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Annex D: Critical Habitat Assessment

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Volume 2: Technical Annexes to the ESIA

Annex D: Critical Habitat Assessment

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1 Introduction

1.1 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).

Once the baseline data was collected, we were able to proceed with the next stage – critical habitat assessment. The purpose of this stage is to determine if any features in the study area qualify as priority biodiversity features or critical habitats following the definitions provided in EBRD's Performance Requirement 6 (2019) and Guidance Note for PR6 (2022) as well as EIB Standard 4 (2022). These features will require special attention in impact assessment and mitigation planning.

2 Methodology

2.1 Introduction

Assessment of potential impact upon sensitive biodiversity features that could be considered "Critical Habitat" and/or "Priority Biodiversity Feature" is done in accordance to EBRD Performance Requirement 6 (2019) and EIB Standard 4: Biodiversity and Ecosystems (2022).

Critical Habitat (CH) is a description of the most significant and highest priority areas of the planet for biodiversity conservation. It takes into account both global and national priority setting systems and builds on the conservation biology principles of 'vulnerability' (degree of threat) and 'irreplaceability' (rarity

or uniqueness). Determination of CH is based upon quantitative thresholds of biodiversity priority which are largely based on globally accepted precedents such as IUCN Red List (IUCN, 2022[1]) criteria, local Red Lists (FBiH Red List in this case) and Key Biodiversity Area (KBA) thresholds. The definition of the critical habitat is based on the presence of high biodiversity values whether or not a project is to be undertaken in that habitat.

EBRD PR6 paragraph 14 (2019) and EIB Standard 4 paragraph 16 (2022) have comparable definitions of the critical habitats as the most sensitive biodiversity features with slight differences noted in the table below.

Table 2.1: Comparison of EBRD and EIB criteria for critical habitat designation

EBRD definition	EIB definition	Comment
Highly threatened or unique ecosystems	A highly threatened and/or unique ecosystem	-
Habitat of significant importance to endangered or critically endangered species	A habitat of priority and/or significant importance to critically endangered, endangered or vulnerable species, as defined by the IUCN Red List of threatened species and in relevant national legislation	IUCN Red List vulnerable species meet the criteria for priority biodiversity habitats according to the EBRD (unless a globally significant population is affected), while EIB considers them to be critical habitats
Habitats of significant importance to endemic or geographically restricted species	A habitat of priority and/or significant importance to a population, range or distribution of endemic or restricted-range species, or highly distinctive assemblages of species	EIB's definition is broader and more specific
Habitats supporting globally significant (concentrations of) migratory or congregatory species	A habitat required for the survival of migratory species and/or congregatory species	Wording of the two criteria is somewhat different; however, they are comparable in essence
Areas associated with key evolutionary processes	A habitat of key scientific value and/or associated with key evolutionary processes	-
-	Biodiversity and/or an ecosystem of significant social, economic or cultural importance to local communities and indigenous groups	The EBRD does not include such features in critical habitat but in priority biodiversity features

EBRD PR6 also uses the concepts of vulnerability and irreplaceability to define areas that, whilst not as globally important as Critical Habitat, are still of significant ecological importance. Such areas are referred under the EBRD PR6

[1] All references to the IUCN Red List have been taken from the most recent update (Version 2022-2) which can be found at: http://www.iucnredlist.org/ (last accessed February 17, 2023)

Guidance[2] as Priority Biodiversity Features (PBF). The EIB does not have this type of features defined in their Standards.

Priority Biodiversity Features are defined as "a subset of biodiversity that is particularly irreplaceable or vulnerable, but at a lower priority level than critical habitats" by EBRD. They may include areas that contain:

- Threatened habitats
- Vulnerable species
- Significant biodiversity features identified by a broad set of stakeholders or governments
- Ecological structure and functions needed to maintain the viability of priority biodiversity features.

Critical Habitat Assessment (CHA) identifies the potential of the Project to impact species and habitats that could trigger Critical Habitat and/or Priority Biodiversity Feature criteria. This Critical Habitat Assessment has been undertaken separately to the ESIA, but used the information from the ESIA to focus attention on areas where critical habitat trigger species were present or potentially present. This involved both the primary data and secondary data collected for the ESIA, plus the opinion of the local experts collecting and interpreting the ESIA data. The supplementary information has been gathered through both field surveys and an up-to-date desk study. Field studies of habitats, vegetation, invasive plant species, invertebrates of conservation concern and vertebrates (herpetofauna, ornithofauna, large mammals and bats) were undertaken during spring, summer, and early autumn. Detailed survey findings have been presented in standalone reports, namely Annexes A-C.

2.2 CHA Process

In line with EBRD Guidance Note 6 and EIB Guidance Note for Standard 3[3], the identification and characterisation of critical habitat is based on biodiversity baseline studies. The four principle steps for the collection of biodiversity baseline are:

- Defining the study area at the appropriate spatial scale - it is important to make the study area large enough to encompass a project's direct and indirect impacts and to characterize the ecological patterns, processes, and functions occurring in the project area.
- Scoping - A review of existing information, field reconnaissance, and stakeholder consultation can provide an initial idea of what features may be present in the study area.

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[2] EBRD (2022). EBRD Performance Requirement 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources. Guidance Note. European Bank for Reconstruction and Development

[3] The EIB Guidance Note for Standard 3 was published in 2018 and based on the 2018 Standards. New EIB Standards were adopted in 2022 in which biodiversity is discussed as a Standard 4; however, Guidance Note based on the 2022 document was not created to date. Therefore, we are using thresholds outlined by the 2018 Guidance.

- Conducting field work - Specialists in the relevant fields should establish biodiversity baseline through field work, following good international practices.
- Critical habitat assessment – The assessment must determine whether the project will affect priority biodiversity features or critical habirat, the assessment relies on a set of criteria and conditions described below.

In order to conduct a CHA, a study area needs to be defined and baseline established following the steps summarized above. The extent of this is dependent on the biodiversity features of interest and ecological functions that support them which can be different for each feature.

Critical Habitat Assessment process starts along with initial screening and scoping to identify biodiversity features that might trigger CH or PBF. With the aim of supplementing rapid field assessment, review of publicly available studies and data regarding the ecological characteristics of the study area has to be undertaken as well. Since this document relies on findings presented in Annexes A-C, all publications used for reference in this CHA have been noted in each Annex and therefore are not listed in this document.

The study area is independent of the Project Area and zone of project influence and can include a larger geographical area in which most of the impacts to biodiversity are expected. Such larger geographical areas determined based on features that may require additional studies or targeted mitigation are regarded as ecologically appropriate areas of analysis (EAAAs). The EAAAs are determined to include the "wider distribution of potentially affected biodiversity features and the ecological patterns, processes and functions that are necessary for maintaining them throughout this distribution"[4]. Defining an appropriate EAAA is an important step in the CHA process as it ensures assessment of an ecologically relevant feature/area, rather than an area influenced only by the project footprint. It also has inherent appreciation of ecological function across an area, and therefore avoids the risk of considering the specific areas in which a Critical Habitat trigger may be present discontinuously or seasonally. Determination of EAAA is done separately for every biodiversity receptor, unless species belonging to a certain group have significant EAAA-overlap and EAAAs can be aggregated[5]. In case of uncertainty around distribution, conservative approach was applied and EAAA slightly enlarged as a part of precautionary measures. Further evaluation of EAAA was done with regard to extent of occurance (EOO) based on IUCN data (if available) and expert inputs to facilitate CHA.

Species found on-site were assessed with regard to CH and PBF criteria. Assessment of each biodiversity receptor against the Critical Habitat and Priority Biodiversity Feature criteria uses both qualitative and quantitative thresholds. These are detailed within Table 2.2 below. Species that initially had the potential to trigger CH and PBF were brought forward for further assessment. Criteria

[4] EIB Guidance Note for Standard 3 on Biodiversity and Ecosystems, 2018

[5] EBRD PR 6 Guidance Note, 2022

used to select sensitive biodiversity features, namely species that need further assessment as part of the CHA, are as following:

- EU Habitats Directive[6] – Species listed in Annex II or IV
- EU Birds Directive[7] – Species listed in Annex I
- Resolutions 4 and 6 of Bern Convention[8] – Resolution 4 (1996) listing endangered natural habitats requiring specific conservation measures (including revised Annex I to Resolution No. 4 (1996), adopted in 2014 by the Standing Committee), and Resolution 6 listing species requiring specific habitat conservation measures (including revised Annex I to Resolution No. 6 (1998), adopted in 2011 by the Standing Committee)
- IUCN Red List[9] – Species with CR, EN or VU conservation status
- FBiH Red List[10] – Species with CR or EN conservation status
- Species with restricted range
- Species that migrate and/or congregate.

On the other hand, threatened habitats are habitats considered under pressure by national, regional or international assessments. These include natural and priority (*) habitats identified under the EU Habitats Directive (Annex I).

Table 2.2: EBRD criteria and conditions for identifying Priority Biodiversity Features and Critical Habitats

Criterion	Priority Biodiversity Feature	Critical Habitat
1. Priority Ecosystems		
1i Threatened ecosystems		
a) Habitats listed in Annex 1 of EU Habitats Directive (EU members only) or Resolution 4 of Bern Convention (signatory nations only) **b) IUCN Red-List EN or CR ecosystems**	a) EAAA is habitat type listed in Annex 1 of EU Habitats Directive or Resolution 4 of Bern Convention b) EAAA < 5% of the global extent of an ecosystem type with IUCN status of CR or EN	c) EAAA is habitat type listed in Annex 1 of EU Habitats Directive marked as "priority habitat type" d) EAAA ≥5% of global extent of an ecosystem type with IUCN status of CR or EN e) EAAA is ecosystem determined to be of high priority for conservation by

[6] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

[7] Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009

[8] Council of Europe, 1979. Convention on the Conservation of European Wildlife and Natural Heritage

[9] IUCN 2023. The IUCN Red List of Threatened Species. Version 2022-2

[10]Red List of Flora of Federation of Bosnia and Herzegovina (2013) and Red List of Fauna of Federation of Bosnia and Herzegovina (2013)

Criterion	Priority Biodiversity Feature	Critical Habitat
		national systematic conservation planning
2. Priority Ecosystems		
2i Threatened species		
a) Species and their habitats listed in EU Habitats Directive and Birds Directive (EU members only) or Bern Convention (signatory nations only) **b) IUCN Red List EN or CR species** **c) IUCN Red List VU species** **d) Nationally or regionally (e.g., Europe) listed EN or CR species**	a) EAAA for species and their habitats listed in Annex II of Habitats Directive, Annex I of Birds Directive, or Resolution 6 of Bern Convention b) EAAA supports < 0.5% of global population OR < 5 reproductive units of a CR or EN species. c) EAAA supports VU species d) EAAA for regularly occurring nationally or regionally listed EN or CR species	e) EAAA for species and their habitats listed in Annex IV of the Habitats Directive (See EU restrictions) f) EAAA supports ≥ 0.5% of the global population AND ≥ 5 reproductive units of a CR or EN species g) EAAA supports globally significant population of VU species necessary to prevent a change of IUCN Red List status to EN or CR, and satisfies threshold h) EAAA for important concentrations of a nationally or regionally listed EN or CR species
2ii Range-restricted species		
	a) EAAA for regularly occurring range-restricted species	b) EAAA regularly holds ≥ 10% of global population AND ≥ 10 reproductive units of the species
2iii Migratory and congregatory species		
	a) EAAA identified per Birds Directive or recognized national or international process as important for migratory birds (esp. wetlands)	b) EAAA sustains, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population at any point of the species' lifecycle EAAA predictably supports ≥10 percent of global population during periods of environmental stress

The Criteria outlined by the EIB's Standards are, as aforementioned, comparable to the EBRD Policy. EIB's 2022 Standards provide general criteria but not thresholds for critical habitat designation. Due to this constraint, the assessment relies on thresholds given in the EIB 2018 Guidance Note.

Criteria for Critical Habitat Designation	
Criterion 1: Highly Threatened or unique ecosystems	Areas will be considered critical habitat under Criterion 1 if they are occupied by or are needed to support: a) Priority Habitats listed in Annex I of the Habitats Directive and habitats considered to be their equivalent in countries outside the EU; b) ≥5% of the global extent of an ecosystem type meeting the criteria for IUCN's Red List of Ecosystems with a status of critically endangered or endangered; c) Examples of ecosystems outside the EU and not yet assessed by IUCN but determined to be of high priority for conservation on the basis of regional or nationallevel systematic conservation planning or informed specialist input.
Criterion 2: Population of critically endangered, endangered or vulnerable species, as defined by the IUCN Red List of threatened species and in relevant legislation	Areas will be considered critical habitat under Criterion 2 if they are occupied by or are needed to support: a) A population of an IUCN Red-listed endangered or critically endangered species that is ≥ 0.5% of the global population and/or ≥ 5 established reproductive units of an endangered or critically endangered species; b) Significant concentration of an IUCN Red-listed vulnerable species or of multiple IUCN Red-listed vulnerable species, especially where the loss of the area would result in the change of the IUCN Red List status to endangered or critically endangered. c) Nationally or regionally-important concentration of a species listed as endangered or critically endangered on a regional/national IUCN Red List, or equivalent on national/regional listing. d) A population of species listed in Annex II and IV of the Habitats Directive.
Criterion 3: Population range or distribution of endemic or restricted-range species, or highly distinctive assemblages of species	Areas will be considered critical habitat under Criterion 3 if: a) They regularly hold ≥10% of the global population size and support ≥10 reproductive units of an endemic or restricted-range species b) They are considered by relevant specialists to support unique or rare assemblages of species that occur there habitually, predictably or repeatably. The constituent species may not meet other critical habitat thresholds mentioned here in their own right, but may present assemblages that are considered important to maintain high biodiversity in the area.
Criterion 4: Habitat required for the survival of migratory species and/or congregatory species	Areas will be considered as critical habitats under Criterion 4 if: a) They sustain ≥ 1%of the global population of a migratory or congregatory species at any point of the species' lifecycle on a cyclical or otherwise regular basis. b) They are needed to support migratory or congregatory species during periods of environmental stress.
Criterion 5: Biodiversity and/or ecosystem	Areas of semi-natural and natural habitat used by indigenous peoples and local communities to obtain essential or priority benefits will be considered critical from an ecosystem service

Criteria for Critical Habitat Designation	
with significant social, economic, or cultural importance to local communities and indigenous groups.	perspective. Criteria for identifying priority ecosystem services should be developed for each project, with input from social specialists and the relevant users and beneficiaries.
Criterion 6: Habitat of key scientific value and/or associated with key evolutionary processes	This may include, but is not limited to, exceptional representations of: a) Landscapes with high spatial heterogeneity and therefore high levels of species diversity; b) Environmental gradients, also known as ecotones, that produce transitional habitat which is associated with the process of speciation and high species and genetic diversity; c) Edaphic interfaces that juxtapose soil types (e.g. serpentine outcrops, limestone and gypsum deposits), which have led to the formation of unique plant communities; d) Connectivity between habitats (e.g. biological corridors) with importance for species migration and gene flow, which is especially important in fragmented habitats and for the conservation of metapopulations. This also includes biological corridors across altitudinal and climatic gradients and from "crest to coast." e) Sites of demonstrated importance to climate change adaptation for either species or ecosystems.

During 2013, the conservation status of part of the species has been assessed and published within The Red List of Flora and Fauna 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.[11]

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

[11] 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)

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.** Due to these reasons, the FBiH RL statuses for specific species (CR and EN categories) could not have been considered as the sole criterion that may trigger critical habitat (CH), however the FBiH RL has been assessed with regard to the criterion of the priority biodiversity features (PBF) – *Significant biodiversity features identified by the broad set of stakeholders or governments.*

It is also important to note that, in BiH, there is no regular and systematic monitoring of biodiversity that could enable up-to date status of the populations for a range of categories of living world and no databases are available with regard to distribution of the populations. This gap has been bridged by engaging and consulting the relevant local biodiversity experts that are/were included in various biodiversity surveys in the project area, wider region of Herzegovina and continental areas of BiH. The expert judgment of the distribution of species and often their own personal experience has been included (particularly for ornithology, invertebrates, amphibians and reptiles, whereas the presence of mammal species has been assessed based on the consultative meetings with hunting society and assessment of potential habitats to sustain species of large mammals. The precautionary principle is applied for endemic species. Additional monitoring during pre-construction is required during spring and early summer for: endemic flora species, ornithofauna, amphibians and bats considering the time of the field surveys undertaken as part of this assignment have only covered summer and autumn.

2.3 Species for Further Assessment

Based on the field findings presented in Annexes A-C, a total of six habitat types and 52 species of flora and fauna with some level of sensitivity or conservation concern have been brought forward for further assessment.

The six habitats assessed in the CHA have been found in the project's area of influence and are listed in the Annex I of the Habitats Directive, two of which are priority habitats and one is an important orchid site (Table 2.3). No habitats listed in the Resolution 6 of the Bern Convention were registered in the Project area.

Table 2.3: Habitats brought forward for further assessment

No.	Habitat code	English name	Conservation status
1.	3240	Alpine rivers and their ligneous vegetation (*Salix eleagnos*)	HD I
2.	*6220	Pseudo-steppe with grasses and annuals of the *Thero-Brachypodietea*	HD I, priority
3.	6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates	HD I, important orchid site
4.	62A0	Eastern sub-Mediterranean dry grasslands	HD I
5.	95A0	High oro-Mediterranean pine forests	HD I
6.	*9530	(Sub-) Mediterranean pine forests with	HD I, priority

		endemic black pines	

The species in the Table 2.4 below are those which are listed on Annex II or IV of the EU Habitats Directive, Resolution 6 of the Bern Convention, Annex I of the EU Birds Directive, or are listed as EN, CR or VU on either the IUCN[12] or FBiH Red List, and are considered likely to be subject to impacts from the project.

Table 2.4: Species brought forward fo further assessment

No.	English name	Scientific name	Conservation status
Plants			
1.	-	*Anthyllis vulneraria* L. subsp. *praepropera* Bornm.	FBiH CR
2.	Hollow-Stemmed Asphodel	*Asphodelus fistulosus* L.	FBiH CR
3.	Dalmatian Crocus	*Crocus dalmaticus* Vis.	IUCN LC, FBiH EN
4.	Ivy-leaved cyclamen	*Cyclamen hederifolium* Aiton.	IUCN LC, FBiH CR
5.	Hercules' All-Heal	*Opopanax chironium* (L.) W.D.J. Koch	FBiH EN
6.	Autumn Lady's-Tresses	*Spiranthes spiralis* (L.) Chevall.	FBiH EN
Invertebrates			
7.	Southern Festoon	*Zerynthia polyxena*	FBiH NT, HD IV
8.	Jersey Tiger	*Euplagia quadripunctaria*	HD II (*), Res. 6
9.	Long-Horned Beetle	*Morimus funereus*	IUCN VU, HD II, Res. 6
Fish			
10.	Bullhead	*Cottus gobio* Linnaeus, 1758	IUCN LC, FBiH LC, HD II, Res. 6
11.	Adriatic Dace	*Squalius svallize* Heckel & Kner, 1858	IUCN VU, FBiH VU
12.	Neretvan Spined Loach	*Cobitis narentana* Karaman, 1928	IUCN VU
Amphibians			
13.	Yellow-bellied Toad	*Bombina variegata*	FBiH NT; HD II, IV; Res. 6
14.	Green Toad	*Bufotes viridis*	HD IV
15.	Greek Stream Frog	*Rana graeca*	FBiH NT, HD IV
Reptiles			
16.	The Hermann's Tortoise	*Testudo hermanni*	IUCN NT, FBiH VU, HD II, IV, Res. 6
17.	Glass Lizard	*Pseudopus apodus*	HD IV
18.	Dalmatian Wall Lizard	*Podarcis melisellensis*	HD IV

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No.	English name	Scientific name	Conservation status
19.	Common Wall Lizard	*Podarcis muralis*	HD IV
20.	Sand Lizard	*Lacerta agilis*	HD IV
21.	Blue-Throated Keeled Lizard	*Algyroides nigropunctatus*	FBiH NT, HD IV
22.	Eastern Green Lizard	*Lacerta viridis*	HD IV
23.	Balkan Green Lizard	*Lacerta trilineata*	HD IV
24.	Nose-Horned Whiper	*Vipera ammodytes*	HD IV
25.	Dahls Whip Snake	*Platyceps najadum*	HD IV
26.	Dice Snake	*Natrix tessellata*	HD IV
27.	Four-Lined Snake	*Elaphe quatuorlineata*	IUCN NT, FBiH VU, HD II, IV, Res. 6
28.	Aesculapian Snake	*Zamenis longissimus*	HD IV
Birds			
29.	European Turtle-Dove	*Streptopelia turtur*	IUCN VU
30.	Pallid Swift	*Apus pallidus*	FBIH EN
31.	Golden Eagle	*Aquila chrysaetos*	BD I, FBIH VU, Res. 6
32.	Western Marsh Harrier	*Circus aeruginosus*	BD I, FBIH VU, Res. 6
33.	Middle Spotted Woodpecker	*Dendrocopos medius*	BD I, Res. 6
34.	White-Backed Woodpecker	*Dendrocopos leucotos*	BD I, FBIH VU, Res. 6
35.	Syrian Woodpecker	*Dendrocopos syriacus*	BD I, Res. 6
36.	Grey-Headed Woodpecker	*Picus canus*	BD I, Res. 6
37.	Black Woodpecker	*Dryocopus martius*	BD I, FBIH NT, Res. 6
38.	Red-Backed Shrike	*Lanius collurio*	BD I, Res. 6
Mammals			
39.	Wolf	*Canis lupus*	IUCN LC, FBiH EN, HD II, IV (*), Res. 6
40.	Brown Bear	*Ursus arctos*	IUCN LC, FBiH VU, HD II (*) IV, Res. 6
41.	Eurasian Lynx	*Lynx lynx*	IUCN LC, FBiH VU, HD II, IV, V, Res. 6
42.	Lesser Mouse-Eared Bat	*Myotis oxygnathus*	IUCN LC, FBiH EN, HD II, IV
43.	Whiskered Bat	*Myotis mystacinus*	IUCN LC, FBiH VU, HD IV
44.	Kuhl's Pipistrelle	*Pipistrellus kuhlii*	IUCN LC, FBiH VU, HD IV
45.	Nathusius' Pipistrelle	*Pipistrellus nathusii*	IUCN LC, HD IV
46.	Serotine Bat	*Eptesicus serotinus*	IUCN LC, HD IV
47.	Common Noctule	*Nyctalus noctula*	IUCN LC, FBiH EN, HD IV

No.	English name	Scientific name	Conservation status
48.	Leisler's Bat	*Nyctalus leisleri*	IUCN LC, HD IV
49.	Free-Tailed Bat	*Tadarida teniotis*	IUCN LC, HD IV
50.	Greater Horseshoe Bat	*Rhinolophus ferrrumequinum*	IUCN LC, FBiH VU, HD II, IV, Res. 6
51.	Lesser Horseshoe Bat	*Rhinolophus hipposideros*	IUCN LC, FBiH EN, HD II, IV, Res. 6
52.	Common Pipistrelle	*Pipistrellus pipistrellus*	IUCN LC, FBiH VU, HD IV

2.4 Definition of the Study Area

Where trigger species were known, or likely, to be present (based on habitat suitability and the presence of field signs nearby or historic records), attempts were made to define appropriate and relevant study area. It was assigned based on habitats present, species survey data, an understanding of the project and the opinion of the experts who collected the data, building on the importance already assigned to the areas in the ESIA.

Taking into consideration the above, the assessment was performed using multiple EAAAs of features of conservation concern. The assessment included:

- localities where endangered or geographically restricted flora species listed in Annex A: Habitats, vegetation and invasive species were found: Kuti-livac, Humi, Podgorani, Ovcari, Koritna Draga and Polje Bijela;
- habitats listed in Annex I of Habitats directive, with focus on (*) priority habitats: Ovcari and Mt. Zlatar, area east of northern portal of Prenj tunnel, north of Mostar, Polje Bijela;
- habitats of invertebrates of conservation concern, including Podgorani, Polje Bijela, Humilisani, Kuti-Livac, Podporim and Rakov Laz;
- natural salmonid spawning grounds which are situated on the river Neretva from the mouth of the river Krupac to the Old bridge in Konjic and from the Old Bridge to the mouth of the river Tresanica;
- habitats important to endangered amphibians and reptiles, as well as amphibians' breeding sites near river Tresanica, two periodical streams in Ovcari, unnamed stream near Repovica, Podvrabac stream in Mladeskovici, Klenovik spring, ponds Zelenika and Bosnjaci (coordinates given in the ESIA and Annex C-2 to the ESIA);
- territories of (i) great cormorant (*Phalacrocorax carbo*) and common kingfisher (*Alcedo atthis*) in Konjic, (ii) middle spotted woodpecker (*Dendrocopos medius*) in Konjic, Polje Bijela, Mladekovici, Zelenika and Humi, (iii) black woodpecker (*Dryocopus martius*) in Rakov Laz, (iv) white-backed woodpecker (*Dendrocopos leucotos*) located at chainages between 9 + 550 km and the Prenj tunnel in the zone of direct impact, (v) male turtle dove (*Streptopelia turtur*) on chainage between 26+800 and 26+950 and (vi) abandoned nest of golden eagle (*Aquila chysaetos*) in Klenova Draga;
- Konjicka Bijela due to highest bat diversity among surveyed localities;

- two unexplored caves north of the settlement Podgorani.

3 Critical Habitat Assessment Outcome

To determine whether the Project affects a critical habitat, a literature review verified by field surveys was undertaken by biodiversity experts. An assessment of confirmed habitats and species which may trigger critical habitat for the above mentioned criteria is presented in Table 3.1 and Table 3.2.

Table 3.1: Habitats of conservation concern that occur in the CHA study area

No.	Habitat code	English name	Conservation status	EBRD Crit. Met	EIB Crit. Met	Comment
1.	3240	Alpine rivers and their ligneous vegetation (*Salix eleagnos*)	HD I	**PBF** 1iaa	No	This habitat is considered to be "endangered" due to its presence on the list of the EU Habitats Directive. This habitat needs to be preserved at the European level. Within the study area, the habitat type has been found in only one locality north of Bijela. The spatial coverage of this habitat type is about 0.59 km^2, so the EAAA is relatively low. Given its conservation status, the EAAA is considered sufficient value to qualify the habitat for priority biodiversity status.
2.	*6220	Pseudo-steppe with grasses and annuals of the *Thero-Brachypodietea*	HD I, priority	**CH** 1iac	**CH** 1a	This habitat is considered to be "endangered" due to its presence on the list of the EU Habitats Directive and it needs to be preserved at the European level. The habitat type is extremely rare and has been found around Mostar and Ovcari. The spatial coverage of this habitat type is about 2.77 km^2, so the EAAA is relatively low. Given its priority status the EAAA is considered sufficient value to qualify for critical habitat according to both EBRD and EIB criteria.
3.	6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates	HD I, important orchid site	**PBF** 1iaa	No	This habitat is considered to be "endangered" due to its presence on the list of the EU Habitats Directive. This habitat needs to be preserved at the European level. This habitat type is present within the area around Konjic (Ovcari). The spatial coverage of this habitat type is about 0.83 km^2. Given its conservation status, the EAAA is considered sufficient value to qualify the habitat for priority biodiversity status.
4.	62A0	Eastern sub-Mediterranean dry grasslands	HD I	**PBF** 1iaa	No	This habitat is considered to be "endangered" due to its presence on the list of the EU Habitats Directive. This habitat needs to be preserved at the European level. It is 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 about 3.45 km^2. Given its conservation status, the EAAA is considered sufficient value to qualify the habitat for priority biodiversity status.
5.	95A0	High oro-Mediterranean pine forests	HD I	**PBF** 1iaa	No	This habitat is considered to be "endangered" due to its presence on the list of the EU Habitats Directive. This habitat needs to be preserved at the European level. This habitat type is present within the buffer zone of 500 m and shown on the vegetation map. The spatial coverage of this habitat type is about 17.30 km^2. Given its conservation status, the EAAA is considered sufficient

No.	Habitat code	English name	Conservation status	EBRD Crit. Met	EIB Crit. Met	Comment
						value to qualify the habitat for priority biodiversity status.
6.	*9530	(Sub-) Mediterranean pine forests with endemic black pines	HD I, priority	**CH** 1iac	**CH** 1a	This habitat is considered to be "endangered" due to its presence in the list of the EU Habitats Directive. This habitat needs to be preserved at the European level. This habitat type is present within a buffer zone of 500 m and shown on the vegetation map. However, the habitat will not be impacted. The spatial coverage of this habitat type is about 3.27 km^2. Given its priority status the EAAA is considered sufficient value to qualify for critical habitat.

Table 3.2: Species of conservation concern that occur in the CHA study area

No.	English name	Scientific name	Conservation status	EBRD Crit. Met	EIB Crit. Met	Comment
Plants						
1.	-	*Anthyllis vulneraria* L. subsp. *praepropera* Bornm.	FBiH CR	**PBF** 2idd	No	The species has been found in Albania, the Carpathians, the East Aegean islands, Greece, France, Monaco, Israel, Italy, San Marino, Malta, Croatia, Montenegro and Bosnia and Herzegovina. (Euro+Med, 2006-2021). The estimated EOO is quite large. In BiH, according to the available literature data and field surveys, it has been determined at cca. 20 localities and the population is estimated at less than 40 km^2. Size of EAAA is 0.2 km^2. Anticipated project activities unlikely to significantly impact the long-term survival of the species. The registered population is not of nationally or regionally important concentration and therefore does not meet the criteria for critical habitat.
2.	Hollow-Stemmed Asphodel	*Asphodelus fistulosus* L.	IUCN LC, FBiH CR	**PBF** 2idd	No	This species is widespread in Europe in the following countries: Albania, Belgium, Spain, Luxembourg, Bosnia and Herzegovina, Croatia, Montenegro, France, Germany, United Kingdom, Greece, Northern Ireland, Italy, San Marino, Turkey, Switzerland, etc. (Euro+Med, 2006-2021). The EOO is relatively large. According to the IUCN, it has the status of the least concerned (LC) species. This species is common in its natural range. It

No.	English name	Scientific name	Conservation status	EBRD Crit. Met	EIB Crit. Met	Comment
						produces large amounts of seeds leading to the rapid establishment of large populations. Based on the available literature research and field surveys, this species has been found at 12 localities in BiH. EAAA size is 0.01km^2. Anticipated project activities unlikely to significantly impact the long-term survival of the species.
3.	Dalmatian Crocus	*Crocus dalmaticus* Vis.	IUCN LC, FBiH EN	**PBF** 2idd	No	In Europe, this species has been found in Albania, Slovenia, Croatia, Bosnia and Herzegovina, Montenegro and Serbia (Euro+Med, 2006-2021). According to the IUCN, it has the status of the least concerned (LC) species. IUCN (2021) states that this species is numerous and common. Overall status of the species population is stable, with localized population declines. Based on the available literature research and field surveys, this species has been found at about 10 localities in BiH. EAAA size is 0.01km^2. Anticipated project activities unlikely to significantly impact the long-term survival of the species.
4.	Ivy-leaved cyclamen	*Cyclamen hederifolium* Aiton.	IUCN LC, FBiH CR	**PBF** 2idd	No	In Europe, this species is widespread in: Albania, Bulgaria, Croatia, Serbia, Bosnia and Herzegovina, Montenegro, Greece, Spain, Malta, Turkey, Switzerland, Cyprus, Northern Macedonia, Kosovo, Switzerland (Euro+Med, 2006-2021). The EOO is relatively large. According to the IUCN, it has the status of the least concerned (LC) species. IUCN (2021) states that no data are available on the abundance of this species. Based on the available literature research and field surveys, this species has been found in BiH at about 20 localities. EAAA size is 0.25km^2. Anticipated project activities unlikely to significantly impact the long-term survival of the species.
5.	Hercules' All-Heal	*Opopanax chironium* (L.) W.D.J.Koch	FBiH EN	**PBF** 2idd	No	In Europe, this species is represented in Albania, Bulgaria, Croatia, Bosnia and Herzegovina, Montenegro, Italy, France, Greece, Romania, Northern Macedonia, Slovenia, Spain, Andorra, Gibraltar, etc. (Euro+Med, 2006-2021). The EOO is relatively large. Based on the available literature research and field surveys, this species has been found at about 30 localities in BiH. EAAA size is 0.01km^2. Anticipated project activities unlikely to significantly impact the long-term survival of the species.
6.	Autumn Lady's-	*Spiranthes spiralis* (L.)	FBiH EN	**PBF**	No	In Europe, this species is widespread in: Croatia, Bosnia and Herzegovina, Montenegro, Albania, Austria, Italy, Belgium, Austria, Albania, Bulgaria, Czech Republic, France,

No.	English name	Scientific name	Conservation status	EBRD Crit. Met	EIB Crit. Met	Comment
	Tresses	Chevall.		2idd		Cyprus, Germany, Greece, Hungary, Ireland, Malta, Moldova, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Switzerland, Turkey, Ukraine and the United Kingdom (Euro+Med, 2006-2021). IUCN (2021) states that this species is rare in its entire distribution, but has a large area of distribution. The population trend is unknown, but existing threats to species and habitats are unlikely to cause a rapid population decline in the near future, and is therefore labeled as least concern (LC) species. In BiH, especially in Herzegovina, the populations are large and stable. EAAA size is 0.01km^2. Anticipated project activities unlikely to significantly impact the long-term survival of the species.
Invertebrates						
7.	Southern Festoon	*Zerynthia polyxena*	FBiH NT, HD IV	**CH** 2iae	No	EOO greater than 20,000 km2; the species is found in more than 10 localities in BiH, there is no data on the size of the population in BiH; no data on population dynamics as well. The species is widespread in Bosnia and Herzegovina and neighbouring countries. Works on the Corridor Vc route, subsection Mostar North - Tunnel Prenj - Konjic (Ovcari), will not disturb the habitats of the species outside the buffer zone.
8.	Jersey Tiger	*Euplagia quadripunctaria*	HD II, Res. 6	**PBF** 2iaa	No	EOO greater than 20,000 km2; the species is found in more than 10 localities in BiH, there is no data on the size of the population in BiH; no data on population dynamics as well. The species is widespread in Bosnia and Herzegovina and neighbouring countries. Works on the Corridor Vc route, subsection Mostar North - Tunnel Prenj - Konjic (Ovcari), will not disturb the habitats of the species outside the buffer zone.
9.	Long-Horned Beetle	*Morimus funereus*	IUCN VU, HD II, Res. 6	**PBF** 2iaa, 2iac	No	EOO greater than 20,000 km2; the species is found in more than 10 localities in BiH, there is no data on the size of the population in BiH; no data on population dynamics as well. The species is widespread in Bosnia and Herzegovina and neighbouring countries. Works on the Corridor Vc route, subsection Mostar North - Tunnel Prenj - Konjic (Ovcari), will not disturb the habitats of the species outside the buffer zone.

No.	English name	Scientific name	Conservation status	EBRD Crit. Met	EIB Crit. Met	Comment
Fish						
10.	Bullhead	*Cottus gobio*	IUCN LC, FBiH LC, HD II, Res. 6	**PBF** 2iaa	No	The species is widely spread in the Central and North Europe. Inhabits the cold, clear and fast-flowing water of small stream to medium-sized rivers. Its distribution is limited by higher temperatures and lower oxygen levels. Anticipated project activities unlikely to significantly impact the long-term survival of the species due to least concern status of the species.
11.	Adriatic Dace	*Squalius svallize*	IUCN VU, FBiH VU	**PBF** 2iac	No	The species is found in the Neretva River and its tributaries. The Adriatic dace is a native species to the catchment area of the Neretva River. It inhabits karst waters and mostly lives in larger groups. Known to inhabit at least 12 localities in Bosnia and Herzegovina.
12.	Neretvan Spined Loach	*Cobitis narentana*	IUCN VU	**PBF** 2iac	No	Characteristic for Neretva river and its tributaries but is also present in Croatia. Known to inhabit at least 10 localities in B&H. Anticipated project activities unlikely to significantly impact the long-term survival of the species.
Amphibians						
13.	Green Toad	*Bufotes viridis*	HD IV, Res. 6	**CH** 2iae	No	Confirmed during field surveys. The species is considered to be widespread in and outside of BiH and considered to be of least concern. It is common and present in whole BiH. It is listed in Annex IV of the HD and therefore meets the criteria for critical habitat. Anticipated loss of habitats unlikely to significantly impact the long-term survival of the species.
14.	Yellow-bellied Toad	*Bombina variegata*	FBiH NT, HD II, IV, Res. 6	**CH** 2iae	CH 2d	The European fire-bellied toad is found throughout Central and Eastern Europe. It is mainly diurnal and aquatic, spending much of its time in slow-moving waters of marshes and ponds. The species was registered along the unnamed stream near Repovica (Konjic bypass road). It is listed in the Annexes II and IV of the HD and therefore meets the criteria for critical habitat of both the EBRD and EIB. There will be no loss of habitat as the species EAAA is located above a planned tunnel.

No.	English name	Scientific name	Conservation status	EBRD Crit. Met	EIB Crit. Met	Comment
15.	Greek Stream Frog	*Rana graeca*	FBiH NT, HD IV	**CH** 2iae	No	Confirmed during field surveys. The species is endemic to Balkan peninsula. The habitat of the species includes clear streams, springs, and small rivers with running water during the whole year. Species inhabits mostly deciduous and mixed forests, but also hilly and mountainous valleys. It is listed in Annex IV of the HD and therefore meets the criteria for critical habitat. EAAA is considered unlikely to support regionally important concentrations and loss of habitat unlikely to significantly impact the long-term survival of the species.
Reptiles						
16.	The Hermann's Tortoise	*Testudo hermanni*	IUCN NT, FBiH VU, HD II, IV, Res. 6	**CH** 2iae	**CH** 2d	Confirmed during field surveys. It prefers open patchy evergreen Mediterranean oak forest, but in its absence inhabits maquis, garrigue, dune scrub and maritime grassland, as well as agricultural and railway edge habitats, thus showing the adaptability to various range of habitats. The species is endemic to southern Europe. It is very common and widespread in Herzegovina. CHSA considered unlikely to support regionally important concentrations of the species and loss of habitat unlikely to significantly impact the long-term survival of the species.
17.	Glass Lizard	*Pseudopus apodus*	HD IV	**CH** 2iae	No	Confirmed during field surveys. Although lacking in some parts of the Europe, the species is considered to be widespread outside of BiH and considered to be of least concern. Due to preferring warmer habitats it is present in southern BiH. It is a very common species. Anticipated loss of habitat unlikely to significantly impact the long-term survival of the species.
18.	Dalmatian Wall Lizard	*Podarcis melisellensis*	HD IV	**CH** 2iae	No	Confirmed during field surveys. Stable population and considered to be of least concern. This species occurs in Mediterranean and sub-Mediterranean zones from extreme north-eastern Italy through southwestern Slovenia, Croatia, southern Bosnia-Herzegovina, and southern Montenegro to north-western Albania. It is present on many Adriatic islands. The species habitats range from sea level up to 1,400 m a.s.l. It is very common and

No.	English name	Scientific name	Conservation status	EBRD Crit. Met	EIB Crit. Met	Comment
						numerous in warmer regions within BiH: Herzegovina and western Bosnia. CHSA considered unlikely to support regionally important concentrations and loss of habitat unlikely to significantly impact the long-term survival of the species.
19.	Common Wall Lizard	*Podarcis muralis*	HD IV	**CH** 2iae	No	Not confirmed during field surveys. The species is considered to be widely spread in Europe and of least conservation concern. This is a very common and widespread species, well adjusted to natural and urban habitats in whole BiH, excluding very dry and warm southernmost area of Herzegovina. Anticipated loss of habitat unlikely to significantly impact the long-term survival of the species.
20.	Sand Lizard	*Lacerta agilis*	HD IV	**CH** 2iae	No	Confirmed during field surveys. The species is considered to be widespread outside of BiH and considered to be of least concern. It can be found in the central and northern areas of BiH and not expected in the Mediterranean area. The mountainous populations of BiH belong to the subspecies *L. a. bosnica*, and the lowland populations in the north to the subspecies *L. a. argus*. The species inhabits a variety of habitats, including meadows, arable land, grasslands, steppe, subalpine and alpine meadows, shrubs, hedges, open forests, alpine areas, traditionally cultivated agricultural land, and rural gardens. Anticipated loss of habitat unlikely to significantly impact the long-term survival of the species.
21.	Blue-Throated Keeled Lizard	*Algyroides nigropunctatus*	FBiH NT, HD IV	**CH** 2iae	No	Confirmed during filed surveys. The species is a Balkan subendemic lacertid lizard. In BiH it inhabits the Mediterranean and sub-Mediterranean area and can be found throughout Herzegovina all the way to mountains Cvrsnica and Cabulja. It prefers habitats with vertical structures (rocks or trees) with sufficient shade and humidity, rural gardens and urban areas and frequently can be found near streams or lakes. CHSA considered unlikely to support regionally important concentrations and loss of habitat unlikely to significantly impact the long-term survival of the species.

No.	English name	Scientific name	Conservation status	EBRD Crit. Met	EIB Crit. Met	Comment
22.	Eastern Green Lizard	*Lacerta viridis*	HD IV	**CH** 2iae	No	Confirmed during field surveys. The species is considered to be widespread outside of BiH in areas of Southeast and East Europe and of least conservation concern. In BiH, it is very common in whole BiH excluding the southernmost area inhabited by *L. trilineata*. Anticipated loss of habitat unlikely to significantly impact the long-term survival of the species
23.	Balkan Green Lizard	*Lacerta trilineata*	HD IV	**CH** 2iae	No	Confirmed during field surveys. Stable population and considered to be of least concern. This species is present from coastal Croatia, Bosnia-Herzegovina, Serbia, Montenegro, east to Bulgaria, south-eastern Romania, Albania, Macedonia, Greece (including the Ionian Islands and many Aegean Islands including Crete, Lesvos and Rhodes), and western and central Turkey. It ranges from sea level to at least 1,600 m a.s.l. In BiH, it inhabits submediterranean parts of BiH where it is very common. CHSA considered unlikely to support regionally important concentrations and loss of habitat unlikely to significantly impact the long-term survival of the species.
24.	Nose-Horned Whiper	*Vipera ammodytes*	HD IV	**CH** 2iae	No	Confirmed during field surveys. The species is considered to be widely spread in Mediterranean and South Europe as well as East Asia and of least conservation concern. It is common and widespread in whole BiH. Anticipated loss of habitat unlikely to significantly impact the long-term survival of the species.
25.	Dahls Whip Snake	*Platyceps najadum*	HD IV	**CH** 2iae	No	Confirmed during field surveys. The species is considered to be widely spread in Europe and BiH and of least conservation concern. It is a common species and inhabits southern BiH. Anticipated loss of habitat unlikely to significantly impact the long-term survival of the species.
26.	Dice Snake	*Natrix tessellata*	HD IV	**CH**	No	Not confirmed during field surveys. The species is considered to be widespread outside of

No.	English name	Scientific name	Conservation status	EBRD Crit. Met	EIB Crit. Met	Comment
				2iae		BiH and associated with rivers, coasts, streams, lakes, ponds and the surrounding terrestrial habitat. Anticipated loss of habitat unlikely to significantly impact the long-term survival of the species since such areas will not to be disturbed.
27.	Four-Lined Snake	*Elaphe quatuorlineata*	IUCN NT, FBiH VU, HD II, IV, Res. 6	**CH** 2iae	**CH** 2d	Confirmed during field surveys. An Eastern Mediterranean type of snake commonly found along forest edges and hedges, open forests and rocky slopes. It prefers warm and shady places, mostly humid habitats, as well as wetlands, and it could also be found near puddles and streams. The species is rare in BiH and it is present in Herzegovina. Anticipated loss of habitat unlikely to significantly impact the long-term survival of the species.
28.	Aesculapian Snake	*Zamenis longissimus*	HD IV	**CH** 2iae	No	Not confirmed during field surveys. The species prefers forested, warm but not hot, moderately humid but not wet, hilly or rocky habitats with proper insolation and varied, not sparse vegetation that provides sufficient variation in local microclimates. Frequented locations include places such as forest clearings in succession, shrublands at the edges of forests interspersed with meadows. They avoid open plains and agricultural deserts. In BiH, it is a common species that can be found throughout the country. Anticipated loss of habitat unlikely to significantly impact the long-term survival of the species.
Birds						
29.	European Turtle-Dove	*Streptopelia turtur*	IUCN VU	**PBF** 2icc	No	EOO is greater than 20,000 km2; the species is found in more than 10 localities in BiH, the size of the population in BiH is estimated at 5,000-1,0000 pairs; while data on dynamics are not available. The species is widespread in Bosnia and Herzegovina and neighbouring countries. Works on the route of Corridor Vc, subsection Mostar North - Tunnel Prenj - Konjic (Ovcari), will not disturb the habitats of the species outside the buffer zone.
30.	Pallid Swift	*Apus pallidus*	FBIH EN	**PBF** 2iaa	No	EOO is greater than 20,000 km2; the species is found in more than 10 localities in BiH, the size of the population in BiH is estimated at 1,000-2,000 nesting pairs; with a population growth trend. The species is widespread in Bosnia and Herzegovina and neighbouring

No.	English name	Scientific name	Conservation status	EBRD Crit. Met	EIB Crit. Met	Comment
						countries. Works on the route of Corridor Vc, subsection Mostar North - Tunnel Prenj - Konjic (Ovcari), will not disturb the habitats of the species outside the buffer zone.
31.	Golden Eagle	*Aquila chrysaetos*	BD I, FBIH VU	**PBF** 2iaa	No	EOO is greater than 20,000 km2; the species is found in more than 10 localities in BiH, the size of the population in BiH is estimated at 50-80 nesting pairs; the population is stable. The species is widespread in Bosnia and Herzegovina and neighbouring countries. Works on the route of Corridor Vc, subsection Mostar North - Tunnel Prenj - Konjic (Ovcari), will not disturb the habitats of the species outside the buffer zone.
32.	Western Marsh Harrier	*Circus aeruginosus*	BD I, FBIH VU, Res. 6	**PBF** 2iaa	No	EOO is greater than 20,000 km2; the species is found in more than 10 localities in BiH, the size of the population in BiH is estimated at 350-700 nesting pairs; the population is stable. The species is widespread in Bosnia and Herzegovina and neighbouring countries. Works on the route of Corridor Vc, subsection Mostar North - Tunnel Prenj - Konjic (Ovcari), will not disturb the habitats of the species outside the buffer zone.
33.	Middle Spotted Woodpecker	*Dendrocopos medius*	BD I, Res. 6	**PBF** 2iaa	No	EOO is greater than 20,000 km2; the species is found in more than 10 localities in BiH, the size of the population in BiH is estimated at 3,000-5,000 nesting pairs; the population is stable. The species is widespread in Bosnia and Herzegovina and neighbouring countries. Works on the route of Corridor Vc, subsection Mostar North - Tunnel Prenj - Konjic (Ovcari), will not disturb the habitats of the species outside the buffer zone.
34.	White-Backed Woodpecker	*Dendrocopos leucotos*	BD I, FBIH VU, Res. 6	**PBF** 2iaa	No	EOO is greater than 20,000 km2; the species is found in more than 10 localities in BiH, the size of the population in BiH is estimated at 350-500 nesting pairs; the population is stable. The species is widespread in Bosnia and Herzegovina and neighbouring countries. Works on the route of Corridor Vc, subsection Mostar North - Tunnel Prenj - Konjic (Ovcari), will not disturb the habitats of the species outside the buffer zone.

No.	English name	Scientific name	Conservation status	EBRD Crit. Met	EIB Crit. Met	Comment
35.	Syrian Woodpecker	*Dendrocopos syriacus*	BD I, Res. 6	**PBF** 2iaa	No	EOO is greater than 20,000 km2; the species is found in more than 10 localities in BiH, the size of the population in BiH is estimated at 75-150 nesting pairs; the population trend is not known. The species is widespread in Bosnia and Herzegovina and neighbouring countries. Works on the route of Corridor Vc, subsection Mostar North - Tunnel Prenj - Konjic (Ovcari), will not disturb the habitats of the species outside the buffer zone.
36.	Grey-Headed Woodpecker	*Picus canus*	BD I, Res. 6	**PBF** 2iaa	No	EOO is greater than 20,000 km2; the species is found in more than 10 localities in BiH, the size of the population in BiH is estimated at 1,500-3,000 nesting pairs; the population is stable. The species is widespread in Bosnia and Herzegovina and neighbouring countries. Works on the route of Corridor Vc, subsection Mostar North - Tunnel Prenj - Konjic (Ovcari), will not disturb the habitats of the species outside the buffer zone.
37.	Black Woodpecker	*Dryocopus martius*	BD I, FBIH NT, Res. 6	**PBF** 2iaa	No	EOO is greater than 20,000 km2; the species is found in more than 10 localities in BiH, the size of the population in BiH is estimated at 1,500-2,500 nesting pairs; the population is stable. The species is widespread in Bosnia and Herzegovina and neighbouring countries. Works on the route of Corridor Vc, subsection Mostar North - Tunnel Prenj - Konjic (Ovcari), will not disturb the habitats of the species outside the buffer zone.
38.	Red-Backed Shrike	*Lanius collurio*	BD I, Res. 6	**PBF** 2iaa	No	EOO is greater than 20,000 km2; the species is found in more than 10 localities in BiH, the size of the population in BiH is estimated at 25,000-50,000 nesting pairs; the population is stable. The species is widespread in Bosnia and Herzegovina and neighbouring countries. Works on the route of Corridor Vc, subsection Mostar North - Tunnel Prenj - Konjic (Ovcari), will not disturb the habitats of the species outside the buffer zone.
Mammals						
39.	Wolf	*Canis lupus*	IUCN LC, FBiH EN, HD II,	**CH**	**CH**	EOO bigger than 20,000 km2; the species is found in more than 10 localities in BiH, there is no data on the size of the population in BiH; as well as data on the dynamics of wolf

No.	English name	Scientific name	Conservation status	EBRD Crit. Met	EIB Crit. Met	Comment
			IV(*), Res. 6	2iad	2d	populations, widespread in the Dinaric Alps in Bosnia and Herzegovina and inhabits high forests. The wolf in the area of influence of the motorway section does not have the habitats necessary for breeding and feeding. The wolf habitats that will be under indirect pressure are the areas of the Prenj Mountain. Possible negative effects are reflected in temporary changes in the behavior of local populations due to noise and the presence of people. The biggest pressure will be the construction of access roads and enabling easier access to the area of the Mt. Prenj, which will increase the number of tourists, hunters and investments in the construction of facilities. CRITERIA: 2iad, 2iia PBF: 2icd; CH: 2iad
40.	Brown Bear	*Ursus arctos*	IUCN LC, FBiH VU, HD II (*) IV, Res. 6	**CH** 2iad	**CH** 2d	EOO bigger than 20,000 km2; the species is found in more than 10 localities in BiH, there is no data on the size of the population in BiH; as well as data on the dynamics of brown bear populations, widespread in the Dinaric Alps in Bosnia and Herzegovina and inhabits high forests. The brown bear in the area of influence of the motorway section does not have the habitat necessary for breeding and feeding. The habitats of the brown bear that will be under indirect pressure are the areas of the Mt. Prenj. Possible negative effects are reflected in temporary changes in the behavior of local populations due to noise and the presence of people. Habitats can only be considered a transit area. The biggest pressure will be the construction of access roads and enabling easier access to the area of the Mt. Prenj, which may increase the number of tourists, hunters and investments in the construction of facilities.
41.	Eurasian Lynx	*Lynx lynx*	IUCN LC, FBiH VU, HD II, IV, Res. 6	**CH** 2iae	**CH** 2d	EOO bigger than 20,000 km2; the species is found in more than 10 localities in BiH, there is no data on the size of the population in BiH; as well as data on the dynamics of Eurasian lynx populations, widespread in the Dinaric Alps in Bosnia and Herzegovina and inhabits high forests. The Eurasian lynx in the area of influence of the motorway section does not have the habitat necessary for breeding and feeding. The habitats of the Eurasian lynx that will be under indirect pressure are the areas of the Mt. Prenj. Possible negative effects are reflected in temporary changes in the behavior of local populations due to noise and the presence of people as it is possible that there will be

No.	English name	Scientific name	Conservation status	EBRD Crit. Met	EIB Crit. Met	Comment
						a change of route. The biggest pressure will be the construction of access roads and enabling easier access to the area of the Mt. Prenj, which may increase the number of tourists, hunters and investments in the construction of facilities.
42.	Lesser Mouse-Eared Bat	*Myotis oxygnathus*	IUCN LC, FBiH EN, HD II, IV	**CH** 2iae	**CH** 2d	EOO is greater than 20.000 km2; the species inhabits the Mediterranean regions of Europe the most; no population estimate has been made for the species in BiH; the species inhabits open meadows, wet meadows, karst areas and the like. The Project will not disturb the habitat of the species. In Mediterranean areas, caves and other underground locations are the places where they roost.
43.	Whiskered Bat	*Myotis mystacinus*	IUCN LC, FBiH VU, HD IV	**CH** 2iae	No	EOO is greater than 20.000 km2; The species is widespread on the Balkan Peninsula; no population estimate has been made for the species in BiH; inhabits wet meadows, open meadows, forest habitats. The Project will not disturb the habitat of the species. Summer litters are under bridges and hollows in the rocks.
44.	Kuhl's Pipistrelle	*Pipistrellus kuhlii*	IUCN LC, FBiH VU, HD IV	**CH** 2iae	No	EOO is greater than 20.000 km2; the species inhabits the Mediterranean regions of Europe; a very synanthropic species and is often found in towns and settlements and is usually found on small elevations below 1000 m; often hunts around populated areas for the species; no estimate of the population size in BiH has been made; inhabits wet meadows, open meadows, forest habitats. The Project will not disturb the habitat of the species. Maternity colonies are most recorded in rocks and abandoned buildings, abandoned roofs and similar places.
45.	Nathusius' Pipistrelle	*Pipistrellus nathusii*	IUCN LC, HD IV	**CH** 2iae	No	EOO is greater than 20.000 km2; the species is widely distributed in Europe; no estimate of the population size in BiH has been made; inhabits naturally rich forest habitats; deciduous mixed forests, moist lowland forests, coastal forests, coniferous forests and parks. It is often found near water bodies. The Project will not disturb the habitat of the species. Litters are in cracks of trees and

No.	English name	Scientific name	Conservation status	EBRD Crit. Met	EIB Crit. Met	Comment
						houses for birds and bats. KS: 2ia
46.	Serotine Bat	*Eptesicus serotinus*	IUCN LC, HD IV	**CH** 2iae	No	EOO is greater than 20.000 km2; widely distributed in Europe, especially in the Mediterranean; no estimate of the population size in BiH has been made; It can be found throughout the spectrum of Central European and Mediterranean habitats. The Project will not disturb the habitat of the species. Maternity colonies are most commonly recorded under the roofs in abandoned houses or in large areas behind stacked wood.
47.	Common Noctule	*Nyctalus noctula*	IUCN LC, FBiH EN, HD IV	**CH** 2iae	No	EOO is greater than 20.000 km2; widely distributed in Europe; no estimate of the population size in BiH has been made; inhabits mostly forest habitats up to 550 m above the sea level; in addition to coastal forests, beech forests and transitions from oak forests to Mediterranean oak forests, it uses a wide range of habitats including cities. The Project will not disturb the habitat of the species. Their litters are mostly in woodpecker holes, a small part of the population of this species uses other cracks in the trees up to 30 m high.
48.	Leisler's Bat	*Nyctalus leisleri*	IUCN LC, HD IV	**CH** 2iae	No	EOO is greater than 20.000 km2; widespread in Bosnia and Herzegovina; no estimate of the population size in BiH has been made; it inhabits forest habitats, it inhabits the oak forests in parts of the Mediterranean. The Project will not disturb the habitat of the species. Litters in the open trees were formed by rottening and cracks overgrown with vegetation. Most often, they are beech and oak trees and the litters are at an average height of 18-19 m.
49.	Free-Tailed Bat	*Tadarida teniotis*	IUCN LC, HD IV	**CH** 2iae	No	EOO is greater than 20.000 km2; inhabits the Mediterranean and sub-Mediterranean part of BiH; no estimate of the population size in BiH has been made; inhabits areas and over 2000 m above the seal level. The Project will not disturb the habitat of the species. Litters are in the rock cracks.

No.	English name	Scientific name	Conservation status	EBRD Crit. Met	EIB Crit. Met	Comment
50.	Greater Horseshoe Bat	*Rhinolophus ferrumequinum*	IUCN LC, FBiH VU, HD II, IV, Res. 6	**CH** 2iae	**CH** 2d	EOO is greater than 20.000 km2; widespread in Bosnia and Herzegovina; widely distributed in both Europe and the Mediterranean region; no estimate of the population size in BiH has been made; inhabits forest habitats and pastures. The Project will not disturb the habitat of the species. Their litters are on house roofs or other warm locations.
51.	Lesser Horseshoe Bat	*Rhinolophus hipposideros*	IUCN LC, FBiH EN, HD II, IV, Res. 6	**CH** 2iae	**CH** 2d	EOO is greater than 20.000 km2; widespread in Bosnia and Herzegovina; no estimate of the population size in BiH has been made; inhabits habitats of preserved structure. The Project will not disturb the habitat of the species. The litters are in habitats where there is no moisture, most often found in abandoned buildings and roofs of houses.
52.	Common Pipistrelle	*Pipistrellus pipistrellus*	IUCN LC, FBiH VU, HD IV, Res. 6	**CH** 2iae	No	EOO is greater than 20.000 km2; widespread in Bosnia and Herzegovina and Europe; no estimate of the population size in BiH has been made; a very flexible species in terms of habitat, inhabiting cities and rural human settlements. The Project will not disturb the habitat of the species. Litters and maternity colonies are found in abandoned buildings.

4 Recommendations and Conclusion

4.1 Summary of CHA Findings

The project is considered to trigger the criteria regarding priority ecosystems for habitats listed in Annex I of the Habitats directive as follows:

- EAAA is habitat type listed in Annex I of EU Habitats directive (HD) – A total of four registered habitats habitats meet this criteria: 3240 Alpine rivers and their ligneous vegetation (*Salix eleagnos*), 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates, 62A0 Eastern sub-Mediterranean dry grasslands and 95A0 High oro-Mediterranean pine forests. The listed EAAAs are priority biodiversity features (PBFs).
- EAAA is habitat type listed in Annex I of EU Habitats Directive marked as „priority habitat type"- Two habitats confirmed during field surveys are (*)priority habitat types: *6220 Pseudo-steppe with grasses and annuals of the Thero-Brachypodietea and 62A0 Eastern sub-Mediterranean dry grasslands. Due to being of large importance for the EU and preserving efforts, EAAA of said habitats are critical habitats (CH).

Regarding the criteria for priority species and their habitat, the project triggers multiple criteria set out by the EBRD.

The first analyzed criterium is Species and their habitats listed in EU Habitat Directive and Birds Directive/Bern Convention – a number of fauna species meet this criteria, for both PBF and CH:

- EAAA for species and their habitats listed in Annex II of the Habitats Directive, Annex I of the Birds Directive, Resolution 6 of Bern convention - two invertebrate, one fish, two reptiles, eight bird and three mammal species meet this criteria and therefore qualify as PBFs. It is important to note that the reptile and mammal species assessed as a part of CHA are listed in both Annex II and Annex IV of the HD; for that reason, said species meet the criteria for CH below.
- EAAA for species and their habitats listed in Annex IV of the Habitats Directive - one invertebrate, three amphibian, 13 reptile and 14 mammal species and their habitats meet the criteria for critical habitat.

Second and third criteria for threatened species are based on conservation status according to IUCN (VU, EN, CR) and FBiH RL (EN, CR). Endangered and critically endangered (IUCN) species were not found during surveys, although several confirmed species are vulnerable. No species and their habitats meet the benchmark for critical habitat; however, several species are PBFs on the following basis:

- EAAA supports IUCN VU species: one invertebrate, two fish and one bird species are vulnerable based on IUCN's assessment and therefore their EAAAs are classified as PBFs.

- The criterion for nationally or regionally listed EN or CR species is met by a total of 12 species, seven of which are plants, one is a bird and four are mammals. These species and their habitats are thus PBFs.

There are no range-restricted species confirmed in the surveyed area, all species have extent of occurrence larger than 50.000 km^2. In addition to this, no IBA or Ramsar sites are located within the project area or the area of 10 km radius.

A total of 31 biodiversity receptors confirmed in the surveyed area meet the criteria for critical habitat, while 21 meet the criteria for PBF. Species satisfying multiple criteria for both CH and PBF are regarded as CH.

The following species and their habitats are CH: southern festoon (*Zerynthia polyxena*), yellow bellied toad (*Bombina bombina*), green toad (*Bufotes viridis*), Greek stream frog (*Rana graeca*), Hermann's tortoise (*Testudo hermanni*), glass lizard (*Pseudopus apodus*), Dalmatian wall lizard (*Podarcis melisellensis*), common wall lizard (*Podarcis muralis*), sand lizard (*Lacerta agilis*), blue-throated keeled lizard (*Algyroides nigropunctatus*), eastern green lizard (*Lacerta viridis*), Balkan green lizard (*Lacerta trilineata*), nose-horned viper (*Vipera ammodytes*), Dahl's whip snake (*Platyceps najadum*), dice snake (*Natrix tessellate*), four-lined snake (*Elaphe quatuorlineata*), Aesculapian snake (*Zamenis longissimus*), wolf (*Canis lupus*), brown bear (*Ursus arctos*), Eurasian lynx (*Lynx lynx*), lesser mouse-eared bat (*Myotis oxygnathus*), whiskered bat (*Myotis mystacinus*), common pipistrelle (*Pipistrellus pipistrellus*), Kuhl's pipistrelle (*Pipistrellus kuhlii*), Nathusius' pipistrelle (*Pipistrellus nathusii*), Serotine bat (*Eptesicus serotinus*), common noctule (*Nyctalus noctula*), Leisler's bat (*Nyctalus leisleri*), free-tailed bat (*Tadarida teniotis*), Greater horseshoe bat (*Rhinolophus ferrrumequinum*) and lesser horseshoe bat (*Rhinolophus hipposideros*). It is important to note that all species besides wolf, brown bear and Eurasian lynx are confirmed. The rationale for including three unconfirmed species of mammals is the expert opinion that habitats present in the surveyed area cannot support their breeding and feeding habits but they occasionally might be used as corridors. Following precautionary approach, mitigation measures will be included in the BMP to reflect our findings.

Species and their habitats that are PBFs are: *Anthyllis vulneraria* subsp. *praepropera*, *Asphodelus fistulosus*, *Crocus dalmaticus*, *Cyclamen hederifolium*, *Opopanax chironium*, *Spiranthes spiralis*, jersey tiger (*Euplagia quadripunctaria*), long-horned beetle (*Morimus funereus*), bullhead (*Cottus gobio*), Adriatic dace (*Squalius svallize*), Neretvan spined loach (*Cobitis narentana*), European turtle-dove (*Streptopelia turtur*), pallid swift (*Apus pallidus*), golden eagle (*Aquila chrysaetos*), western marsh harrier (*Circus aeruginosus*), middle spotted woodpecker (*Dendrocopos medius*), white-backed woodpecker (*Dendrocopos leucotos*), Syrian woodpecker (*Dendrocopos syriacus*), grey-headed woodpecker (*Picus canus*), black woodpecker (*Dryocopus martius*) and red-backed shrike (*Lanius collurio*).

An important thing to note is that wolf (*Canis lupus*), brown bear (*Ursus arctos*) and Eurasian lynx (*Lynx lynx*) are the only species not verified during field surveys to be included in the critical habitat assessment. The rationale for this is that the mentioned species have conservation statuses of concern and are important for both the EU and B&H. Presence of large carnivores was not confirmed and the habitats within the project's area of influence are not thought to be able to support feeding or breeding habits of the species; however, the species have a very large range and project area might be used as a corridor. Therefore, mitigation measures relating to wolf, bear and lynx are proposed as a part of this assessment as well as in BMP.

Based on the requirement of the PR 6 paragraph 15, critical habitat must not be further fragmented, converted or degraded to the extent that its ecological integrity or biodiversity importance is compromised. No net loss of habitats and species that triggered PBF is allowed, and project must be designed to deliver net gains for features that triggered CH. EBRD's requirements can only be achieved through specific and targeted mitigation in line with mitigation hierarchy of avoiding the negative impact to these habitats and species. Mitigation measures for all species of conservation concern have been given in BMP and this ESIA and must be implemented effectively, adequately and timely.

4.2 Mitigation Measures

No net loss of aquatic habitats and species will be achieved through specific and targeted mitigation in line with mitigation hierarchy of avoiding the negative impact to aquatic habitats and species. Mitigation will require preservation of same conditions of the watercourse Neretva without disturbance, preservation of the riparian vegetation and preservation of the flow regime same as the current conditions downstream of the affected area. Fish EAAA, along with all EAAAs of PBFs and CHs are provided in Chapter 5, only the ones directly affected by the project will be assessed below.

Net gain is applicable for the aquatic species as well, however due to the reason that restocking, if not implemented properly, can do more harm to the autochthonous species, restocking with native fish species needs to be implemented by engaging the suitable local biodiversity experts with relevant professional background along with a local fishing society.

Mitigation measures for terrestrial species of conservation concern can be implemented effectively for terrestrial ecology, as given in BMP, whereas below only the main mitigation measures for terrestrial habitats and species are given:

- Due to potential loss of Annex I habitats, it will be needed to include the requirement for habitat revitalization and aforestation after the completion of construction by planting native plant species characteristic for this area (e.g. Dalmatian Laburnum, Bosnian pine, hornbeam, oak etc.) and to prevent the growth and spread of invasive species. In the following section, only the habitats with EAAAs estimated to be under direct impact of the

project will be mentioned and will have accompanying precise mitigation measures.

- Habitat type 3240 Alpine rivers and their ligneous vegetation with *Salix elaeagnos* (PBF) is found near the northern portal of tunnel Prenj (Figure 4.1). Even though it can be assumed no significant construction activies are planned at that point, this habitat must be preserved, and no access roads or movement of machinery is allowed.

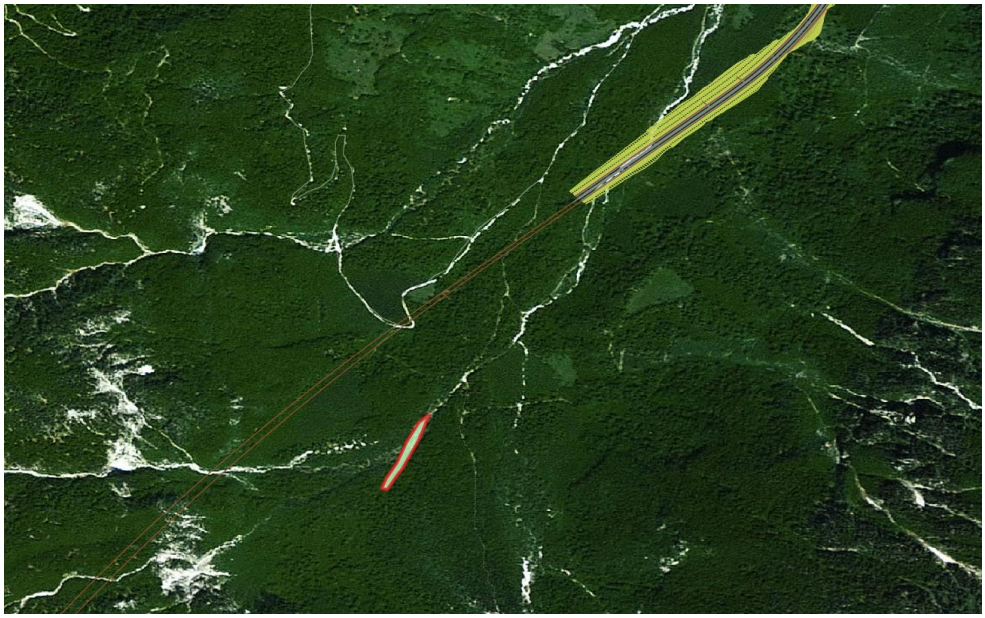


Figure 4.1: EAAA of habitat type 3240 Alpine rivers and their ligneous vegetation with Salix eleagnos *in relation to the north portal of Prenj tunnel*

- Four EAAAs of 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates habitat type (PBF) were found in the project's general area, of which one, located in Ovcari, requires special compensation measures to ensure no net loss. It is positioned in the hilly area above settlement (Figure 4.2). Compensation requirements and recommendations are given in the BMP.

Figure 4.2: EAAA of habitat type 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates in Ovcari

- Habitat type 62A0 Eastern sub-Mediterranean dry grasslands (*Scorzoneratalia villosae*) (PBF) is a common and widespread habitat in this area of Europe. It is also present in the project area, in multiple locations around Konjic and Podgorani. The EAAAs around Konjic will not be impacted by the construction works; however approx 0.03 ha will be under direct impact in Podgorani (Figure 4.3). Net gain must be achieved by revitalization of surrounding habitats according to the recommendations and requirements provided in BMP. It is to be assumed that, due to movement of machinery, a somewhat larger area might be affected, at least 0.05 ha gain of this habitat but be achieved through habitat revitalization and active management.

*Figure 4.3: EAAAs of habitat type 62A0 Eastern sub-Mediterranean dry grasslands (*Scorzoneratalia villosae*) is Podgorani*

- 62A0 habitat type is also present in Kutilivac – approx 100m north of a souther portal of a tunnel. It is assumed that, due to the route passing under the habitat, that no direct impacts will be present. However, precautionary mitigation measure of no machinery movement or destruction o this habitat is allowed in the area.

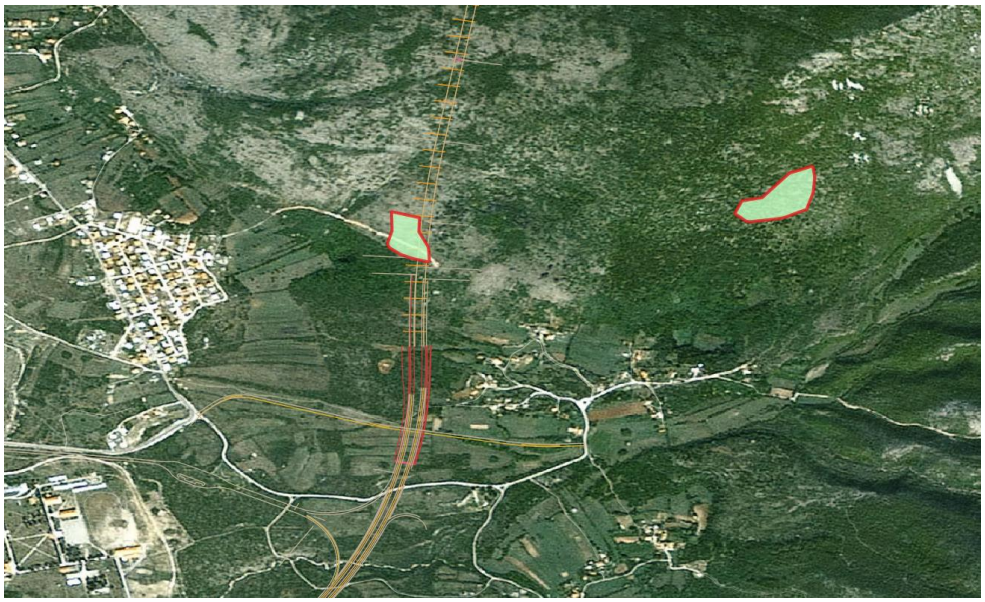


Figure 4.4: EAAA of habitat type 62A0 Eastern sub-Mediterranean dry grasslands (Scorzoneratalia villosae) is Kutilivac

- Priority habitat type *6220 Pseudo-steppe with grasses and annuals of the Thero-Brachypodietea (CH) is found on a number of locations around the planned route, two of which stand our for protection from negative impacts during construction – a total of four EAAAs in Ovcari and Kutilivac. This habitat must not be disturbed during construction. However, due to the fact that the EAAA in Kutilivac are close to the portal of the tunnel (distance of

approx. 100m) some adverse impact might be expected. If any do occur, the Client is obligated to conduct revitalization of said habitats in a larger area than area lost.

*Figure 4.5: EAAAs of *6220 Pseudo-steppe with grasses and annuals of the Thero-Brachypodietea habitat type in Ovcari*

*Figure 4.6: EAAAs of *6220 Pseudo-steppe with grasses and annuals of the Thero-Brachypodietea habitat type in Kutilivac*

- Plant species *Spiranthes spiralis* is a PBF therefore ther must not be a loss of this species or its habitat. Two EAAAs are positioned in a way that makes them possibly succept to adverse impact of motorway construction. Precisely, they are located in Humilisani, approx 1,400 m and 2,800 m via existing R435a road away from the planned route (Figure 4.7). Due to the

fact that these existing roads will likely be used as access roads, it is important not to allow the machinery to exit the roads and widen them.

Figure 4.7: Two EAAAs of Spiranthes spiralis in Humilisani in relation to the motorway route

- Species *Anthyllis vulneraria* L. subsp. *praepropera* is a PBF as well and two EAAAs might be impacted by the project. No loss of habitats marked in Figure 4.8 and Figure 4.9 are allowed.

Figure 4.8: Anthyllis vulneraria *L. subsp.* praepropera *EAAA north of Podgorani in relation to the motorway route*

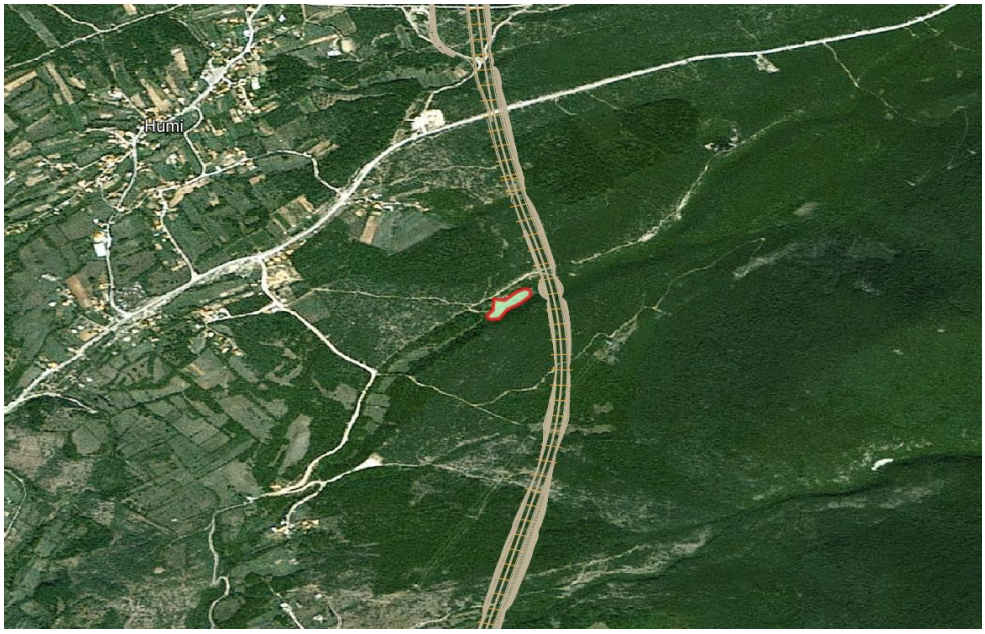


Figure 4.9: Anthyllis vulneraria *L. subsp.* praepropera *EAAA in Humilisani in relation to the motorway route*

- *Crocus dalmaticus* is a plant species qualifying for PBF due to being endangered in FBiH. The project will not impact the conservation status of this species due to two small EAAAs being located in project's impact area (Figure 4.10). It can be assumed that, due to their position, no habitat loss will be caused.

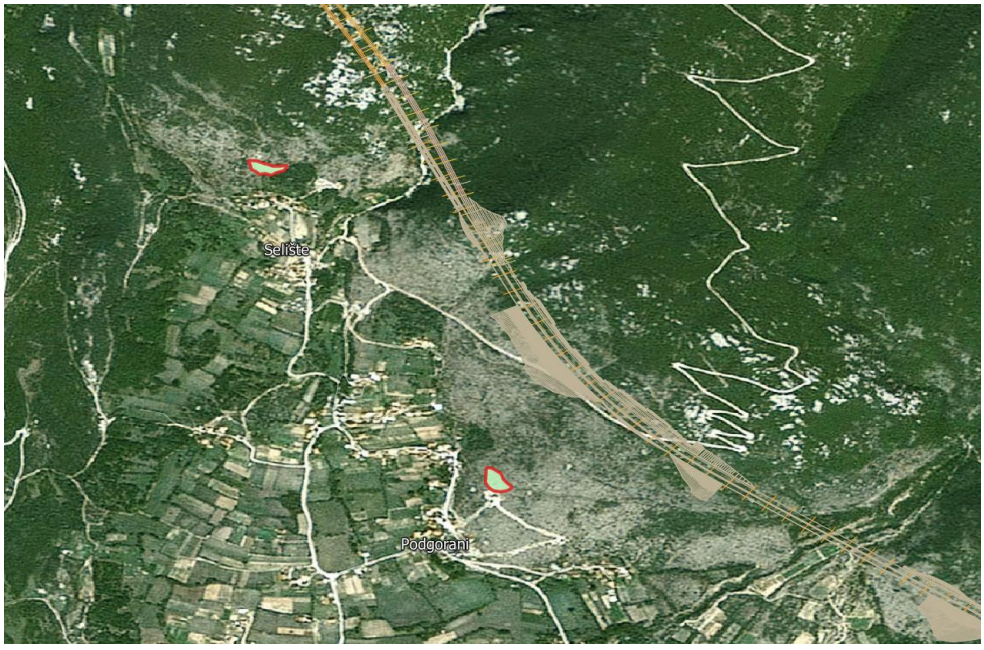


Figure 4.10: Crocus dalmaticus *EAAAs in Podgorani*

- *Cyclamen hederifolium* is a PBF (CR in FBiH). Based on the available literature research and field surveys, this species has been found in BiH at about 20 localities. EAAA size is 0.25km^2. Anticipated project activities unlikely to significantly impact the long-term survival of the species. There

are multiple EAAAs of this species located directly on the footprint (Figure 4.11), meaning that there will be unavoidable loss of this species' habitat. The Client must ensure there is no net loss by avoiding any impact where possible, revitalization of all affected habitats and net gain of said habitats in the amount of at least 1 ha.

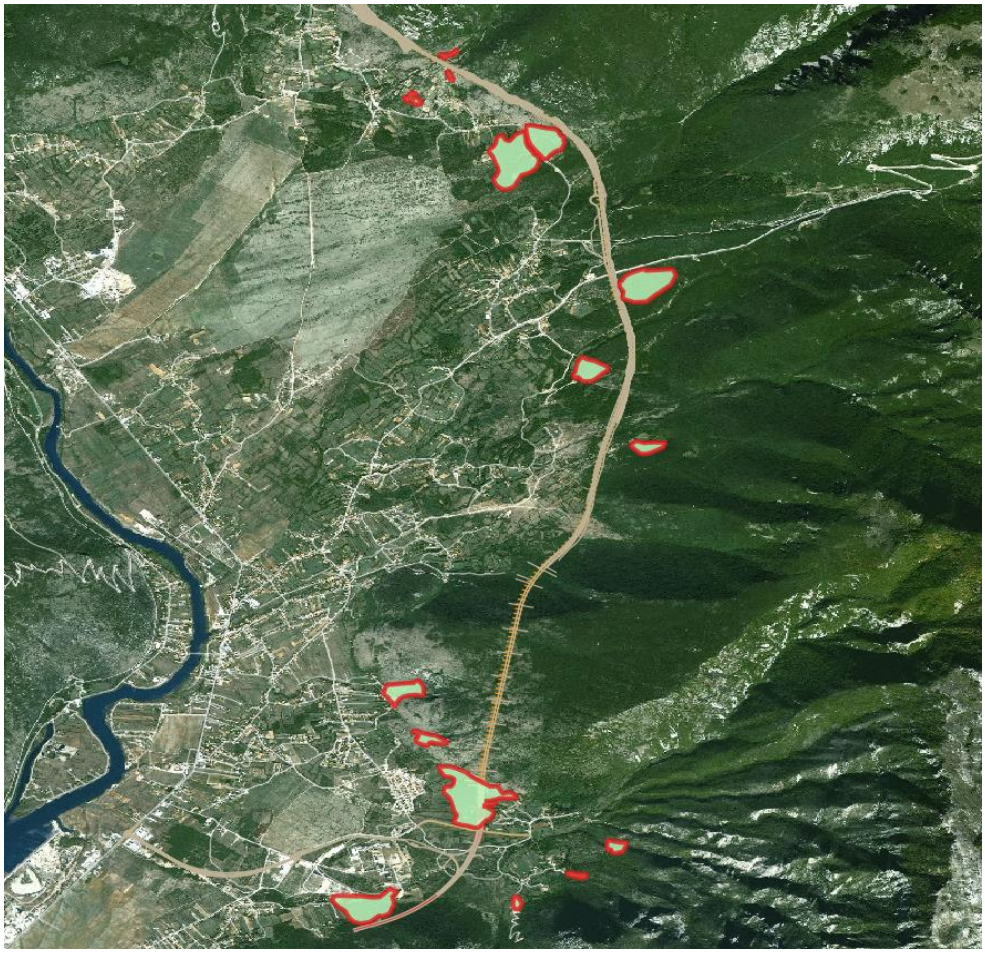


Figure 4.11: EAAAs of Cyclamen hederifolium *in relation to the motorway route*

- Regarding invertebrates assessed as a part of the CHA (one CH, two PBF), due to the wide distribution of found species and the possibility of subsequent recolonisation of habitats, no significant irreversible negative effects are expected. The species *Zerynthia polyxena* (CH) was found in Podgorani. Areas inhabited by this species are open meadow habitats. Opening of forest habitats, provided that the area is maintained in a way to promote the development of meadows rather than lawns along the motorway, can lead to an increase in open micro-habitats of this species. This is the case for *Euplagia quadripunctaria* (PBF) as well; while *Morimus funereus* (PBF) depends on preserved forest areas, old beech and oak trees. During cutting down of trees in the belt of the route, at least 5% of trees are to be stacked in piles that will remain in the area along the route to ensure that individuals developing in the trees complete the cycle.

Whenever possible, avoid unnecessary cutting of older trees and removal of dead wood.

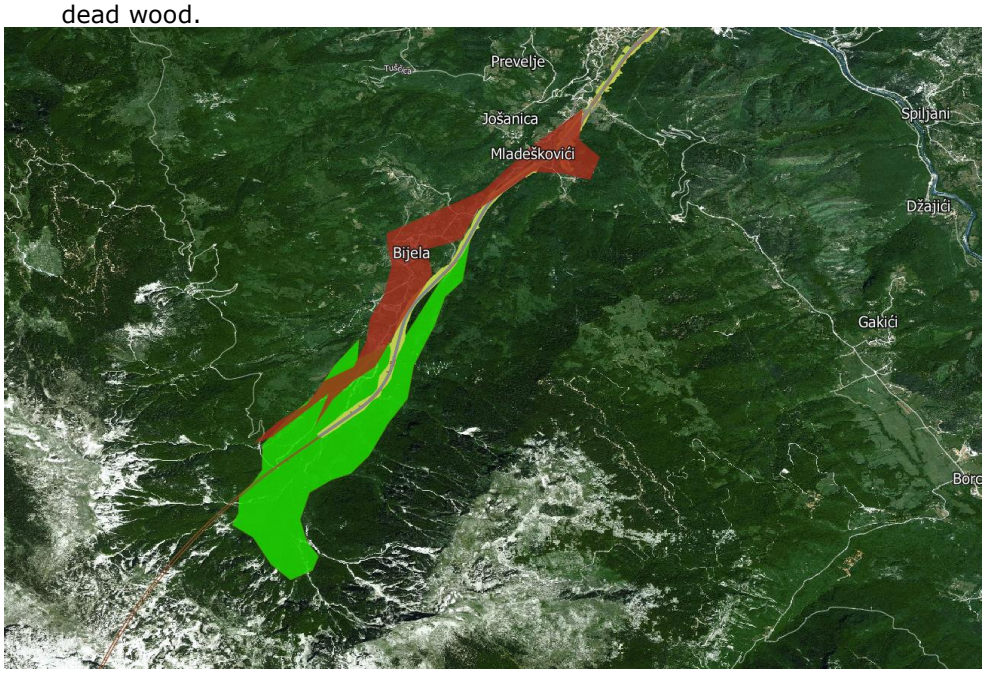


Figure 4.12: Invertebrate EAAAs north of Prenj tunnel

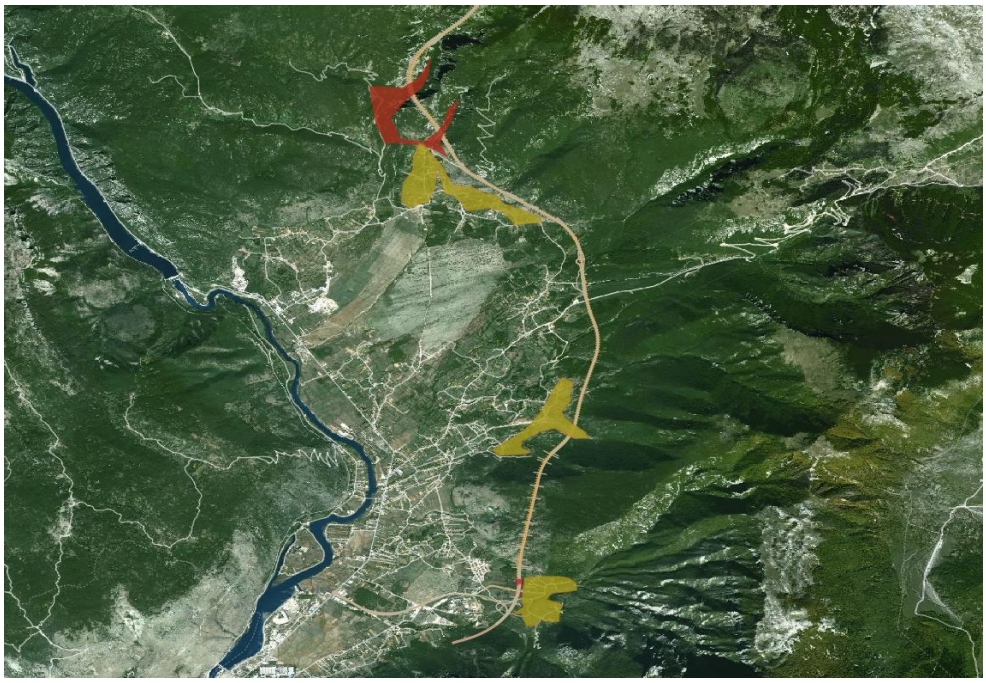


Figure 4.13: Invertebrate EAAAs south of Prenj tunnel

- Habitats of reptiles are dominant in the area south of Prenj tunnel, while amphibian habitat dominate in the area noth of the tunnel due to more humid climate and more watercourses and streams. All of the registered species listed in Table 2.4 are either PBFs or CHs meaning them or their habitats must not suffer loss of, additionally, have net gain.
  - Avoid habitat destruction and alteration outside of the defined Project footprint to the best extent possible.

- There must be no loss of amphibians or reptiles of conservation importance. If found, they must be relocated by a qualified and experiences ecologist to the appropriate pristine and safe habitat nearby.
- It is necessary to perform daily checks for the presence and removal of individuals of the species Hermann's tortoise (*Testudo hermanni)* within the motorway section under construction, and, if species are found, safely remove them from the area to the habitat of the same type away from machines, local roads and other dangers. EAAA of said species is shown in Figure 4.14 and, despite the EAAA and Project footprint not overlapping, a walkover of the construction site in search for individuals must be performed as they are numerous in the area and might find their way into the site.

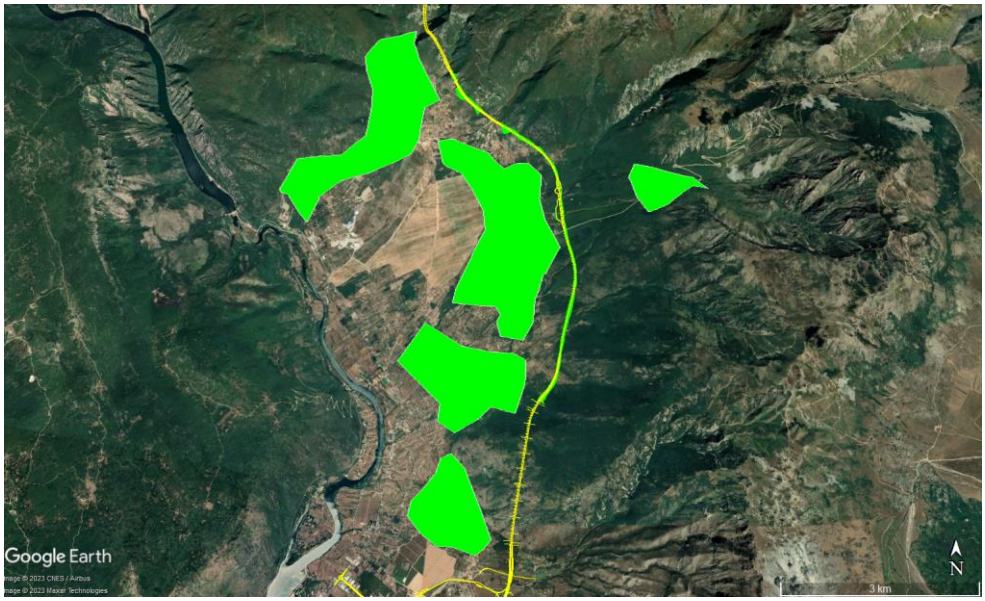


Figure 4.14: Hermann's tortoise EAAA

- Fragmented and small habitats, suitable for amphibians found in the area of Konjic bypass, Ovcari, Mladeskovici, Klenova draga, Zelenika and Bosnjaci (coordinates are provided in Annex C-2: Herpetofauna) must not be disturbed by heavy machinery during construction (Figure 4.15 and Figure 4.16).

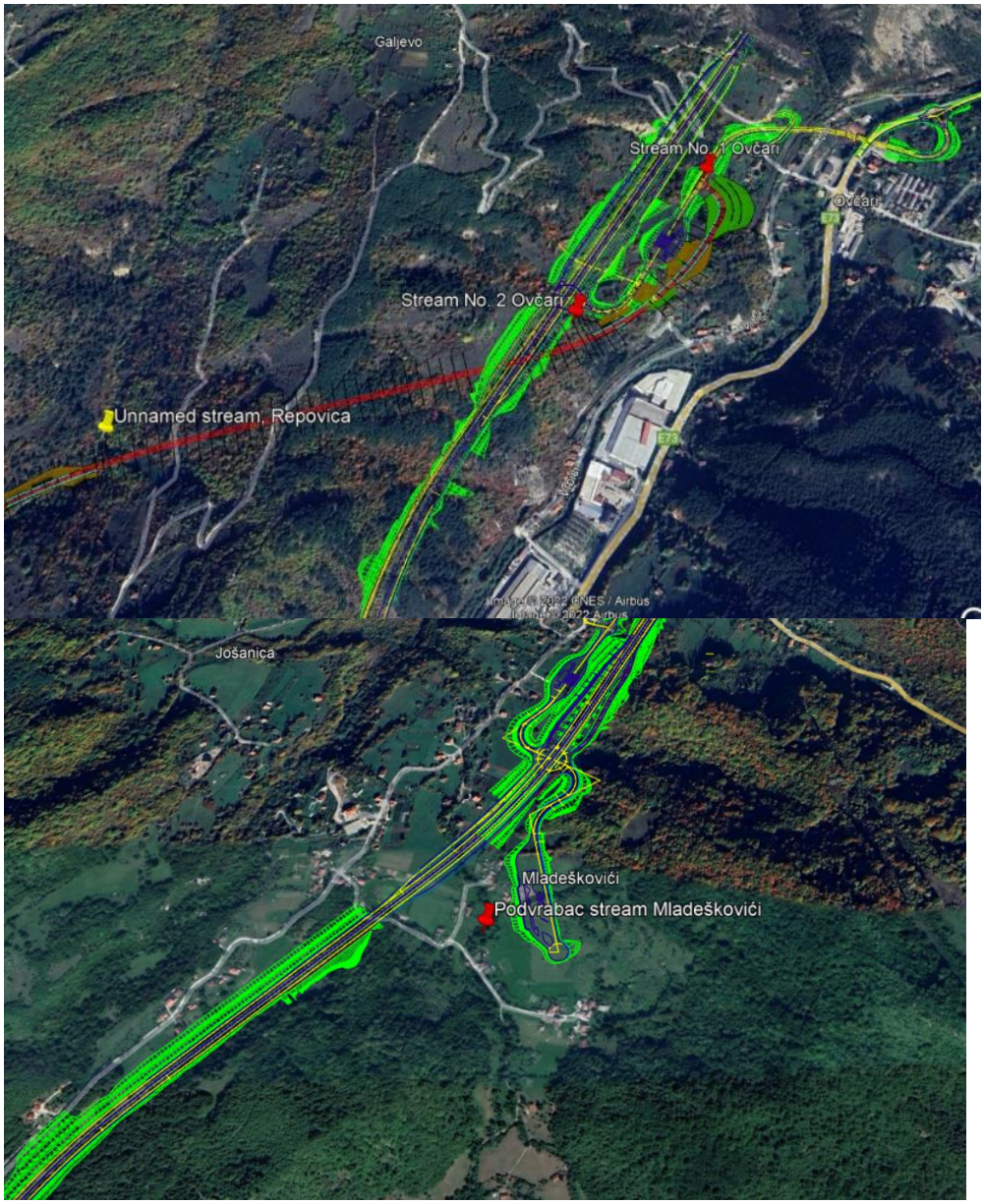


Figure 4.15: Amphibian breeding sites north of Prenj tunnel

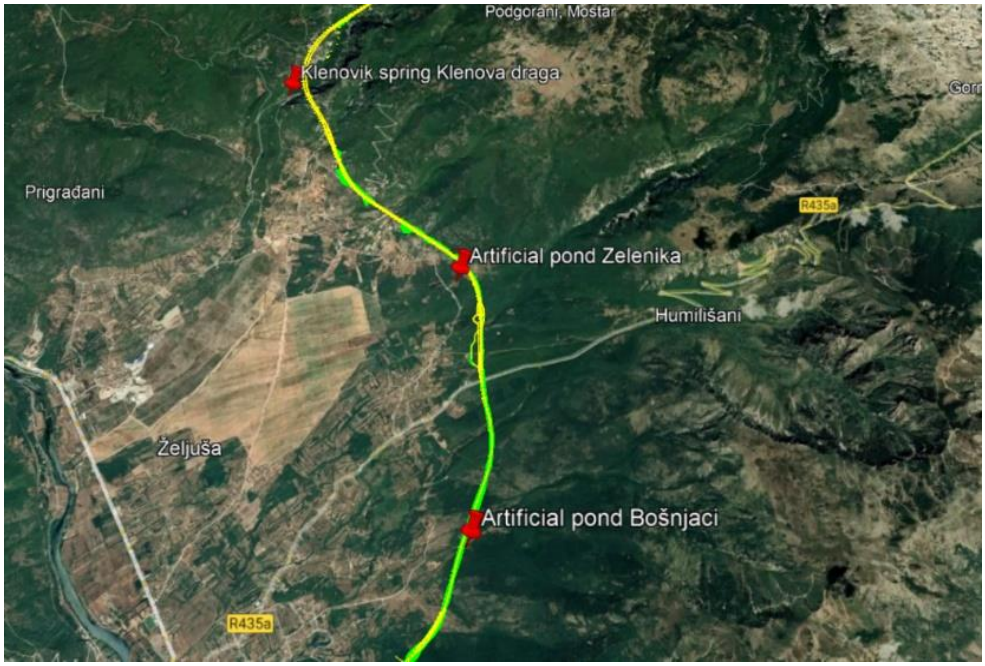


Figure 4.16: Amphibian breeding sites south of Prenj tunnel

- In aforementioned locations, due to identification of a large number of amphibians and potential habitat fragmentation, tunnels should be set up to allow the unimpeded passage of animals.

- When it comes to ornithofauna, in order to preserve the bird population in the referenced area, it is necessary to apply the following mitigation measures during the construction phase:
  - It is necessary to install protective panels on the bridges over the Tresanica River in Ovcari, over the Neretva River and in Mladeskovici. At these localities, a high frequency of birds feeding high in the sky is noticeable, which is why it is possible for them to get hurt due to collisions with moving cars. Protective panels must be placed on both sides of the road at a height of 1.5 m. In order to reduce the collision of birds with protective panels, it is necessary to stick black and white foil over the transparent plexiglass, which increases the visibility of the panels for birds, or silhouettes of birds of prey, which would scare the birds and move them away from the route.
  - On the part of the route prior to entering the Prenj Tunnel in the zone of direct impact, one territory of the white-backed woodpecker and two territories of the black woodpecker have been registered (Figure 4.17). Both species are indicators of old and preserved forests with a lot of rotten trees on the ground. In order to protect these species, it is necessary to reduce removal of the forest cover to the required minimum.

*Figure 4.17: Pinned territory of white-backed woodpecker (*Dendroocopos leucotos*) in relation to the planned motorway route*

- In the area of Klenova Draga, an abandoned nest of a Golden Eagle and one individual flying over K. Draga has been registered (Figure 4.18). If it is established that in the following seasons the couple is active at the given locality, it is necessary to apply a number of protective measures:
  - There are no access roads for the transport of machinery and materials for the construction of the motorway at the given locality. It is necessary to break through the access roads in the off-breeding period from July to February, i.e. to suspend the works from the beginning of incubation to the take-off of the fledglings (beginning of March-end of June).
  - Remove trees from access roads only to the width of the road. The existence of a living barrier made of trees will significantly absorb noise, and tree canopies will reduce the visibility of machines, which could reduce the negative impact of disturbance.
  - If a pair stays in the nest during the motorway construction phase by putting motorway into operation, there will probably be no major negative impacts on this nesting pair.

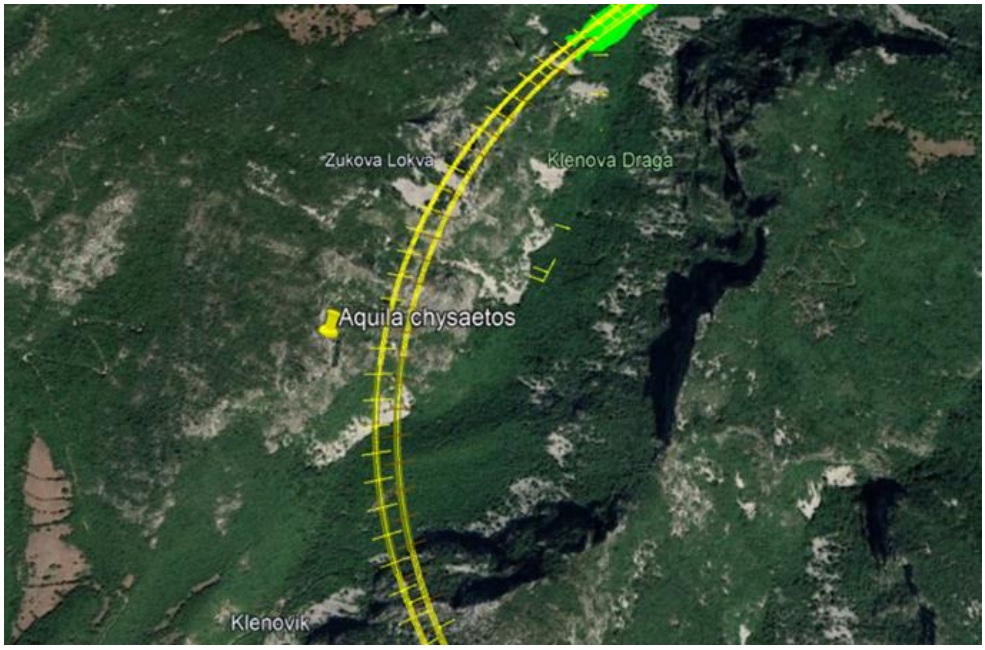


*Figure 4.18: Location of the inactive nest of golden eagle (*Aquila chrysaetos*) in relation to the planned motorway route*

- On the chainage between 26+800 and 26+950, it is necessary to remove woody vegetation on the right side of the route within the 50 m belt, where one territorial male turtle dove, a vulnerable species according to IUCN status, was found (Figure 4.19).

*Figure 4.19: Territory of male turtle dove (*Streptopelia turtur*) in relation to the planned motorway route; white line marks the transect line*

- On the part of the route between 24+100 km and 31+100 km, the habitat is dominated by garrigue with thorns and wild pomegranate, as well as young, dense, low coppice forests of white hornbeam, thorns and black ash. No species of birds that feed by hunting in low flight above the ground have been registered in this area. Singing birds inhabiting thickets and shrubs are present. The noise made by cars is a

very important factor that negatively affects the reproductive success of these species. Singing males, due to noise, are less noticeable and harder to find females. It is desirable to remove woody and shrubby vegetation in the belt of 30-50 m on both sides of the route and maintain this condition in the future. Removal of vegetation will make habitats less tempting and cars will be easier to spot, which should reduce bird mortality due to collisions with moving cars.

- In order to prevent adverse impact to bat species, which all meet the criteria for critical habitat (Figure 4.20), measures presented in Biodiversity Management Plan regarding development of Main Design and planning of construction works must be respected:
  - Deforestation should be reduced to a minimum, only the necessary interventions required for the implementation of project activities. Due to the fact that bats use forests as a shelter, reforestation with autochtonous species is necessary.
  - No roost sites have been identified during desk or field surveys. Their potential destruction would be an unaccaptable loss of biodiversity therefore if any are found during construction, a biodiversity expert must be included in planning of adverse impacts mitigation such as relocation to alternative sites.

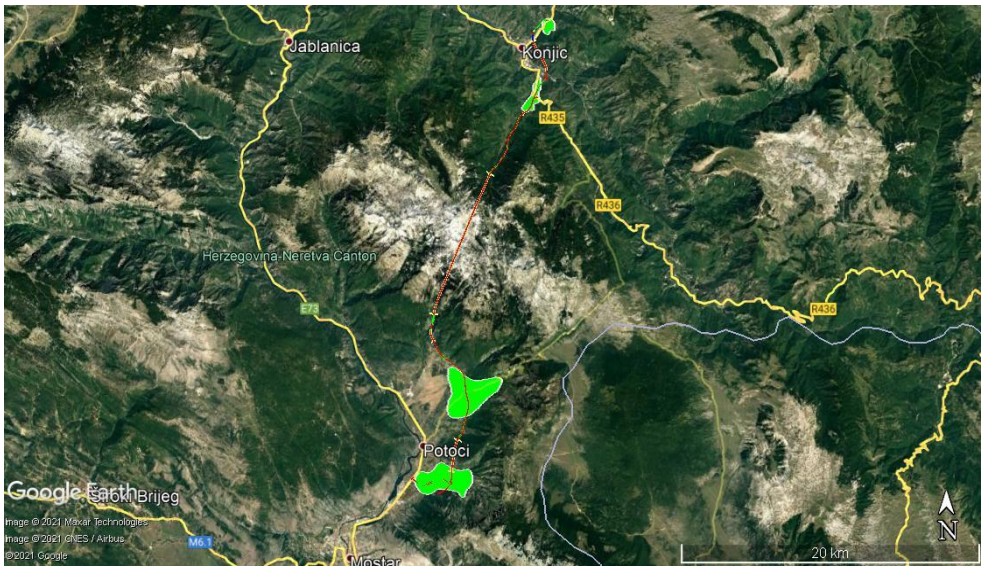


Figure 4.20: Bat EAAAs were aggregated due to siginificant overlap

In general, other main mitigation measures are:

- adequate planning of works is essential to maintaining the good state of biodiversity receptors,
- conduct rapid biodiversity assessment if the pre-construction phase doesn't begin within three years after completion of field surveys as a part of this project (surveys were finalized in the beginning of june 2021) in order to establish whether any changes occurred and, if they have, to respond adequately,
- develop and implement Invasive Species Management Plan, Land and Habitat Restoration Plan

- timely implement the set of mitigation measures listed in the BMP,
- conduct monitoring as defined in BMP,
- promote the aim of no net loss of biodiversity, and tend to achieve a net gain of biodiversity (implement tree planting, restocking of fish and construct open channels for fauna where proposed by the BMP),
- properly recultivate the construction waste landfills, by using autochthonous species in order to preserve the domestic gene pool.

4.3 Residual impacts

For the purpose of the CHA report, residual impacts refer to those biodiversity impacts predicted to remain after the application of mitigation measures, either in construction or operation phase. The following table summarises the **identified significant biodiversity impacts** and their assessment after implementation of mitigation measures. With adequate, timely and strict application of mitigation measures, along with the ones propsed in the BMP, impacts cannot be fully mitigated. Due to permanent nature of the object, some habitats will be inevitably lost by the construction residual impacts are expected.

Table 4.1: Residual impacts

Phase	Identified impact	Impacts evaluation/ significance before mitigation	Proposed mitigation measures	Assessment of impacts after mitigation	Residual impact after mitigation
Habitats					
Pre-construction	Adverse impacts due to inadequate planning of works and Main Design requirements	Major / Significant	19.1.1 in ESMP, BMP	If the Main Design is developed to include revitalization of habitats after the construction is finalized with planting autochthonous plant species characteristic for the area and prevent growing and spread of invasive species and if mitigation measures given in BMP are implemented, this impact will be fully mitigated.	No
Pre-construction	Lack of up-to-date baseline	Major / Significant	19.1.2 in ESMP, BMP	The impact can be fully mitigated by	No

Phase	Identified impact	Impacts evaluation/ significance before mitigation	Proposed mitigation measures	Assessment of impacts after mitigation	Residual impact after mitigation
	conditions			conducting surveys as given in the ESMP and BMP.	
Construction	Loss of habitats due to preparation of the construction site and performing construction works	Major / Significant	19.1.3 in ESMP, BMP	With implementation of the proposed measures, it is not possible to fully mitigate this measure. This impact is considered to be the project permanent impact. PBFs and CHs recorded in the Project area will likely be under adverse pressures of different nature. These pressures can be partly mitigated by the proposed measures; however, some of the features will be under direct and unavoidable impact due to their position in relation to the planned motorway route. This residual impact is not acceptable as is, and compensation will have to be included.	Yes
Construction	Potential additional unplanned disturbance of habitats	Moderate / Significant	19.1.3 in ESMP, BMP	If the mitigation measures given in BMP are implemented, this impact will be fully	No

Phase	Identified impact	Impacts evaluation/ significance before mitigation	Proposed mitigation measures	Assessment of impacts after mitigation	Residual impact after mitigation
				mitigated.	
Construction	Spread of invasive species	Moderate / Significant	19.1.4 in ESMP, BMP	The impact can be fully mitigated by conducting surveys as given in the ESMP and BMP.	
Operation	Habitat fragmentation	Moderate / Significant	19.1.5 in ESMP, BMP	With implementation of the proposed measures, it is not possible to fully mitigate this measure. This impact is considered to be the project permanent impact. Compensational measures will have to be implemented as given in the BMP.	Yes
Vegetation and flora					
Pre-construction	Adverse impacts due to inadequate planning of works	Moderate / Significant	19.1.6 in ESMP, BMP	If the Main Design is developed to include Invasive Species Management Plan to prevent growth and spread of invasive species and if mitigation measures given in BMP are implemented, this impact will be fully mitigated.	No
Pre-construction	Lack of up-to-date baseline conditions	Moderate / Significant	19.1.6 in ESMP, BMP	The requirements regarding updating baseline conditions are given in the	No

Phase	Identified impact	Impacts evaluation/ significance before mitigation	Proposed mitigation measures	Assessment of impacts after mitigation	Residual impact after mitigation
				BMP. If they are completed as required, the impact will be fully mitigated.	
Construction	Vegetation removal and clearance of flora species in the phase of preparation of construction site and during the performance of construction works	Moderate / Significant	19.1.7 in ESMP, BMP	With implementation of the proposed measures, it is not possible to fully mitigate this measure. This impact is considered to be the project permanent impact. Due to this reason, the Project requires compensation as given in the BMP.	Yes
Fauna					
Pre-construction	Adverse impacts due to inadequate planning of works and Main Design requirements	Major / Significant	19.1.9 in ESMP, BMP	If the Main Design is developed to include protective bird panels and to avoid any possible roosts and hibernations sites, and if mitigation measures given in BMP are implemented, this impact will be fully mitigated	No
Pre-construction	Lack of up-to-date baseline conditions	Moderate / Significant	19.1.10 in ESMP, BMP	The requirements regarding updating baseline conditions are given in the BMP. If they are completed as required,	No

Phase	Identified impact	Impacts evaluation/ significance before mitigation	Proposed mitigation measures	Assessment of impacts after mitigation	Residual impact after mitigation
				the impact will be fully mitigated.	
Construction	Disturbance of fauna	Moderate / Significant	19.1.11 in ESMP, BMP	This impact is temporary and might cause reversible change in fauna behaviour. If the mitigation measures given in BMP are implemented, this impact will be fully mitigated.	No
Construction	Potential disturbance of nests/roosts of species that have a seasonally variable vulnerability due to breeding, feeding times or seasonal migrations	Moderate / Significant	19.1.12 in ESMP, BMP	If the mitigation measures given in BMP are implemented, this impact will be fully mitigated.	No
Construction	Potential fatalities or injuries of fauna species due to vegetation removal and movement of heavy machinery	Moderate / Significant	19.1.13 in ESMP, BMP	If the mitigation measures given in BMP are implemented, this impact will be fully mitigated.	No
Operation	Habitat fragmentation	Moderate / Significant	19.1.14 in ESMP, BMP	Assuming successful implementation of mitigation measures, and maintenance of amphibian funnels and passages under the viaducts, this impact can be fully	No

Phase	Identified impact	Impacts evaluation/ significance before mitigation	Proposed mitigation measures	Assessment of impacts after mitigation	Residual impact after mitigation
				mitigated.	

Residual impacts on CH and PBF are not acceptable by the EBRD and EIB. If the mitigation hierarchy is implemented and the impacts cannot be avoided, minimized and/or mitigated, biodiversity compensation (offset) is required. The table below provides the list of CH/PBF that will be directly impacted and gives information on how the residual impact will be compensated. Further details on compensation strategy are provided in Chapter 7 of the BMP as a part of framework given for the Biodiversity Offsetting Plan. The units of measure for impact assessment must be consistent with those for measuring the benefits of a biodiversity offset. They should reflect both the quantity and quality of the feature. For example, if a threatened species' habitat is measured, its extent as well as its quality relative to the species' optimal habitat requirements are important to consider. In this case, quality (Q) might be expressed as a coefficient (0-1) multiplied by the area (e.g., hectares), providing the unit of measure Qha. For the habitat types and species' habitats where it was possible to estimate the net gain in hectares at this moment, the quality and size of the area needed to achieve NNL/NG was provided.

Table 4.2: Summary of needed compensation for residual impacts on PBF/CH

Biodiversity receptor	Impact description	Impacted area (ha)	Residual impact	Habitat quality	Compensation measure	Acceptable if BMP measures implemented?
Habitats						
6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates	Direct habitat loss	0.17	Yes	0.25	This habitat type is of very low quality and already disturbed by forest fires that occurred on this habitat and adjacent black pine forests in April 2020. This provides an opportunity to enhance biodiversity and compensate for lost habitat on site. Seminatural grasslands require low intensity or extensive management to maintain their nature conservation value. JPAC must try to reach an agreement with farmers in the immediate vicinity (if any, that information shall be available upon completion of LARP) regarding farmers bringing a limited number (up to three individuals) of domestic farm animals to the site to graze on the grass for 10-15 weeks of the year. If that is not possible, mowing of the grass and removal of leaf litter as a part of regular motorway maintenance is to be performed in order to prevent succession.	Yes
62A0 Eastern sub-Mediterranean dry grasslands (*Scorzoneratalia villosae*)	Direct habitat loss	1.1	Yes	0.5	The establishment, maintenance and management of the site is comparable to the 6210 habitat type. Grasslands are prone to succession process and	Yes

Biodiversity receptor	Impact description	Impacted area (ha)	Residual impact	Habitat quality	Compensation measure	Acceptable if BMP measures implemented?
					regular maintenance and mowing is needed. As the area intended for conversion into grassland is adjacent to the habitat, it can be safely assumed species shall spread naturally as conditions for their establishment are met. Review of satellite imagery has shown that succession and densification of shrubs in the area is evident. By cutting down of the shrubs of low conservation value and doing in regularly in June every year, the succession process shall be stopped, and grassland habitats enhanced.	
Invertebrates						
Zerynthia polyxena	Direct habitat loss Habitat fragmentation	1.45	Yes	0.5	In order to compensate for habitat lost, measures to be implemented are targeted to the habitat *Z. polyxena* inhabits. Total od 1.45 ha will be directly impacted, while 3.6 ha will be fragmented. Residual impact of the project is calculated at (1.45 ha + 3.6 ha) * 0.5 Q = 2.52 Qha. Offsetting minimum is 2.52 Qha / 0.75 Q = 3.36 ha (or 5.05 ha if like-for-like). Restoration and management of suitable habitat in the general Project area is needed by introducing the plant species *Aristolochia clematitis* – European birtwort since this plant species is essential for the life cycle of *Z. polyxena*. The	Yes

Biodiversity receptor	Impact description	Impacted area (ha)	Residual impact	Habitat quality	Compensation measure	Acceptable if BMP measures implemented?
					potential locations for implementation of this offsetting strategy are the habitats adjacent to the identified EAAAs as they would be of comparable quality and such compensation would be like-for-like (or better). Additionally, formation of wet habitats along streambeds to form microhabitats (wet meadows) as habitats suitable for the host plant would result in creation of habitats of very good quality (0.75) and therefore the area needed for compensation would be at least 3.36 ha.	
Euplagia quadripunctaria	Direct habitat loss Habitat fragmentation	21.14	Yes	0.5	Approximately 21.14 ha of *Euplagia quadripunctaria* habitat is located on the project footprint and will be inevitably lost by the motorway and access road construction - 17.43 ha in Mladeskovici and 3.71 ha in Klenova Draga to be impacted by an access road. Measures are related to habitat revitalization. It is necessary to do additional revitalization with native herbaceous plants (eg. *Rubus fructicosus*) and forming hedgerows near the edge of the forest. The exact calculation of area available for habitat gain is difficult to calculate at the moment, as not all structures that will need forest and vegetation clearance are known. Approximately 13.35 ha in	Yes

Biodiversity receptor	Impact description	Impacted area (ha)	Residual impact	Habitat quality	Compensation measure	Acceptable if BMP measures implemented?
					Konjicka Bijela and 8 ha in Klenova Draga will be suitable for habitat (re)instatement efforts enabled by vegetation clearance and creation of open habitats for the species by the construction works.	
Morimus funereus	Direct habitat loss Habitat fragmentation	15.22	Yes	0.75	Since this species inhabits beech and oak forests, and as during the construction of access and auxiliary roads, their removal may occur, no less than 5% of cut beech and oak trees, stacks and piles are required. This action ensures that individuals developing in pilled trees can complete their life cycle	Yes
Reptiles						
Pseudopus apodus	Direct habitat loss Habitat fragmentation	26.98	Yes	0.5	Compensation for aforementioned species can be done on one site as they share a very similar scrubby habitat. The size of the proposed area is approx. 32.6 ha. This is an area with overgrown vegetation and going through succession due to change in human activities in the area (especially reduced grazing and agricultural activities). Afforestation and grazing abandonment in steppe-like grasslands alters the characteristics of open natural areas. Species of open habitats have virtually disappeared from the general area	Yes
Podarcis melisellensis						Yes
Lacerta trilineata						Yes
Algyroides nigropunctatus		20	Yes	0.25		Yes
Vipera ammodytes		14.3	Yes	0.5		
Platyceps najadum		2.83	Yes	0.25		

Biodiversity receptor	Impact description	Impacted area (ha)	Residual impact	Habitat quality	Compensation measure	Acceptable if BMP measures implemented?
					surrounding the project due to abandonment. The proposed strategy of clearing tertiary vegetation and trees to revitalize the original habitat and create a mosaic of diverse types of vegetation is a good approach to support the target species and promote biodiversity. Not all trees are to be removed. Mosaic habitats with different type of vegetation are high in species diversity and can support a high number of species. In this way, species already inhabiting this area will remain, and new ones will appear. Such management must be performed at least 100 m from the regional road and the motorway (besides the thin strip connecting this area to the reptile passage) to prevent fauna fatalities. Through removal of overgrown vegetation and installing at least 100 m of drywalls, net gain of habitats for aforementioned reptiles and the turtle dove would be ensured. Habitat connectivity is to be ensured by one of the reptile tunnels that is to be constructed as elaborated in the BMP Chapter 5.3.2. Maintenance programme must be developed and strictly implemented permanently as any non-compliance	

Biodiversity receptor	Impact description	Impacted area (ha)	Residual impact	Habitat quality	Compensation measure	Acceptable if BMP measures implemented?
					will result in rapid succession.	
Podarcis muralis	Direct habitat loss	Approx. 90	No	0.75	Compensation for this species is not necessary. *Podarcis muralis* is a species mainly dominant in urban and suburban environments, present in rocky habitats, around buildings, road and rail infrastructure. Construction of the motorway will affect its existing habitats but the species is adaptable and the motorway surroundings present a suitable habitat for the species that will enable them to inhabit such areas. Therefore, there will be no net loss.	Yes
Lacerta agilis	Direct habitat loss	0.37	Yes	0.5	Compensation targeted at this species is not necessary. Through compensation for habitat type 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates, habitat for this species will be created.	Yes
Lacerta viridis	Direct habitat loss	Approx. 70	No	0.5	Compensation for this species is not necessary as the construction of motorway will create new habitats and not targeted measures need to be implemented.	Yes
Birds						
Streptopelia turtur	Direct habitat	0.2	Yes	0.25	Please see above.	Yes

Biodiversity receptor	Impact description	Impacted area (ha)	Residual impact	Habitat quality	Compensation measure	Acceptable if BMP measures implemented?
	loss					
Woodpeckers	Direct habitat loss	10	Yes	0.75	Expert opinion is that its territory will not be directly impacted, however, approx. 10 ha of forest and potential habitat of woodpeckers will be removed in its general surroundings. It is important to ensure that the habitat of the white-backed woodpecker is not lost or degraded, even if the territory is not directly impacted. Due to this, no net loss must be assured. Woodpeckers are under the pressure from forest management that is not line with preservation of its habitat, especially extensive logging. Designating a core habitat for the woodpeckers, where logging is forbidden and the forest is managed to meet their conservation needs, is a good alternative strategy to achieve no net loss. This approach will help to maintain the existing habitat of the woodpeckers and prevent any further loss.	Yes
Bats	Disturbance and light polution		Yes	0.5	Reforestation with autochtonous species is necessary. Regarding the light pollution, it is necessery to provide alternative roosts nearby the construction site. Alternative roosts in form of dark chambers. Bat hop-over on chainage 10+580.00 to	Yes

Biodiversity receptor	Impact description	Impacted area (ha)	Residual impact	Habitat quality	Compensation measure	Acceptable if BMP measures implemented?
					ensure habitat connectivity.	

4.4 Monitoring Requirements

It is important to emphasize the CHA and BMP are living documents that will need to be updated and revised to reflect any new findings in the period prior to and during preconstruction phase. As new findings are collected these two documents will require updating to reflect the additional data and adjusting the mitigation measures, which need to be agreed by the EBRD.

Further, any changes to the need for offsets or mitigation measures will be publicly disclosed.

Should any threatened species or habitats, or species and habitats of conservation concern be identified before or during preconstruction period, CHA and BMP update must include additional mitigation measures to ensure no net loss and net gain of biodiversity. BMP needs to be updated prior to finalisation of the Main Design to enable potential additional mitigation measures to be included in the Main Design.

The scope and the timing of the required monitoring is defined in BMP.

Due to the complexity on biodiversity features and ecosystem services, the aim will be to adopt a practice of adaptive management in which the implementation of mitigation and management measures are responsive to the changing conditions and the results of monitoring throughout the Project's lifecycle. This BMP should therefore be reviewed on an annual basis during the construction phase in order to review the mitigation contained herein.

The plan will be reviewed in conjunction with the following stakeholders:

- JPAC (including Head of Project)
- Contractor's Representative – qualified biologist/ecologist and
- Supervising Authority
- The EBRD.

5 Annex

5.1 EAAAs of PBFs

5.1.1 Habitats

Figure 5.1: EAAA of 3240 above the north portal of Prenj tunnel

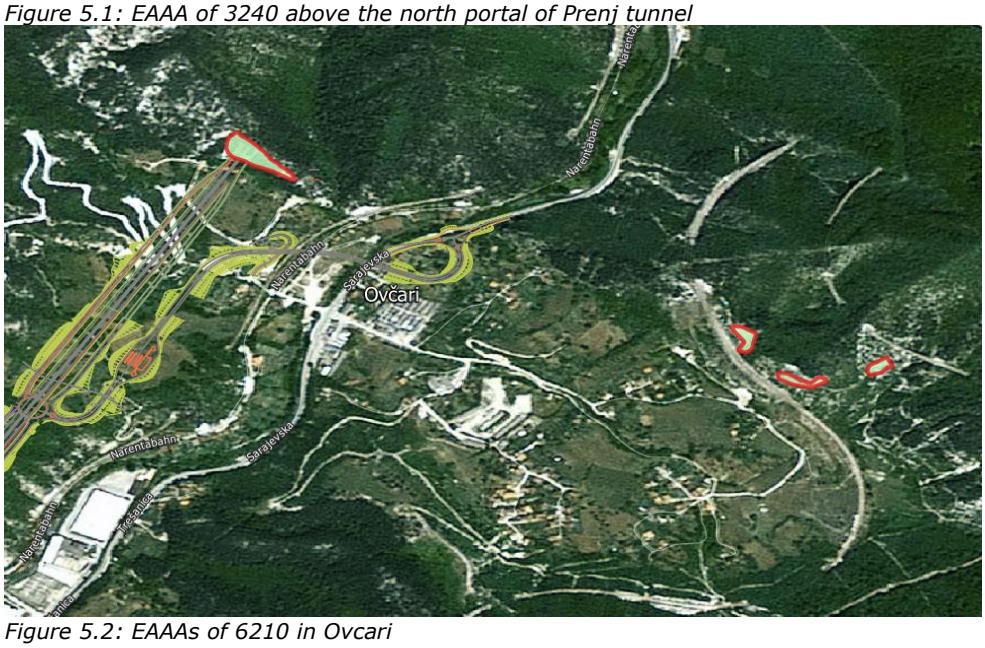


Figure 5.2: EAAAs of 6210 in Ovcari

Figure 5.3: EAAAs of 62A0 in Ovcari

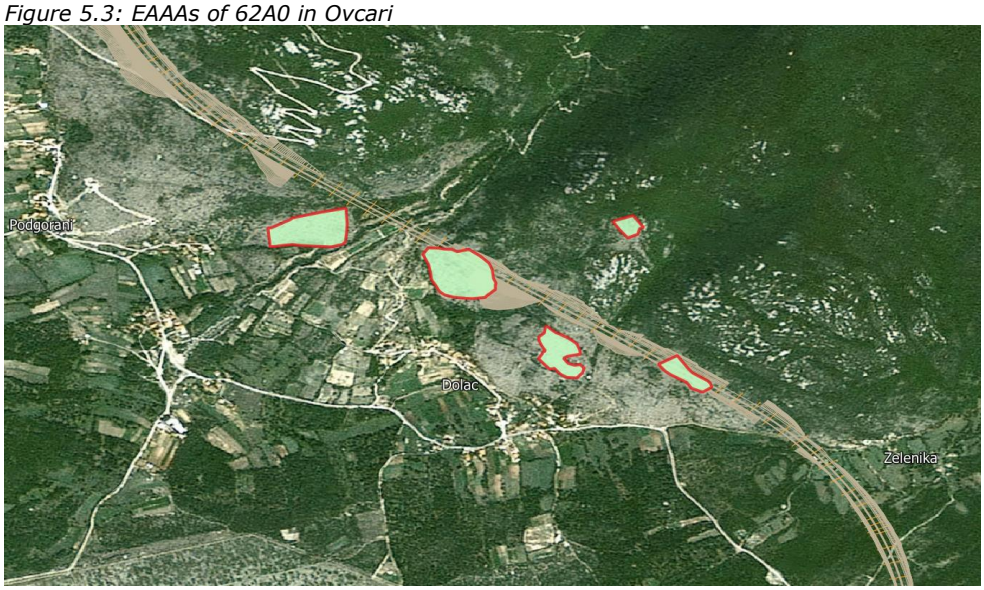


Figure 5.4: EAAAs of 62A0 in Podgorani

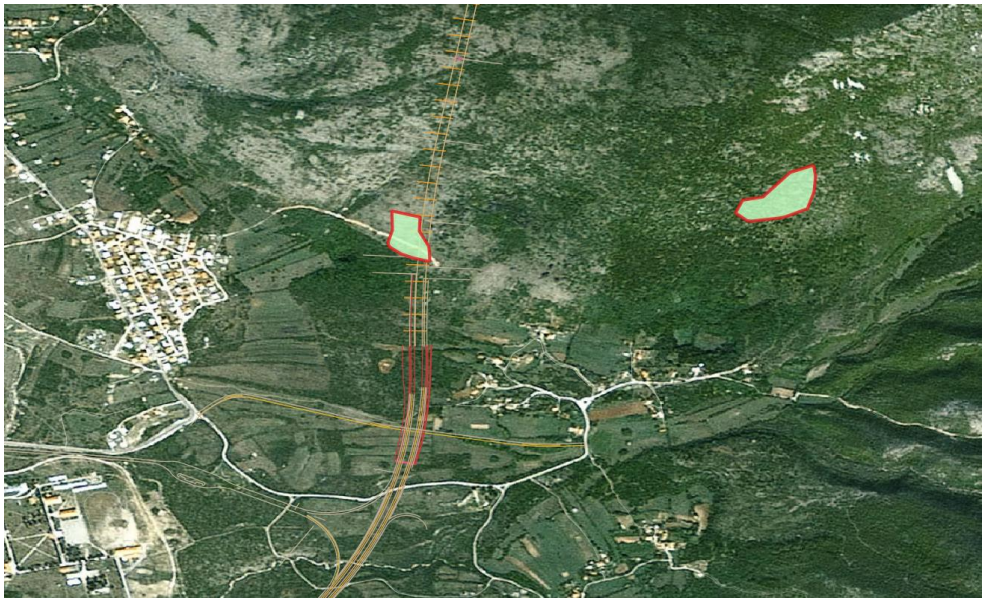


Figure 5.5: EAAAs of 62A0 in Kutilivac

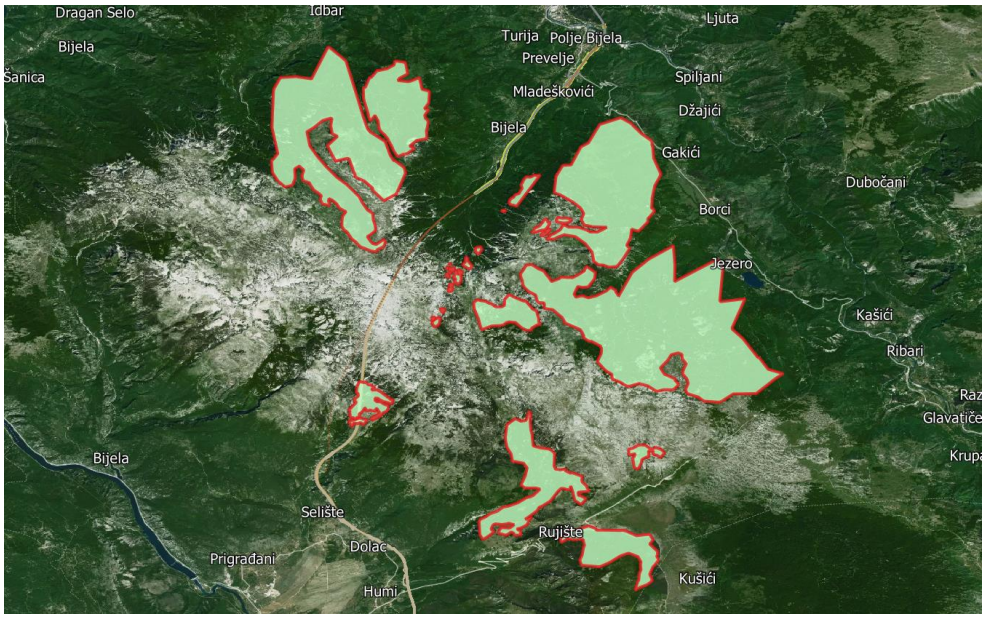


Figure 5.6: EAAAs of 95A0 on Prenj mountain

5.1.2 Flora

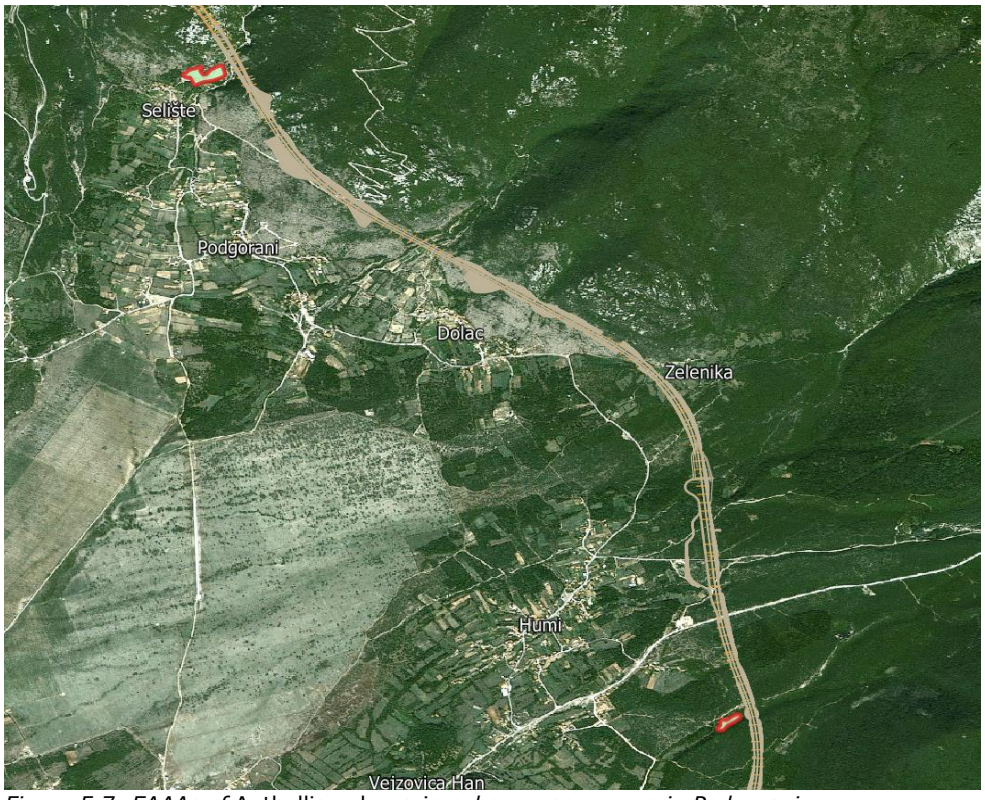


Figure 5.7: EAAAs of Anthyllis vulneraria *subsp.* praepropera *in Podgorani*

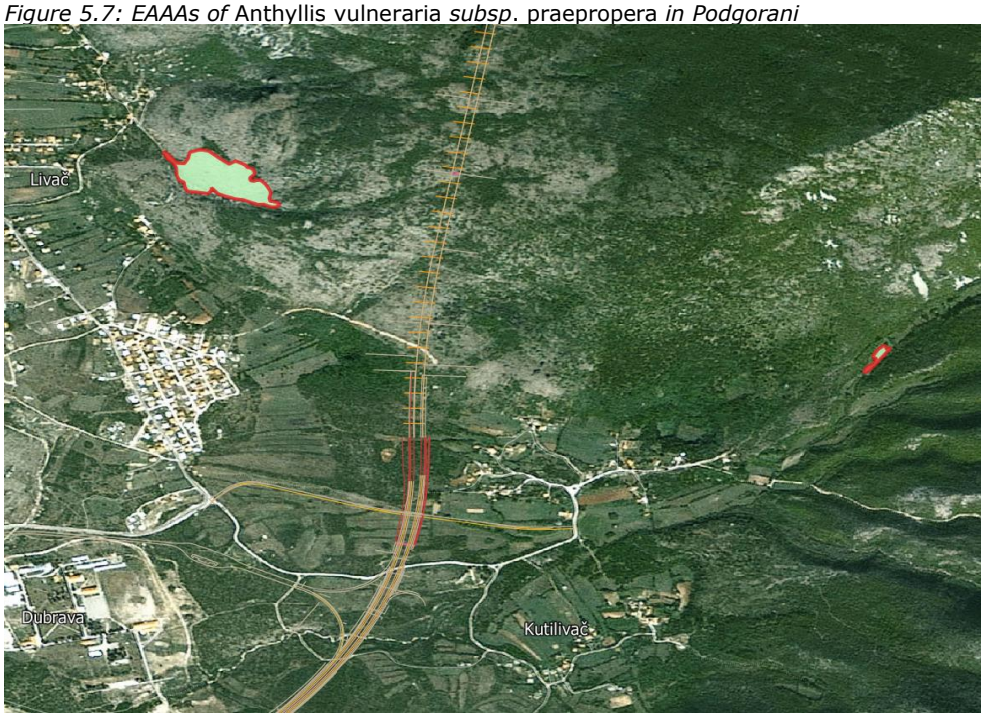


Figure 5.8: EAAAs of Anthyllis vulneraria *subsp.* praepropera *in Kutilivac*

Figure 5.9: EAAA of Asphodelus fistulosus *south of Kutilivac*

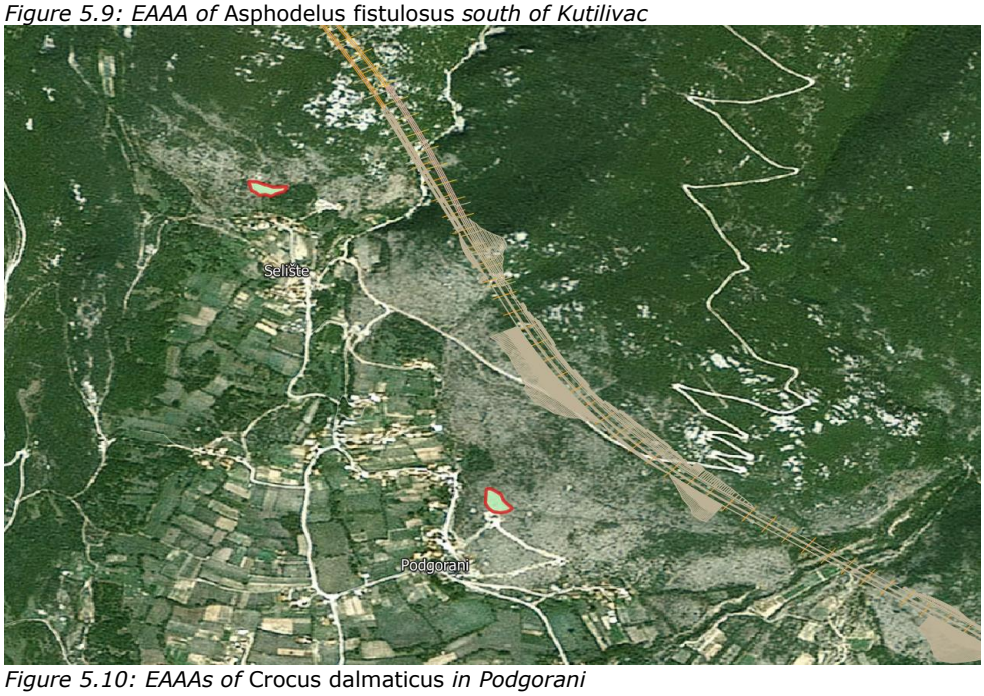


Figure 5.10: EAAAs of Crocus dalmaticus *in Podgorani*

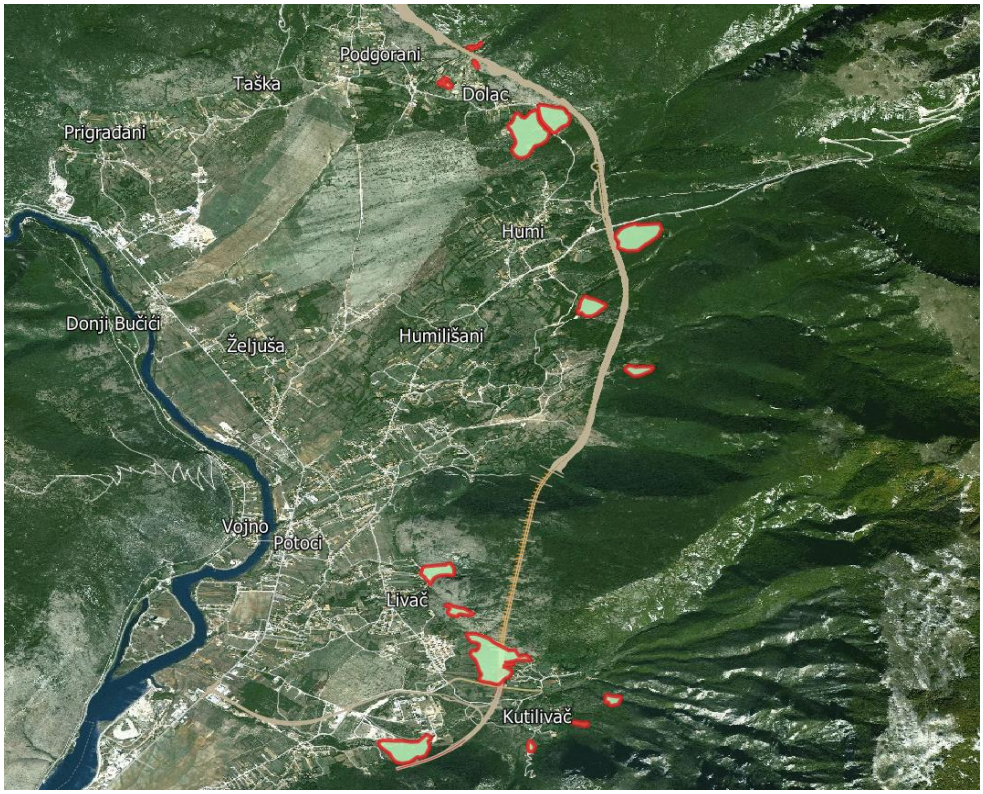


Figure 5.11: EAAAs of Cyclamen hederifolium *south of the Prenj tunnel*

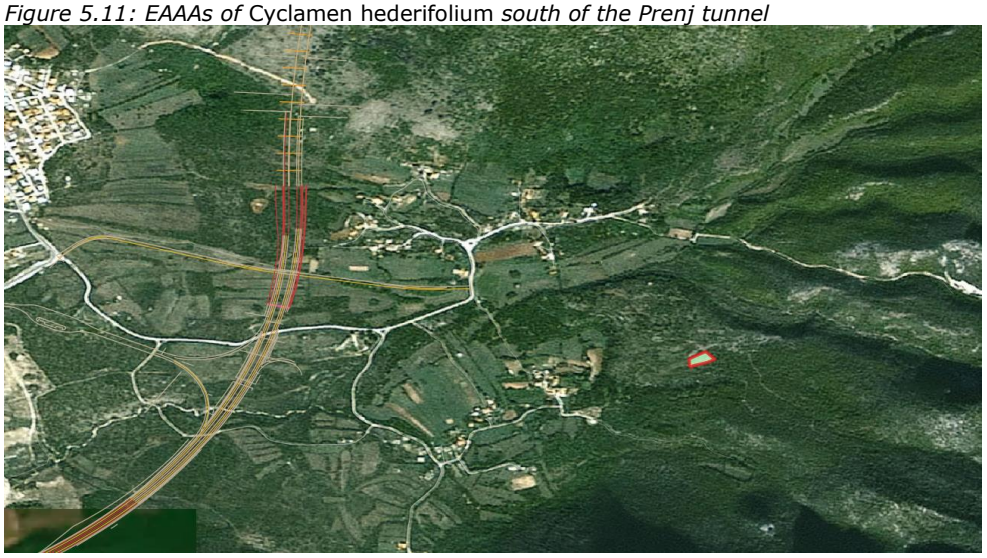


Figure 5.12: EAAA of Opopanax chironium *in Kutilivac*

Figure 5.13: EAAAs of Spiranthes spiralis *in Humilisani*

5.1.3 Invertebrates

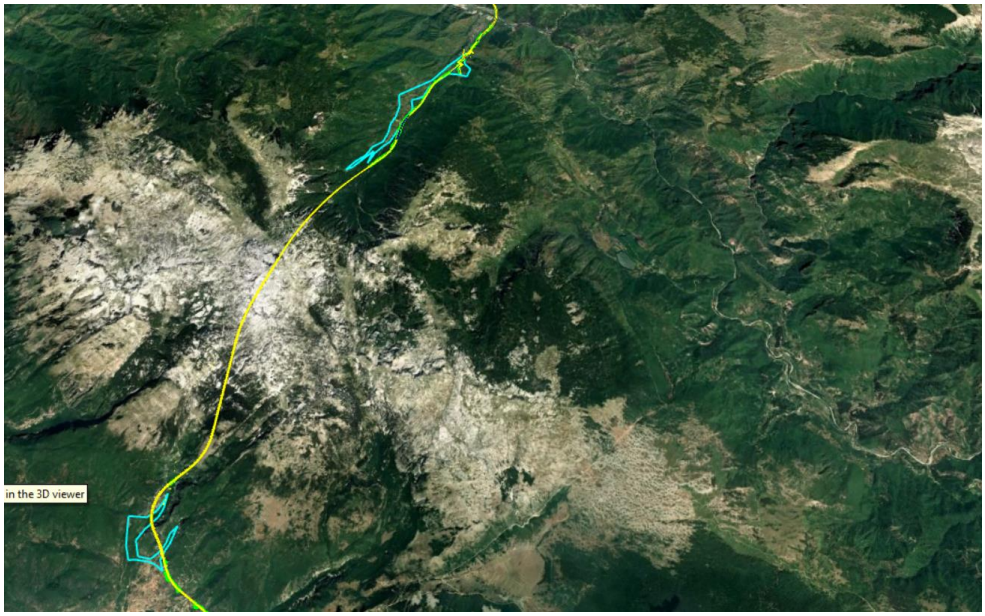


Figure 5.14: EAAAs of Euplagia quadripunctaria

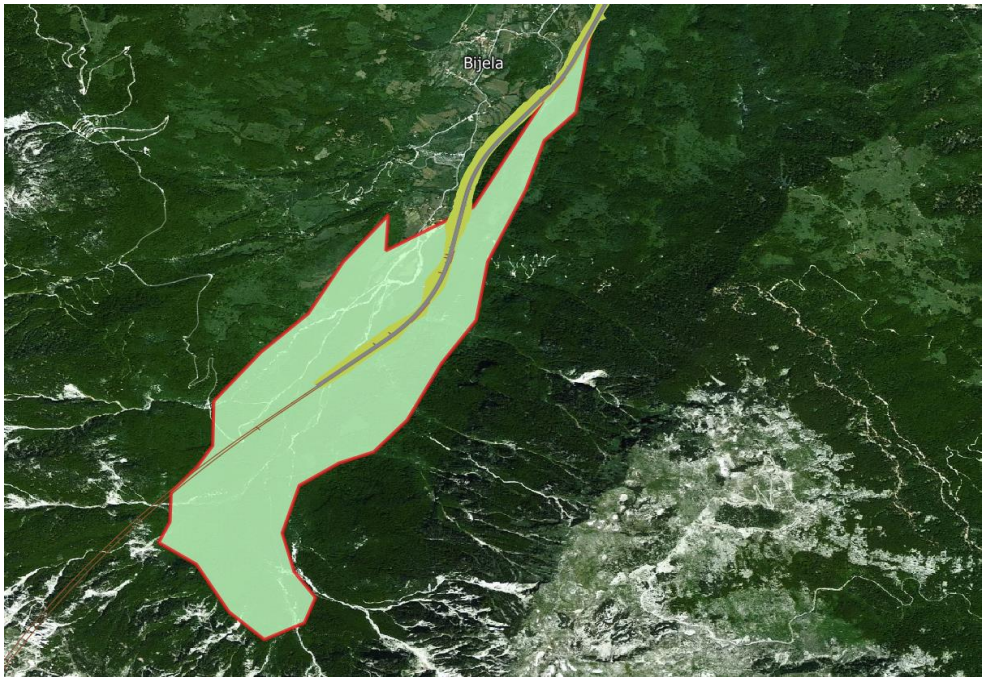


Figure 5.15: EAAA of Morimus funereus *in woodland habitats prior to motorway's entry into Prenj mountain*

5.1.4 Fish

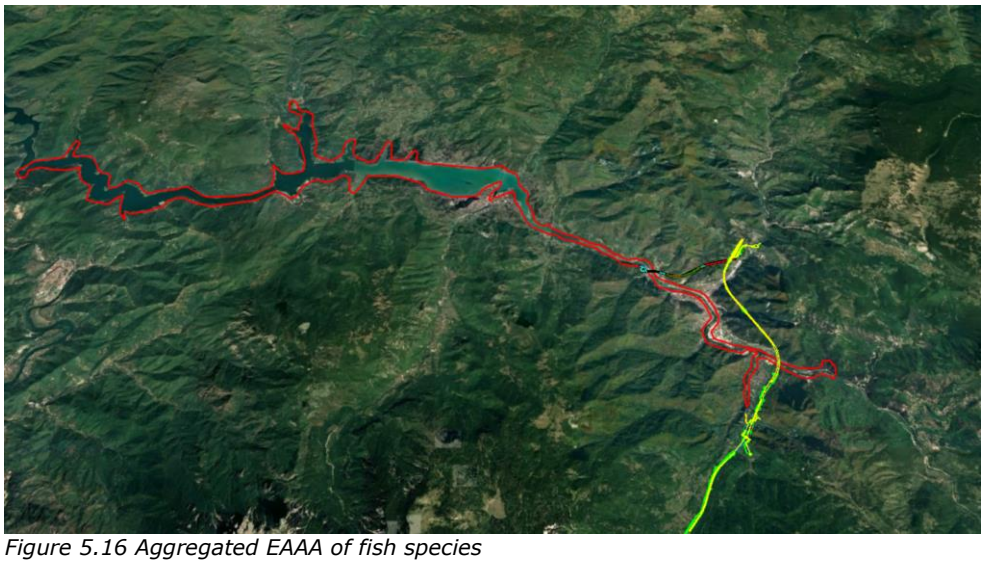


Figure 5.16 Aggregated EAAA of fish species

5.1.5 Birds

All bird EAAAs have been given in chapter 4.2.

5.2 EAAAs of CHs

5.2.1 Habitats

*Figure 5.17: EAAAs of *6220 in Ovcari*

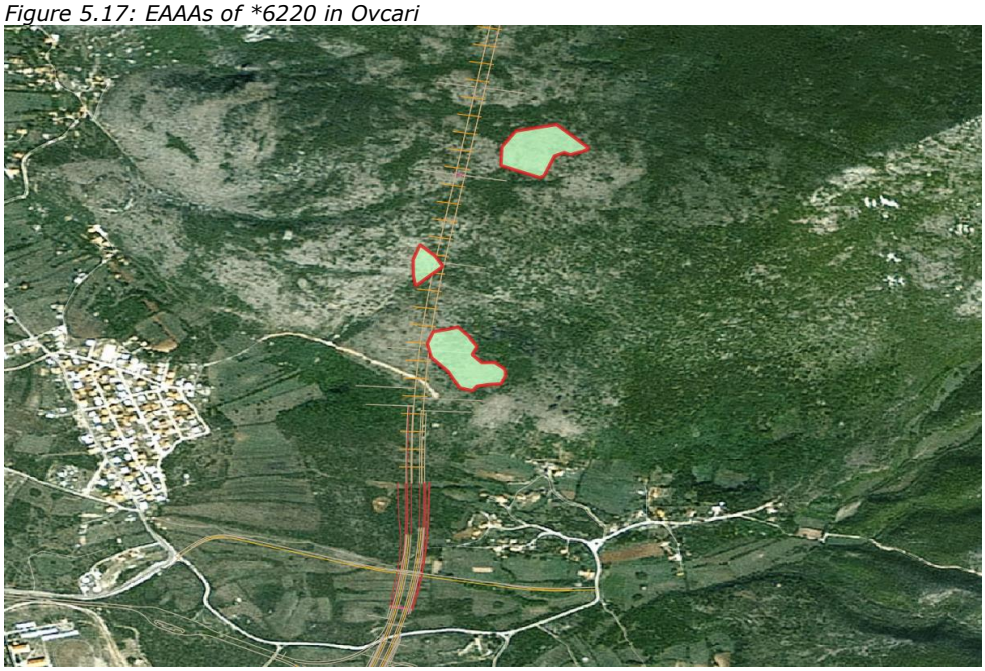


*Figure 5.18: EAAAs of *6220 in Kutilivac*

*Figure 5.19: EAAA of *9530 in Ovcari*

5.2.2 Invertebrates

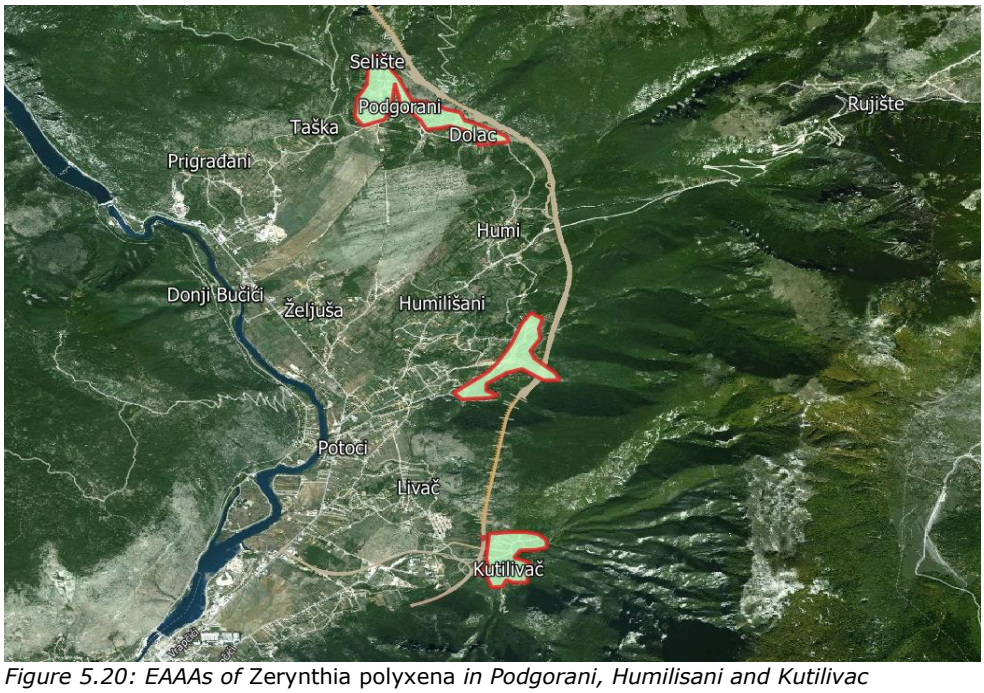


Figure 5.20: EAAAs of Zerynthia polyxena *in Podgorani, Humilisani and Kutilivac*

5.2.3 Amphibians

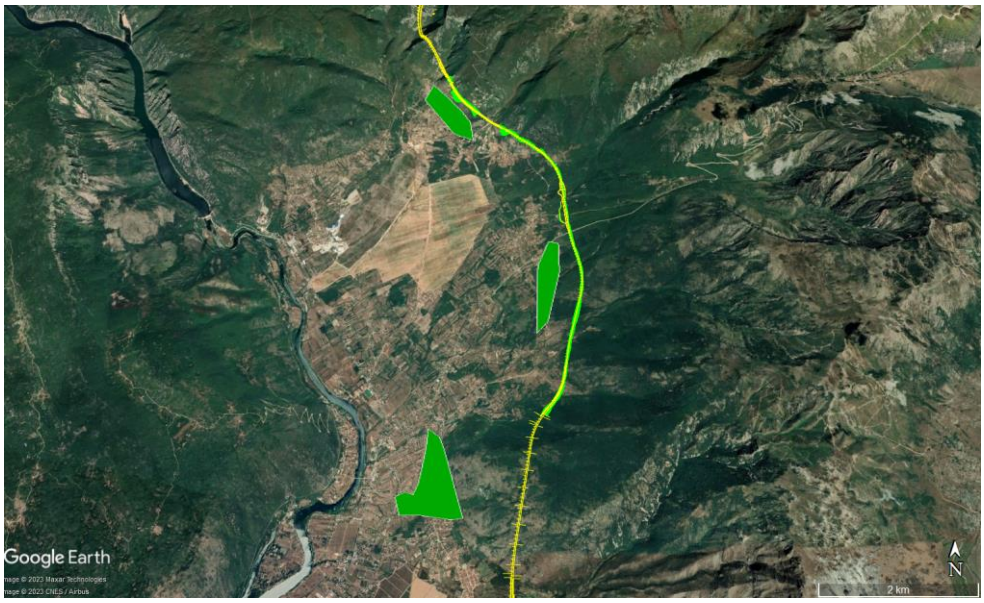


Figure 5.21: EAAA of Bufotes viridis

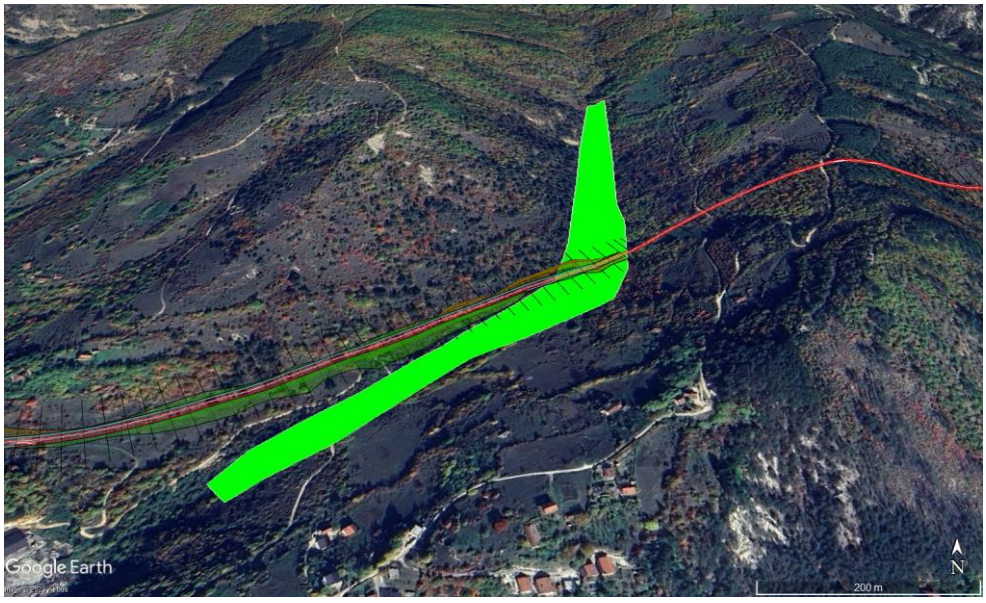


Figure 5.22: EAAA of Bombina variegata

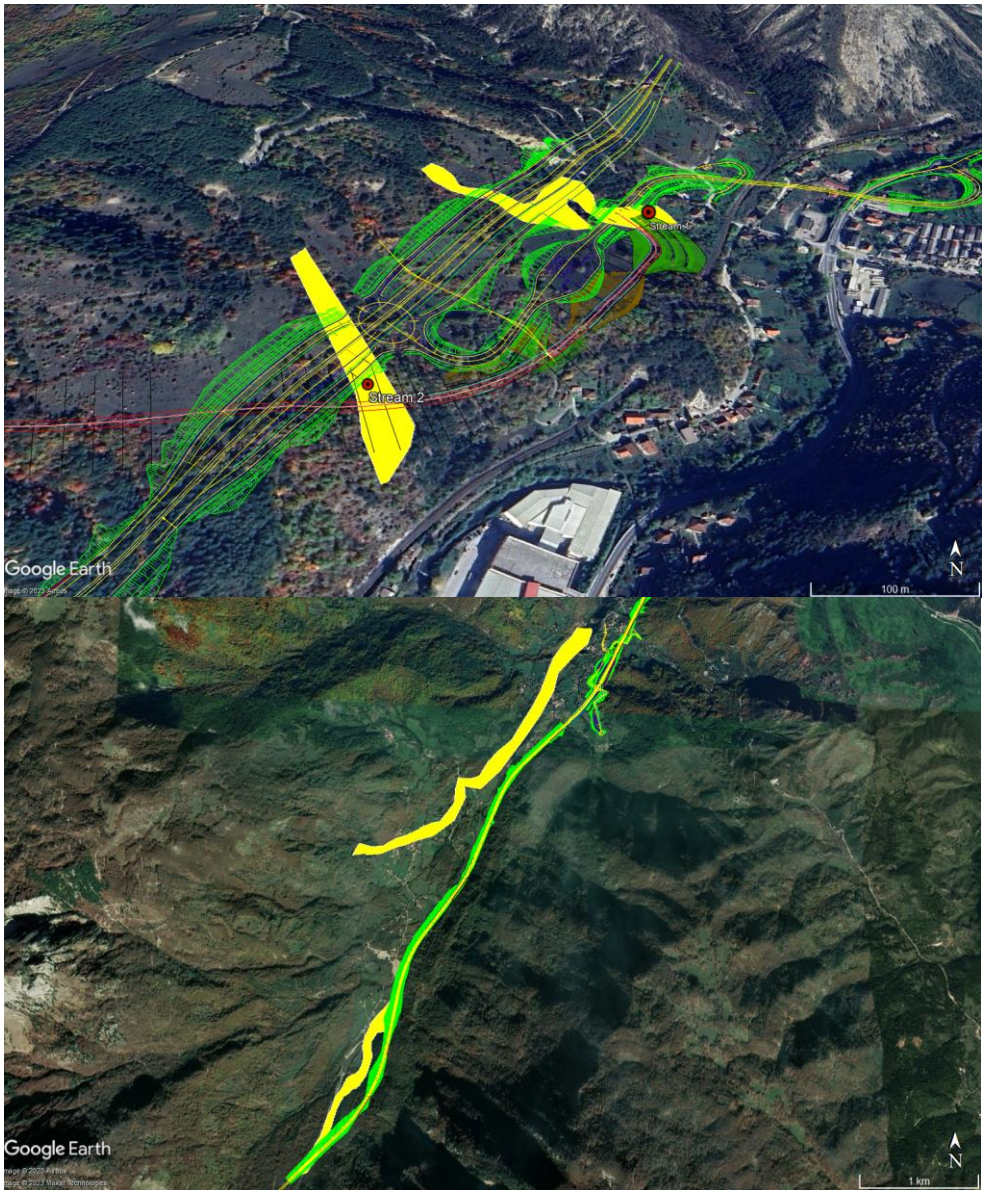


Figure 5.23: EAAAs of Rana graeca

5.2.4 Reptiles

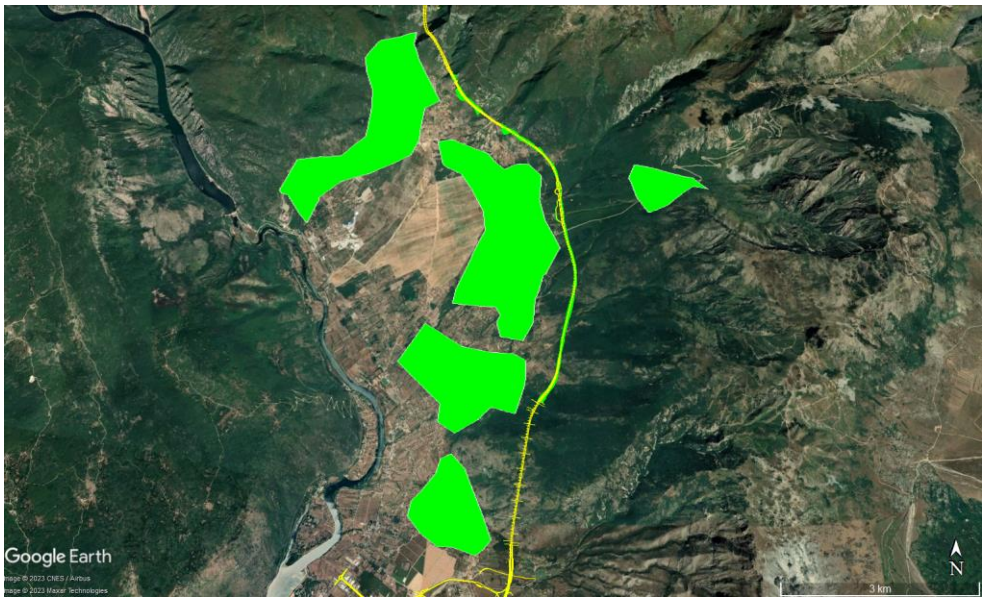


Figure 5.24: EAAAs of Testudo hermanni

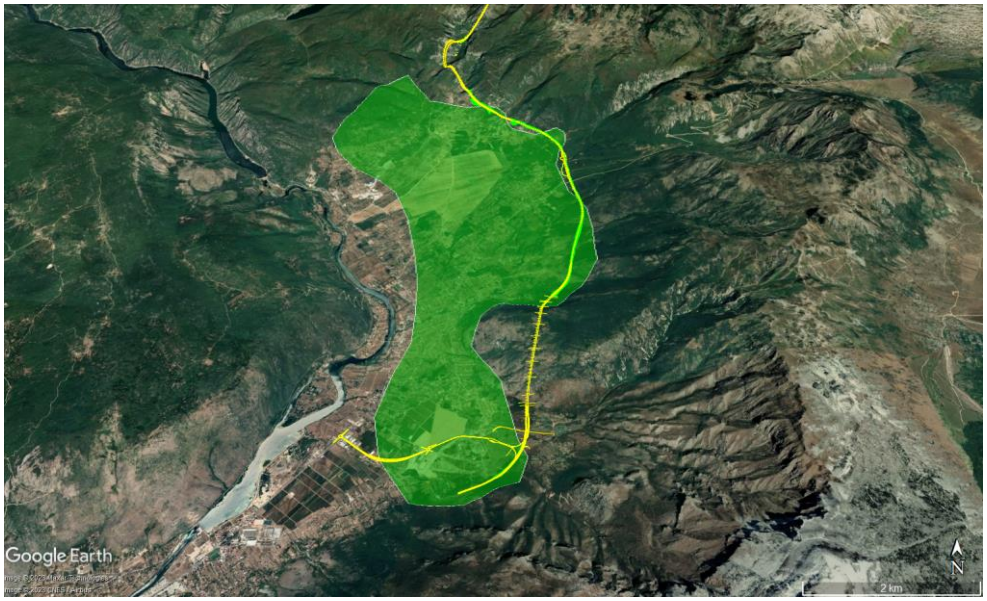


Figure 5.25: Aggregated EAAAs of Pseudopus apodus, Podarcis melisellenis, and Lacerta trilineata

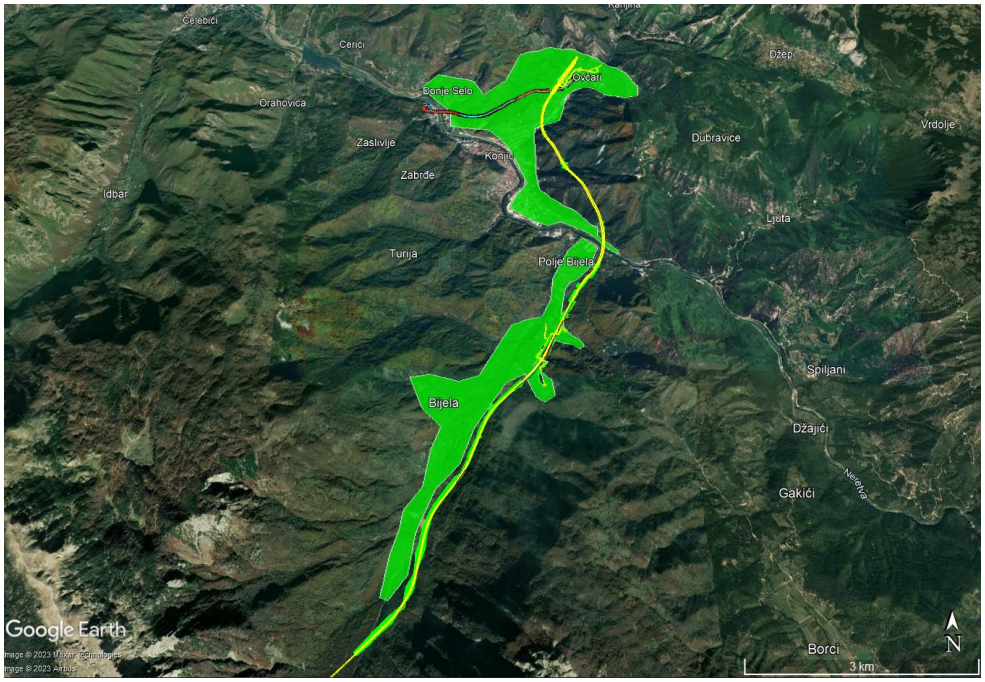


Figure 5.26: EAAA of Lacerta viridis *and* Podarcis muralis

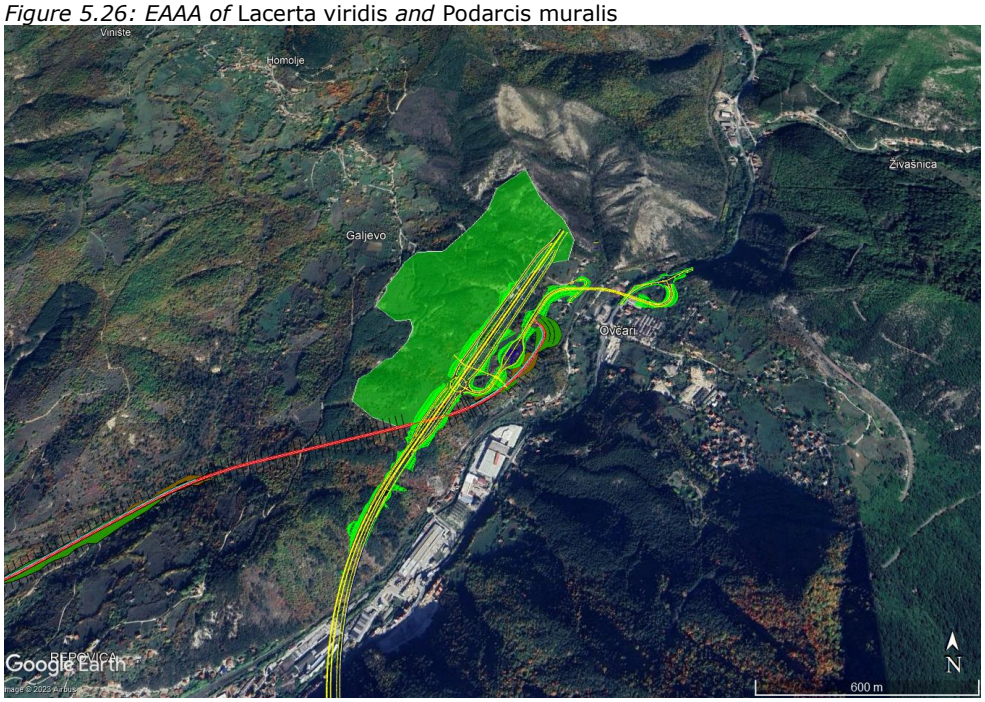
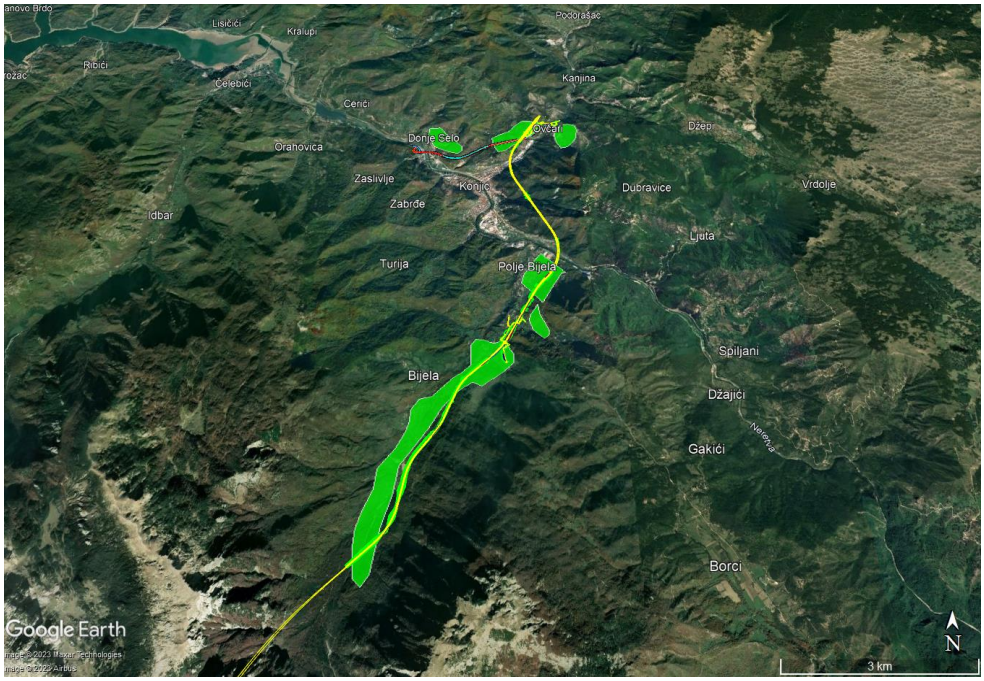


Figure 5.27: EAAA of Lacerta agilis in Ovcari

Figure 5.28: EAAA of Algyroides nigropunctatus *in Humilisani*



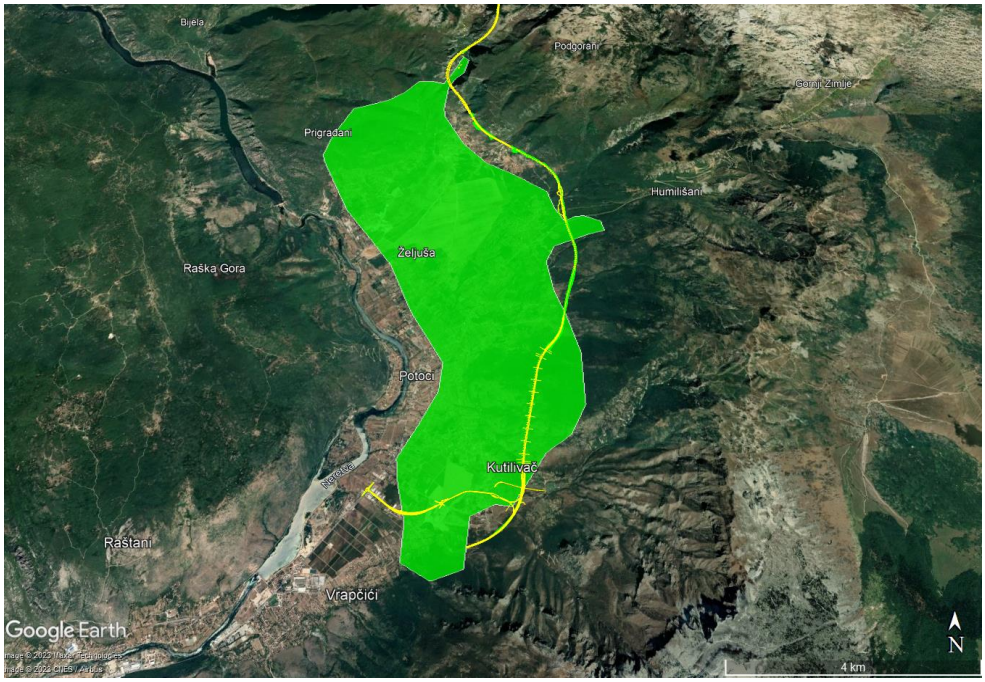


Figure 5.29: EAAAs of common and widespread Vipera ammodytes

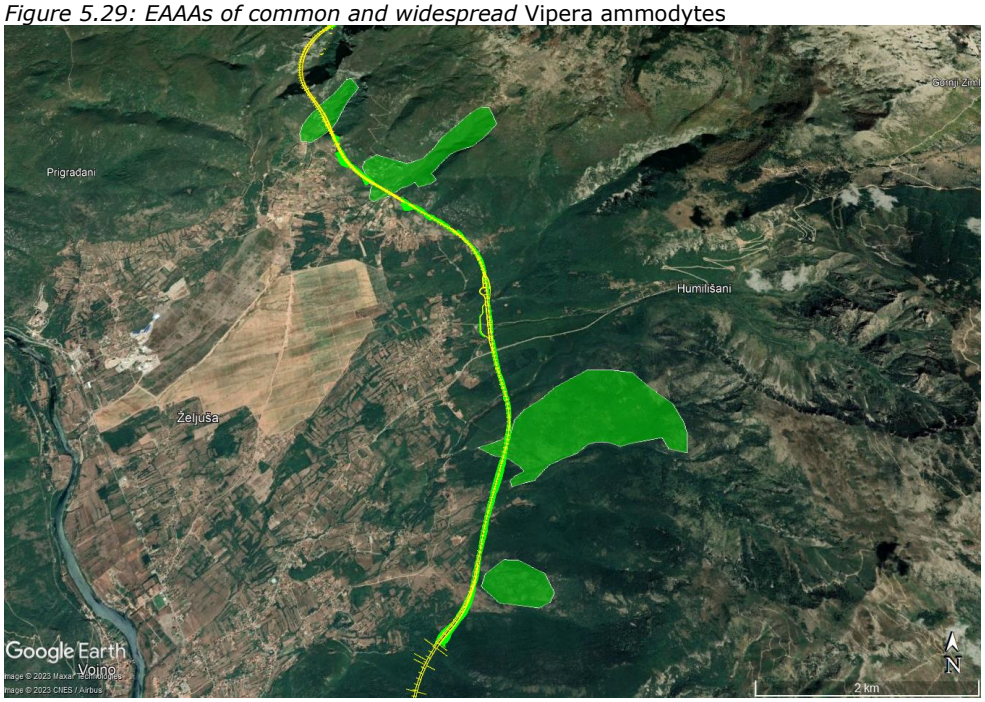


Figure 5.30: EAAAs of Platyceps najadum

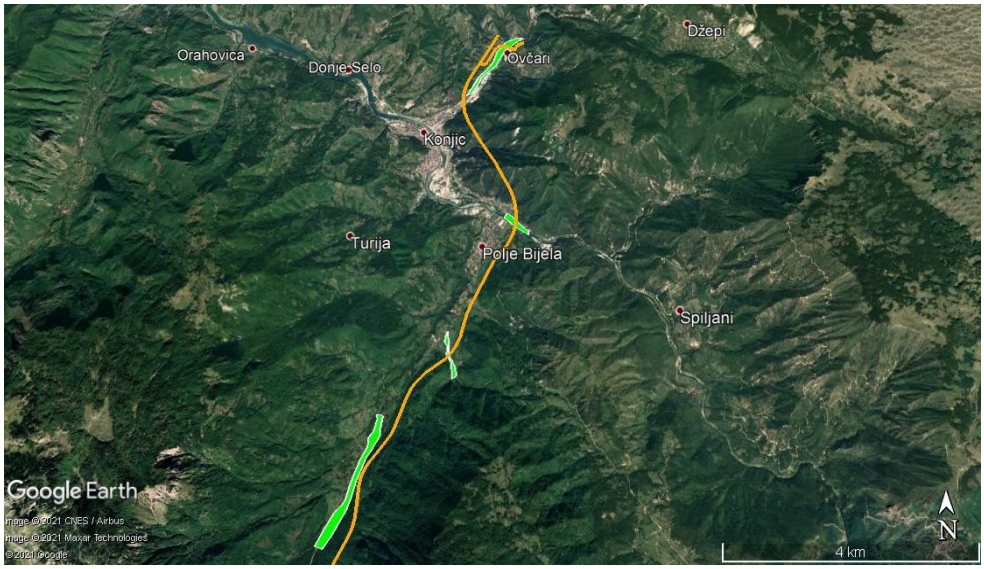


Figure 5.31: EAAAs of Natrix tessellata *north of Mt. Prenj*

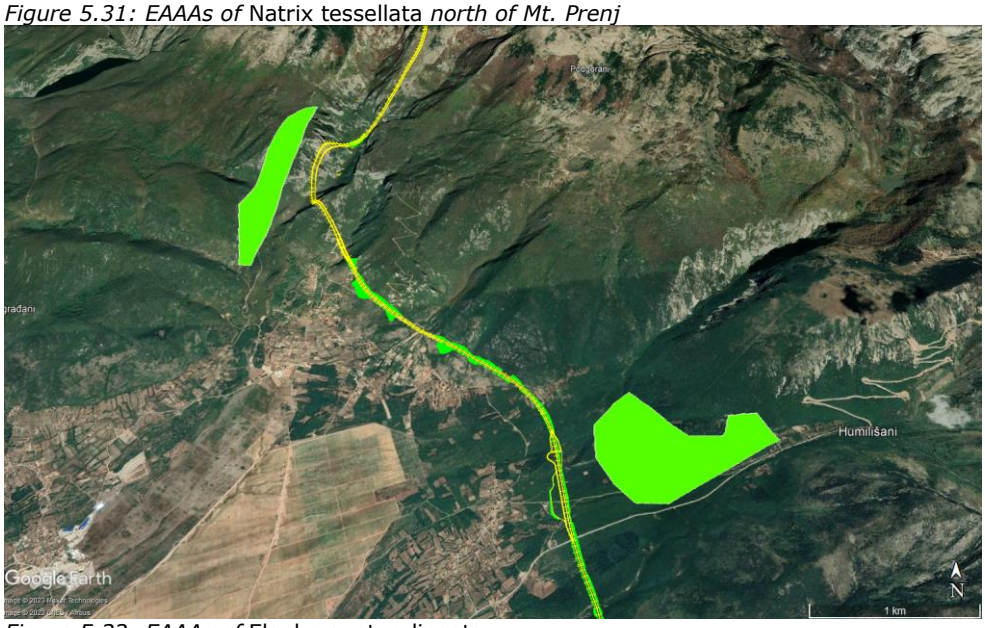
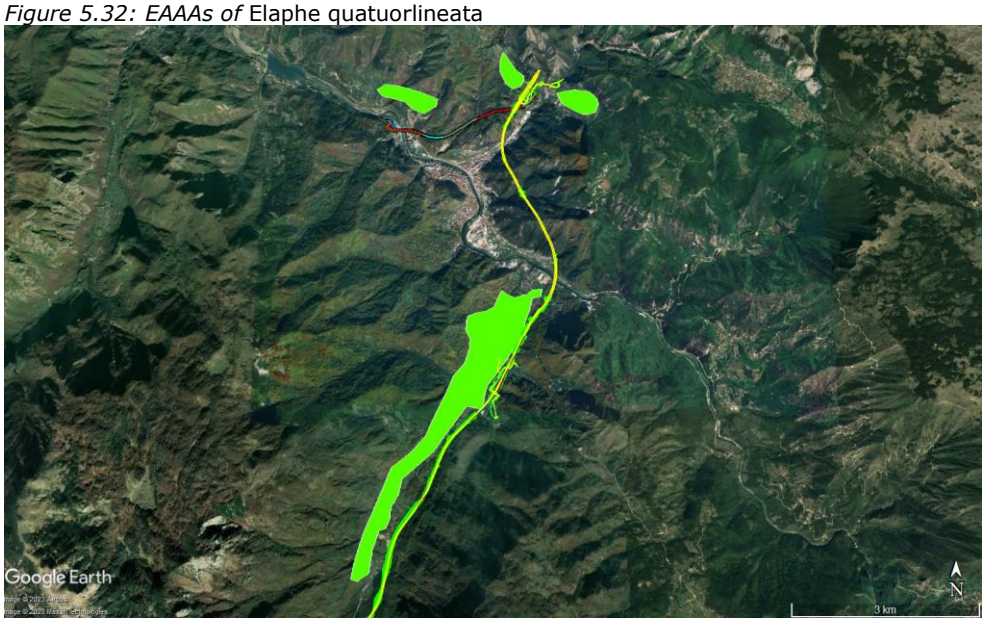


Figure 5.32: EAAAs of Elaphe quatuorlineata



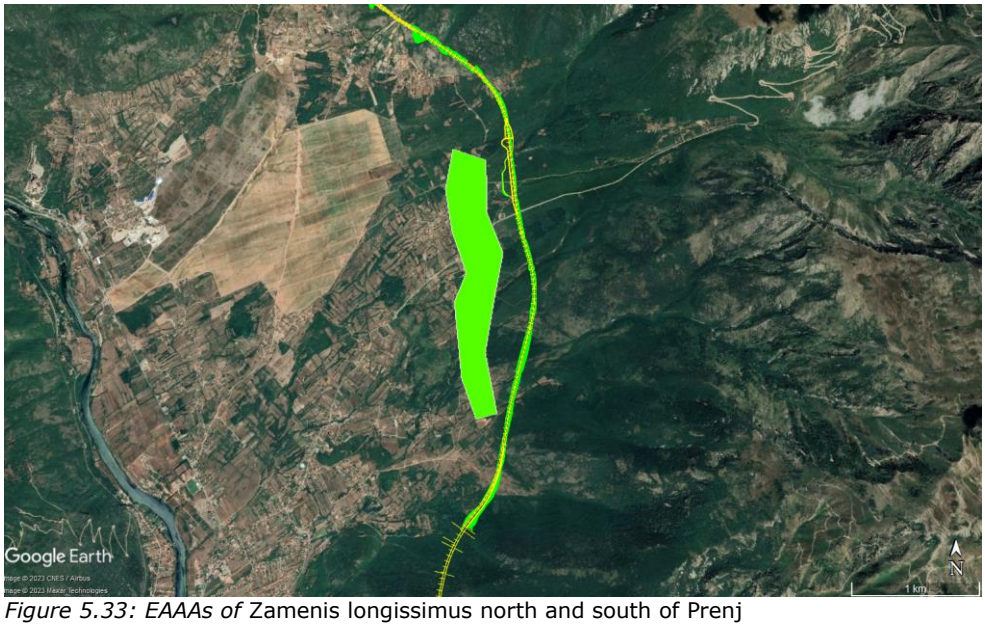


Figure 5.33: EAAAs of Zamenis longissimus north and south of Prenj

5.2.5 Mammals

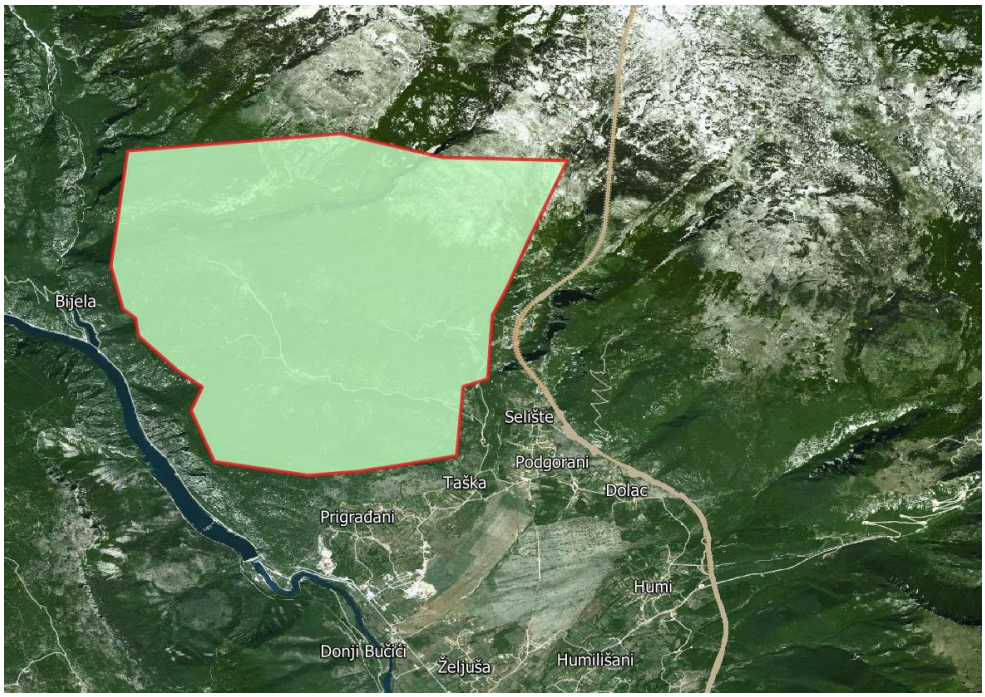


Figure 5.34: EAAA of Canis lupus

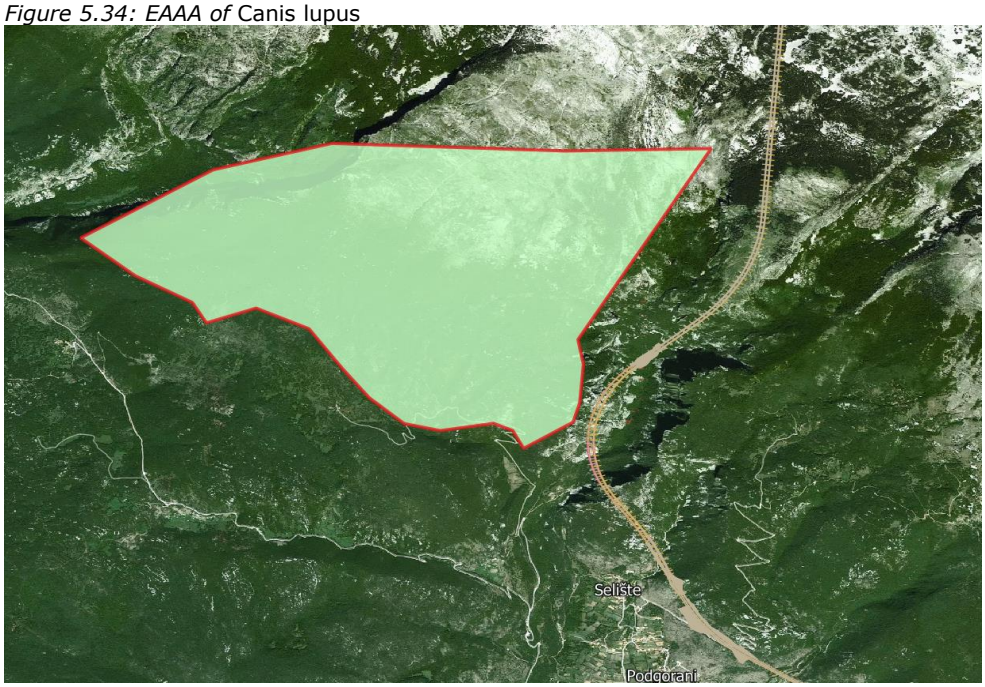


Figure 5.35: EAAA of Ursus arctos

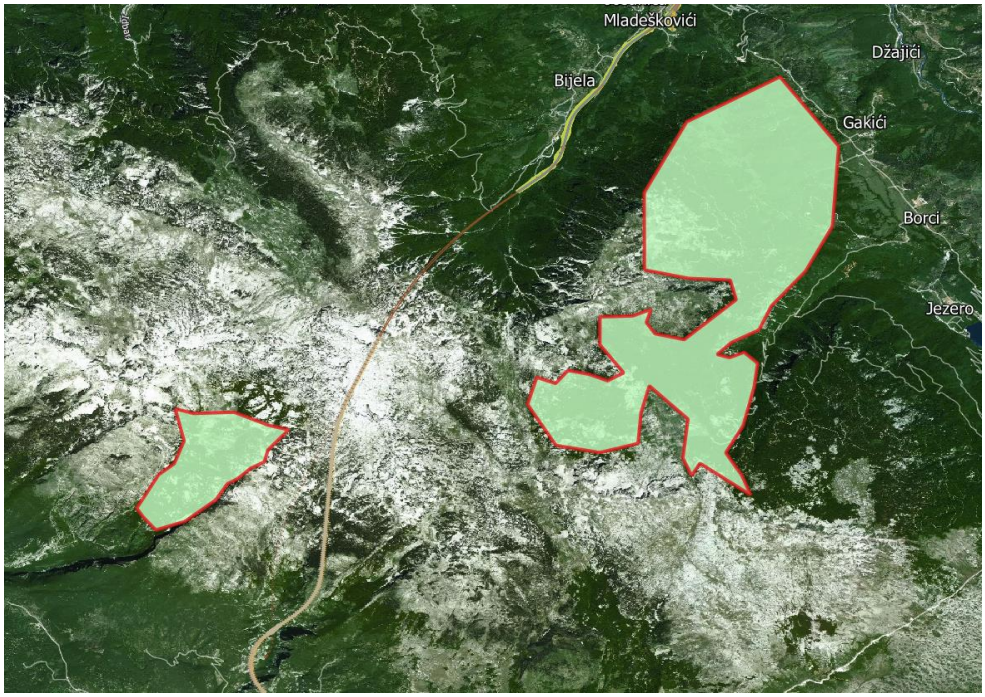


Figure 5.36: EAAAs of Lynx lynx

Figure 5.37: Aggregated bat EAAAs