A3).

4.2.2 Construction Phase

Clearly mark areas for vegetation clearance, with biodegradable paint, install temporary fencing to prevent unnecessary loss of vegetation in the Project area. During the vegetation clearance and earthworks, the disposal of the material is to be well managed, in order to prevent the degradation of natural vegetation and invasion of non-native species into the natural habitats.

Motorway route only needs to be used for construction activities and organisation of construction site. Should any need for additional areas to be used occur, e.g. access roads to the motorway route, rock areas and scress need to be avoided and only already modified areas may be used (e.g. existing roads or degraded non-natural habitats).

Spray and wet of the temporary traffic lanes to prevent generation of dust and sedimentation of dust on nearby vegetation. Prevent unnecessary movement of vehicles outside of area designated for implementation of construction activities to preserve surrounding vegetation from dusting.

The excess construction waste must be re-used to level the road route and the remaining material shall be disposed at construction waste landfill, in order to prevent degradation of other natural vegetation and no temporary landfills are to be formed elsewhere, as these act as focal points for dispersion of invasive species.

Undertake forestation as a part of the anti-erosion works to preserve slope stability and reduce erosion.

4.2.3 Operation Phase

Avoid the use of herbicides and hazardous substances and materials, as to protect the environment from their potentially harmful impacts.

Undertake regular maintenance and cleaning of the drainage structures and oil separators.

Ensure implementation of afforestation measures.

4.3 Monitoring Measures

4.3.1 Construction Phase

The monitoring of cleared vegetation areas is to be regularly performed during the construction phase.

Environmental supervision of the contractor's work: weekly visual inspections throughout the construction phase to monitor the implementation and effectiveness of prescribed mitigation measures.

During the construction phase, the monitoring of the status of invasive species into natural habitats must be undertaken.

4.3.2 Operation Phase

Monitoring of adherence to measures.

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6 Annexes

6.1 Maps

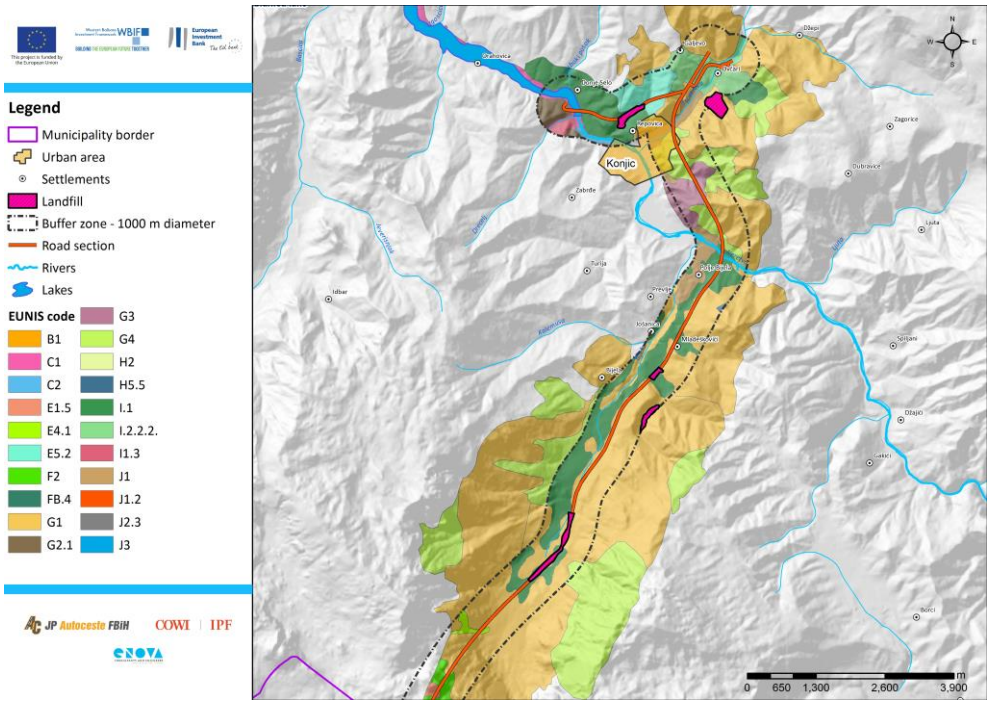

Figure 21: Map of EUNIS habitat types in the surveyed area north of Prenj Tunnel

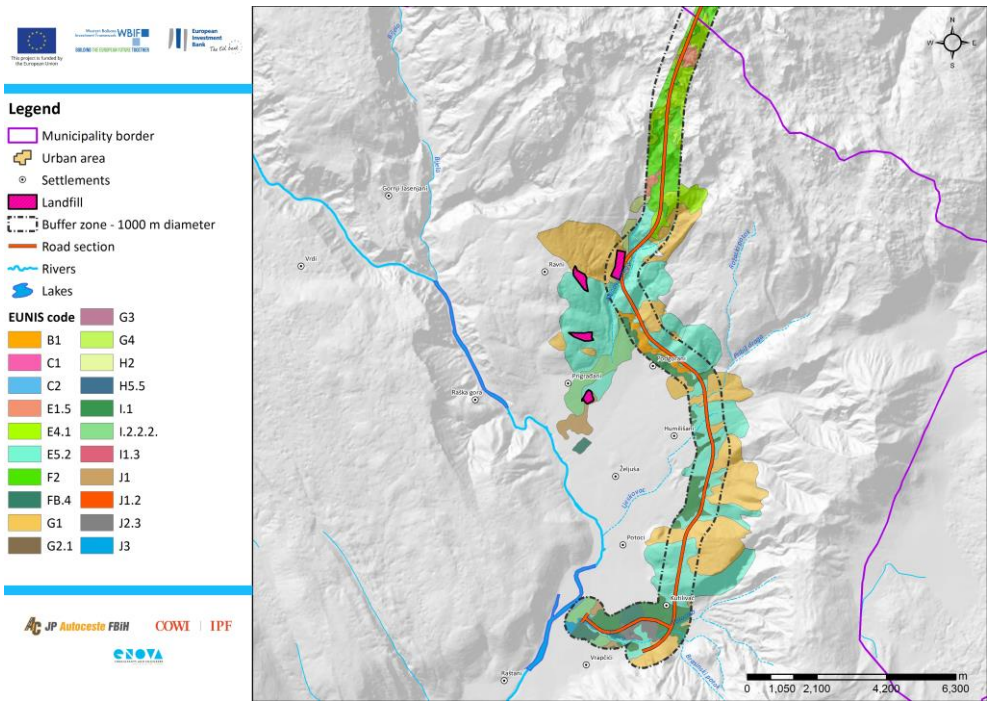

Figure 22: Map of EUNIS habitat types in the surveyed area south of Prenj Tunnel