



**TÜRKİYE  
PETROLLERİ**

ANONİM ORTAKLIĞI



**OTC**

OFFSHORE  
TECHNOLOGY  
CENTER

**SAKARYA GAS FIELD DEVELOPMENT PROJECT – ENHANCEMENT OF SUBSEA PRODUCTION  
CAPACITY AND FLOATING PRODUCTION UNIT**

**Chapter 6.2 Onshore Biological Baseline**

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## 6.0 ENVIRONMENTAL AND SOCIAL BASELINE

### 6.2 Onshore Biological Baseline

#### 6.2.1 Flora

**Table 6-1: General overview of Flora**

<b>Description</b>	The plant species composing the terrestrial habitats of the region and study area.
<b>Study Area</b>	<p><b>RSA:</b> The Western Euxine region within the “PA0422. Euxine-Colchic broadleaf forests”<sup>1</sup>.</p> <p><b>Rationale:</b> Based on literature review, this is the regional broad area containing the geographically distinct plant species and habitats potentially occurring within and in the vicinity of the Project.</p> <p><b>Aol:</b> 200 m buffer around the Project Area</p> <p>Rationale: Flora species are expected to be influenced by Project activities only in the immediate vicinity of the Project site.</p>
<b>Data sources</b>	<p><b>Primary sources:</b> 5 field work campaigns:</p> <ul style="list-style-type: none"> <li>■ conducted in April and May 2021 by Armada.</li> <li>■ conducted in February and May 2022 by a local flora expert Prof. Hayri Duman on behalf of WSP.</li> <li>■ conducted in June 2023 and June 2024 by a local flora expert Prof. Hayri Duman.</li> </ul> <p><b>Secondary sources:</b> Secondary sources came from scientific articles and grey literature.</p>

#### Methodological approach

Data to describe the regional context (i.e., RSA) were collected through literature review (references reported in Chapter 13.0), whereas the local context (i.e., Aol) was assessed by both literature review and the gathering of field data.

A general assessment of the RSA was obtained from the literature to identify sensible flora species within its boundaries and provide the ecological and climatic context for flora distribution and its conservation status in the region.

An initial bibliographic search was carried out by the local flora expert, Prof. Hayri Duman, to identify sensitive flora species potentially found within the project Aol according to national and international published literature and previous studies (see also Appendix F for all table). The bibliographic data was then implemented with a field survey campaign conducted by Prof. Hayri Duman under the coordination of WSP. 2024 field surveys were

<sup>1</sup> According to Terrestrial ecoregions identified by WWF (<http://www.worldwildlife.org/biomes>)

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conducted at 6 sampling points of 400 m<sup>2</sup> each, scattered across the project site to represent the different habitats identified within the AoI (Figure 6-1).

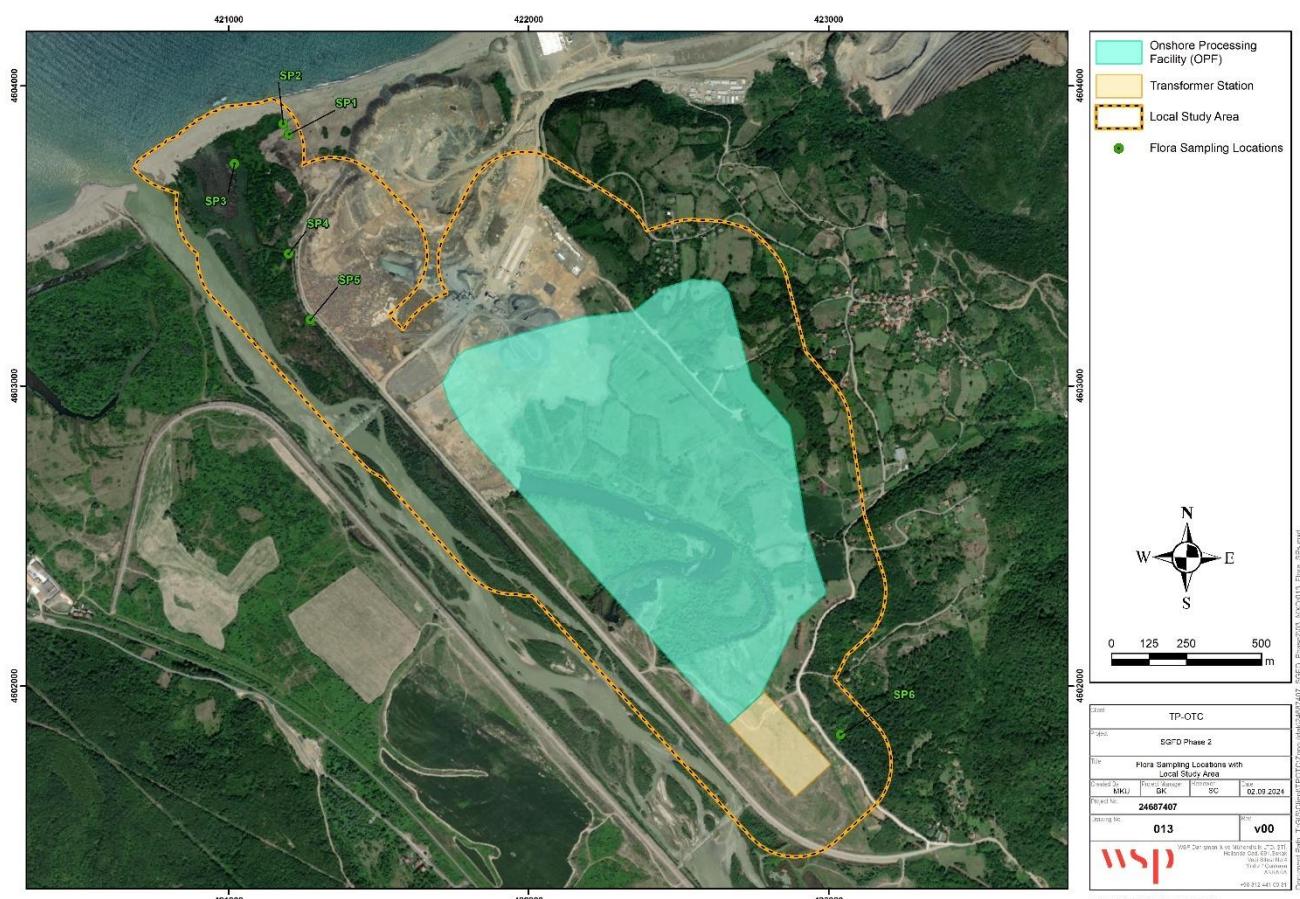


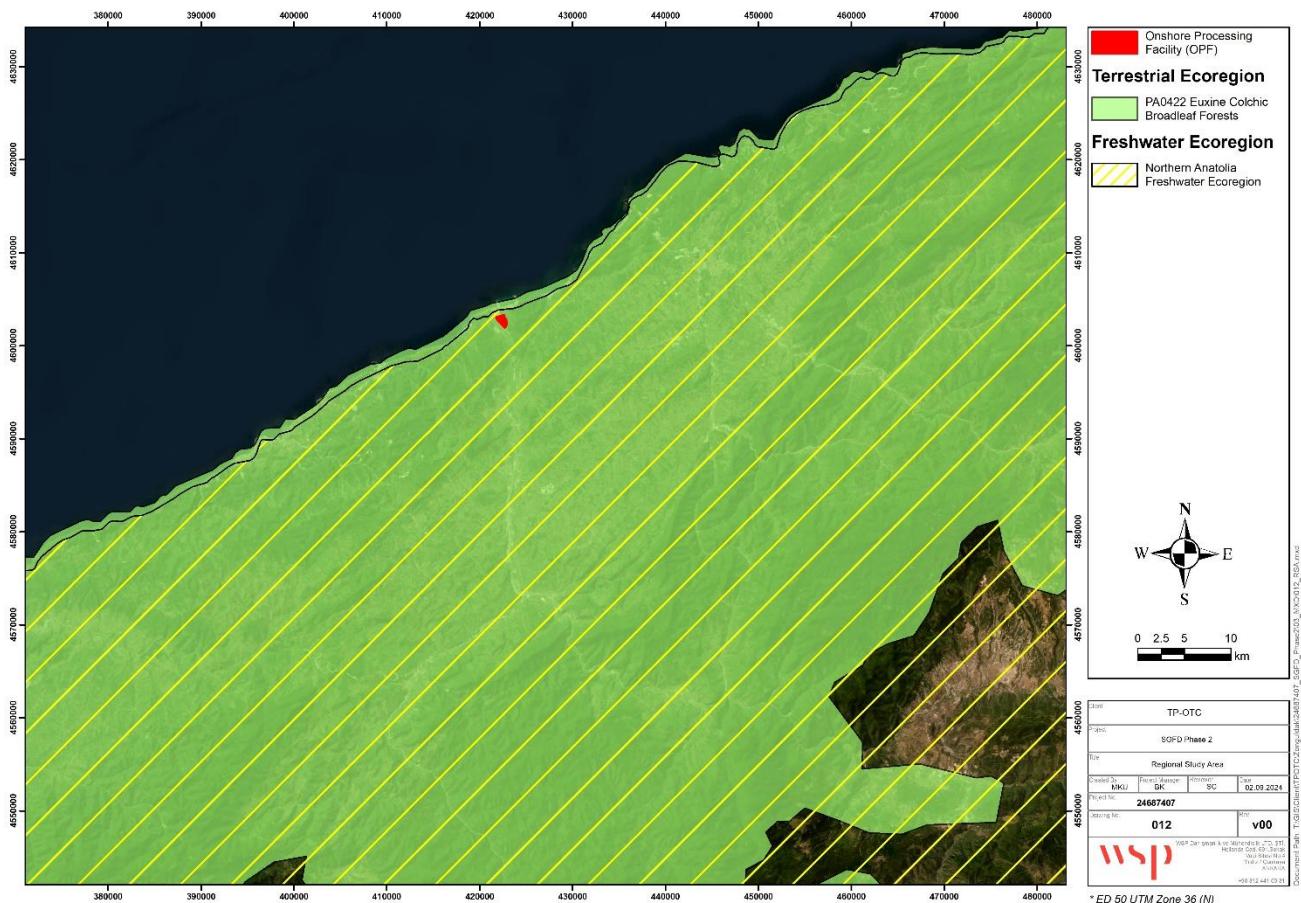
Figure 6-1: Flora AOL with sampling locations.

The findings from field observations were used to produce a habitat-based species list which was then screened against national and international conservation datasets (e.g., “Red Data Book of Turkish Plants”, Bern Convention and CITES) to identify endemic, endangered and critically endangered species. The floristic composition at each sampling point was also used to identify the different habitats included in the AoI and to categorize them according to international habitat classification (EUNIS, 2024). The sensitivity of the observed flora was then evaluated considering the conservation status of each species and the impact factors these may be subjected to during construction, operation and decommissioning phases.

## Regional context (RSA)

The Project terrestrial RSA corresponds to the terrestrial ecoregion “PA0422. Euxine-Colchic broadleaf forests”, which is considered part of the broader category “Temperate Broadleaf and Mixed Forests” (Figure 6-2). The ecoregion can be divided into two parts based on climate: a more humid Eastern Colchic region a relatively less humid Western Euxine region where the Project is located.

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**Figure 6-2: Terrestrial and freshwater RSA.**

### Local context (Aol)

The field investigations identified 211 plant species within the Project's Aol (Appendix F), only six of these were considered as sensitive or potentially sensitive under national and/or international conservation classifications (The area surveyed by the flora expert encompasses a 400 m<sup>2</sup> area around the sampling points (SPs) and represents a larger area than the Aol in the dune habitat. Based on observations conducted in this scope, the population of sensitive plant species was determined in the protection area (Figure 6-5). The status of the population within the Aol is provided in Table 6-2, as observed by Prof. Hayri Duman (Table 6-2). The area surveyed by the flora expert encompasses a 400 m<sup>2</sup> area around the sampling points (SPs) and represents a larger area than the Aol in the dune habitat. Based on observations conducted in this scope, the population of sensitive plant species was determined in the protection area (Figure 6-5). The status of the population within the Aol is provided in Table 6-2, as observed by Prof. Hayri Duman.

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**Table 6-2: Sensitive plant species**

Species	Local conservation status (Ekim et al., 2000)	IUCN Classification	Endemism	Status of population within the AoI	Habitat
<i>Centaurea kilaea</i>	EN	Not Evaluated	X	3500	B1.4
<i>Heracleum platytaenium</i>	LC	Not Evaluated	X	3	G1.1
<i>Peucedanum obtusifolium</i>	VU	Not Evaluated	-	20	B1.4
<i>Pancratium maritimum</i>	VU	LC	-	4000	B1.4
<i>Leucojum aestivum</i>	VU	LC	-	800	D5.2
<i>Cyclamen coum</i> var. <i>coum</i>	CITES Appendix 2	Not Evaluated	-	100	G1.A

According to the literature (Ekim, 2000) the endemic *C. kilaea* (Figure 6-3-a) is strictly linked to the disappearing grey dune habitat and its numbers are constantly declining within Turkish territory. Similarly, *P. maritimum* (Figure 6-3-b) population has also seen a constant reduction, due to the loss of suitable habitat, putting this species in a vulnerable position nationally, despite the “LC” classification at a global level (IUCN).

*Leucojum aestivum* (Figure 6-3-c) is widespread in Europe from Ireland to northern Mediterranean (south France, Corsica, and Sardinia), and across east Europe to Iran. This species is considered rare in Türkiye (Ekim, 2000) with a diminishing population, which determined the vulnerability of the species at a national level.

*Heracleum platytaenium* (Figure 6-3-d) is widespread endemic species with no indications of a diminishing population. Conversely, *Peucedanum obtusifolium* (Figure 6-3-e) shares similar reductions in numbers as per *C. kilaea* and *P. maritimum*, as well as the same habitat although it is only classified as vulnerable at a national level and, as per *H. platytaenium*, it is not the characterizing species of the area.

*Cyclamen coum* var. *coum* (Figure 6-3-f) appears to have stable populations in Türkiye, although, the collection of wild specimens for the ornamental plant market required a regulation of the species' trade with its inclusion in Appendix II of CITES.


**a) *Centaurea kilaea***

**b) *Pancratium maritimum***

**c) *Leucojum aestivum***

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d) *Heracleum platytaenium*

e) *Peucedanum obtusifolium*

f) *Cyclamen coum* var. *coum*

Figure 6-3: Sensitive plant species photos within the project AOL.

As part of the Phase 1 Biodiversity Management studies, the bulbs and rooted vegetative individuals of *Centaurea kiliaea* and *Pancratium maritimum* species, which are distributed in the coastal dunes, were transplanted to a similar habitat outside the Project area (Kızılıkum beach) and a 'Rare Plant Protection Area' was surrounded by a wire fence. Approximately 4500 rooted *Centaurea kiliaea* and 6000 *Pancratium maritimum* bulbs were transported and planted in the 'Rare Plant Protection Area'. The success rate of both species is nearly 100%. Additionally, approximately 10,000 seeds of *Pancratium maritimum* species collected from the project area were planted in the 'Rare Plant Protection Area' in March 2022 and it was determined that almost all of the seeds germinated. The seeds of *Pancratium maritimum* species collected from the project area within the scope of Ex-Situ conservation were also delivered to Türkiye Seed Gene Bank. Furthermore, to improve employee awareness and encourage conservation activities, signs were installed to highlight the presence of the *Centaurea kiliaea* and *Pancratium maritimum* species, which grow in the coastal dune habitat adjacent to the natural gas transmission line.



Figure 6-4: "Rare Plants Protection Area" signage near Kızılıkum Beach and overview of the area.

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**Figure 6-5: Signage for the protection of *Centaurea kilaea* and *Pancratium maritimum* species.**

Invasive species, including *Xanthium spinosum*, *Aster subulatus*, *Conyza canadensis*, *Amaranthus spinosus*, *Datura stramonium*, and *Ambrosia artemisiifolia*, were identified within the AOL. The presence of invasive species such as *Aster subulatus*, *Datura stramonium*, *Xanthium strumarium*, and *Conyza canadensis* was detected along the pipeline route and the adjacent service road (36 T 421166-4603634) near the natural gas pipeline landfall. As part of ongoing operational efforts, control measures against these invasive species are continued, and a decrease in their population has been observed.

### Sensitivity Assessment

Sensitivity features	Supported by	Sensitivity value
Limited Presence (1) of threatened species of flora.	Primary data and secondary data	Medium
Limited presence (1) of protected species.		
Limited presence of endemic or restricted range species of flora.		

### 6.2.2 Invertebrates

**Table 6-3: General overview of Invertebrates**

<b>Description</b>	Any animal, aquatic and/or terrestrial, lacking a vertebral column, in all its life stages. These comprise 30 different phyla, and nearly 95% of all animal species.
<b>Study Area</b>	<b>RSA:</b> The Western Euxine region within the “PA0422. Euxine-Colchic broadleaf forests and the freshwater ecoregion “430 Northern Anatolia” <sup>2</sup> , which

<sup>2</sup> According to Freshwater Ecoregions of The World (FEOW) (<https://www.feow.org/>)

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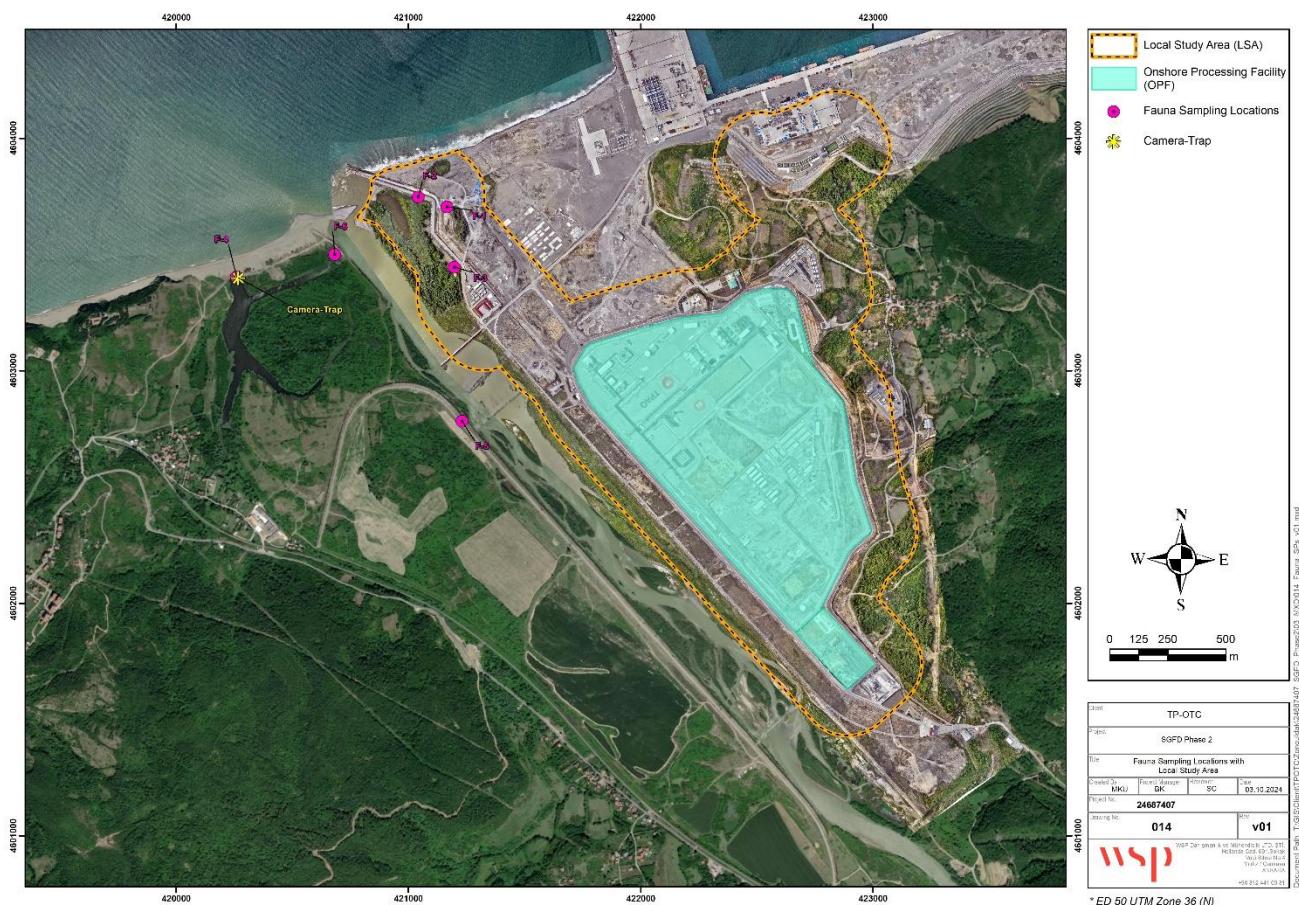
	<p>comprises temperate coastal rivers and estuaries of north-central and western Anatolian Türkiye.</p> <p><b>Rationale:</b> Based on literature review, these are the regional broad areas containing the geographically distinct terrestrial and freshwater habitats potentially occurring within and in the vicinity of the Project.</p> <p><b>Aol:</b> 1000 m buffer around the Project Area</p> <p><b>Rationale:</b> This taxonomic group includes a variety of species with different distribution ranges and that can be found in a number of different habitats. The Aol was selected, in a conservative manner, considering all species (terrestrial and aquatic) that could be impacted by the different Project actions.</p>
<b>Data sources</b>	<p><b>Primary sources:</b> field work campaigns:</p> <ul style="list-style-type: none"> <li>■ conducted in January, February, March, and May 2022, July 2023 and July 2024 by local expert Dr. Şafak Bulut.</li> <li>■ conducted in March and May 2022, July 2023 and July 2024 by local freshwater expert prof. Aydin Akbulut.</li> </ul>
	<p><b>Secondary sources:</b> Secondary sources came from scientific articles and grey literature.</p>

### Methodological approach

Data to describe the regional context (i.e., RSA) were collected through literature review (references reported in Chapter 13.0), whereas the local context (i.e., Aol) was assessed by both literature review and the gathering of field data.

Terrestrial invertebrates were surveyed through visual inspections and identification at different fauna survey locations (Figure 6-6) within the Project Aol.

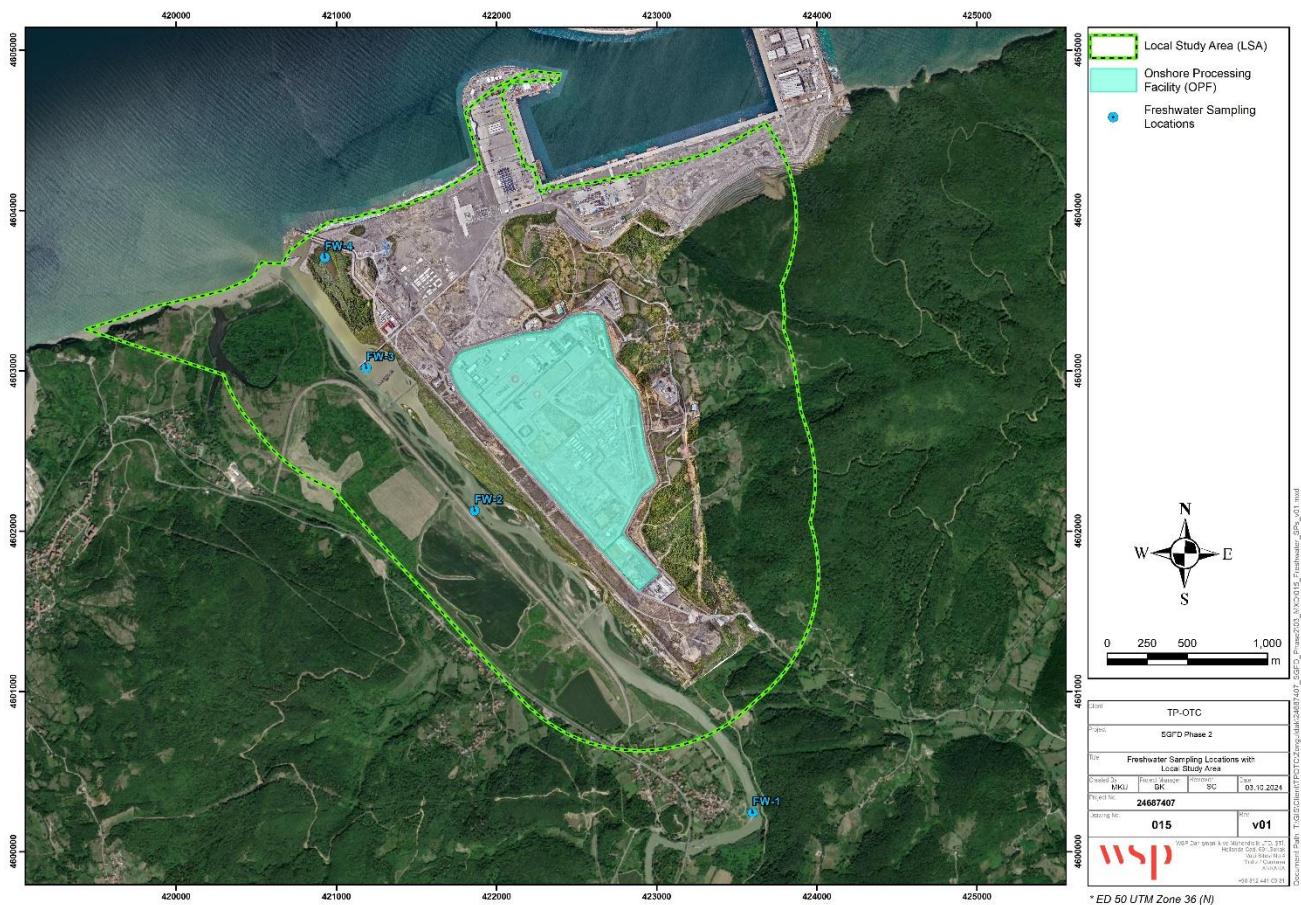
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**Figure 6-6: Fauna sampling stations.**

Aquatic invertebrates, including those having only an aquatic life stage, were sampled from four stations along Yenice River and the coastal pond on the Project area (Figure 6-7). Tables of aquatic invertebrates are available in Appendix F.

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**Figure 6-7: Freshwater sampling stations.**

Invertebrate specimens were collected using a scoop net in the three river stations and a Peterson Grap for the pond station (Station 4) (Figure 6-8), sampling was replicated three times at each station and sampled material was sieved (mesh size 0.5mm) and sorted for subsequent identification in the laboratory.



**Figure 6-8: Sampling of benthic organisms using a scoop net and a Peterson Grap.**

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The collected data on abundance, diversity, and distribution of aquatic invertebrate taxonomic groups and species was then used to calculate four different biotic indices (Shannon-Wiener Index ( $H'$ ), BWMP (Biological Monitoring Working Party), ASPT (Average Score Per Taxon), and FBI (Family Biotic Index)) which gave an indication of the biological water quality of Yenice River and the coastal pond. The values obtained concluded that Yenice River is in a moderate ecology state while the pond ecological status has been evaluated as poor.

### Regional context (RSA)

There are an identified 30.000 invertebrate species present in Türkiye although the real number is thought to potentially reach the 80.000 species (GDEI API, 2016). This uncertainty makes it difficult to assess the number of species present within the RSA from bibliographical data as this is represented as the combination of both terrestrial and freshwater RSAs (Figure 6-2). Despite the uncertainty on the actual number of species, invertebrates remain a main contributor to Türkiye's rich biodiversity in the different regions, supported by a high rate of endemism. Amongst them, only 59 endemic Lepidoptera (Butterflies) species have been reported as both endemic and either rare or endangered (GDEI API, 2016). This group is also fundamental to the food chain in a wide range of terrestrial and aquatic habitats.

### Local Context (Aol)

The terrestrial invertebrates table that has been observed within the Project Aol both through the specific surveys and recorded historically from literature sources given in Appendix F. Field survey focused on two main groups, namely Lepidoptera (Butterflies) and Odonata (Dragonflies) as these represent a widely used indicator of environmental health. No endangered and/or endemic species were identified locally, only one lepidoptera species, *Lycaena dispar* (Large Copper, Figure 6-9), was reported as Near Threatened according to IUCN and the Red Book of Butterflies in Türkiye (Karaçetin and Welch, 2011).



Figure 6-9: *Lycaena dispar* (Large Copper).

The 589 freshwater aquatic invertebrates sampled in Yenice River, and the coastal pond belonged to 22 species from four systematic groups, in order of abundance Arthropoda-Insecta (14), Arthropoda-Crustacea (4), Mollusca (3) and Anellida (2). A comprehensive list of collected and expected (from literature) species is given in Appendix F.

Taxa of Annelida phylum and members of the Chironomidae family of class Diptera were predominantly found at the pond station (4th station), these groups are generally associated to stagnant water, low in oxygen, with muddy bottoms and are often found in polluted environments. Conversely, members of orders such as Trichoptera, Odonata and Ephemeroptera live in gravelly and oxygen-rich environments and have been found in river stations.

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## Sensitivity Assessment

Sensitivity features	Supported by	Sensitivity value
Limited number (1) of threatened species of freshwater aquatic invertebrates.	Primary data and secondary data	<b>Medium-low</b>
Absence of endemic or restricted range species of freshwater aquatic invertebrates.		

### 6.2.3 Freshwater fish

<b>Description</b>	Fish are aquatic animals which have gills. They are found in almost all aquatic environments and have a great diversity. Freshwater fish include species that evolved to survive exclusively in freshwater as well as those species that can tolerate different levels of salinity and also spend part of their life in salt water. It includes lampreys, hagfish, bony fish and cartilaginous fish.
<b>Study Area</b>	<p><b>RSA:</b> The freshwater ecoregion “430 Northern Anatolia”<sup>3</sup>, which comprises temperate coastal rivers and estuaries of north-central and western Anatolian Türkiye.</p> <p><b>Rationale:</b> This freshwater ecoregion provides the general species and habitats potentially occurring within and in the vicinity of the Project Site.</p> <p><b>AoI:</b> The terminal 4 km of Yenice River, including ponds and estuary ramifications.</p> <p><b>Rationale:</b> None of the Project’s activities have been considered to influence the abundance and distribution of freshwater fish species further upstream than 4 km from the river mouth.</p>
<b>Data sources</b>	<p><b>Primary sources:</b> specific field work campaigns:</p> <ul style="list-style-type: none"> <li>■ eDNA analysis from water samples collected by WSP in February 2022</li> <li>■ conducted in February, March and May 2022, July 2023 and July 2024 by local freshwater expert Prof. Aydin Akbulut.</li> </ul>
	<b>Secondary sources:</b> Secondary sources came from scientific articles and grey literature.

<sup>3</sup> According to Freshwater Ecoregions of The World (FEOW) (<https://www.feow.org/>)

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## Methodological approach

Data to describe the regional context (i.e., RSA) were collected through literature review (references reported in Chapter 13.0, whereas the local context (i.e., AOL) was assessed by both literature review and the gathering of field data.

### Fish Survey Campaign

Fish surveys were conducted in three stations in Yenice River, and one in the coastal pond (Figure 6-7). River surveys consisted in a 30 min long electrofishing sampling using a portable electro-shocker, a device that generates a small electric field around the surveyor to stun the fish (Figure 6-10) and allow its collection with a scoop net (Figure 6-11).

Electrofishing technique was not deemed suitable in the coastal pond due to its muddy bottom and deeper waters. Fish nets were used in this habitat, 150 m long nets were deployed in the water crossing the pond and left in place for 24 hours. The fish collected was then identified to the lowest taxonomic level, measured (length, weight, etc.) and released, only one individual per species was kept for laboratory confirmation of species and genetic samples.



**Figure 6-10: Electrofishing survey of Yenice River.**



**Figure 6-11: Net sampling in coastal pond.**

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## Regional Context (RSA)

The Project freshwater RSA corresponds to the freshwater ecoregion “430 Northern Anatolia” characterized by temperate coastal rivers which drainages flowing into the Black Sea. It comprises the drainages of north-central and western Anatolian Türkiye, from the Sakarya basin in the west to the Kizil and Kelkit basins in the east (Figure 6-2).

Türkiye can count a total of 409 freshwater fish species, with about 194 endemic species, mostly due to speciation in isolated mountain lakes and water basins (Çiçek et al., 2018).

There is a very limited number of studies on the fish species from the streams of the Western Black Sea region, within the RSA there is only one species classified as CR (“Critically Endangered”) by IUCN, *Cobitis splendens*, which has been described in only one stream about 16 km east of Akçakoca (west of Zonguldak area). No endangered species were reported within the RSA (IUCN), although, between 10% and 20% of the species in the area are endemic (Çiçek et al., 2018). According to Çiçek et al. (2018) the number of endangered and critically endangered species under the IUCN classification parameters could be up to 30% of the total endemic fish. In addition, 29 exotic fish species have been also introduced to freshwater systems across Türkiye.

## Local context (Aol)

The results of the field investigation campaign confirmed the absence of endangered and critically endangered fish species among the 17 encountered within the Aol. Two endemic species were recorded during fish surveys, *Capoeta tinca* (Figure 6-12-a) and *Cobitis simplicispina* ((Figure 6-12-b)). Other endemic species, *Alburnoides turani* (Figure 6-12-c) was detected with the eDNA analysis of water samples taken from the river during previous field surveys and not observed in July 2023-2024 surveys.



a) *Capoeta tinca*



b) *Cobitis simplicispina*



c) *Alburnoides turani*

Figure 6-12: Endemic fish species within the project Aol.

Despite the absence of endangered species, the presence of endemic species should be considered as an indication of the ecological importance of freshwater habitat around the Project site. In particular, *Alburnoides turani*, has been discovered and described in Yenice Basin only in 2020.

The endemic fish species, *Capoeta tinca*, was sampled from stations 1, 2, 3, and 4, and *Cobitis simplicispina* was sampled from stations 1 and 3 during the 2023-2024 surveys

Finally, two introduced species were also found, *Carassius gibelio* (Prussian carp) in the coastal pond, and *Pseudorasbora parva* (Topmouth gudgeon) in station 3 and station 2.

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## Sensitivity Assessment

Sensitivity features	Supported by	Sensitivity value
Absence threatened fish species	Primary data and secondary data	<b>Medium</b>
Presence (3) of endemic fish species		
Presence (2) of introduced species		

### 6.2.4 Amphibians

<b>Description</b>	Cold-blooded vertebrate animals that have, at least, an aquatic gill-breathing larval stage. This class comprises frogs, toads, newts, salamanders, and caecilians and inhabit a wide variety of habitats, with most species living within terrestrial, fossorial, arboreal or freshwater aquatic ecosystems. Although, there is a need for freshwater habitats across nearly all species.
<b>Study Area</b>	<p><b>RSA:</b> The freshwater ecoregion “430 Northern Anatolia”, which comprises temperate coastal rivers and estuaries of north-central and western Anatolian Türkiye.</p> <p><b>Rationale:</b> This freshwater ecoregion provides the general species and habitats potentially occurring within and in the vicinity of the Project Site.</p> <p><b>Aol:</b> The terminal 4 km of Yenice River, including ponds and estuary ramifications.</p> <p><b>Rationale:</b> None of the Project’s activities have been considered to influence the abundance and distribution of freshwater fish species further upstream than 4 km from the river mouth.</p>
<b>Data sources</b>	<p><b>Primary sources:</b> specific field work campaigns:</p> <ul style="list-style-type: none"> <li>■ conducted in July 2023 and July 2024 by local expert Dr. Şafak Bulut.</li> </ul>
	<b>Secondary sources:</b> Secondary sources came from scientific articles and grey literature.

### Methodological approach

Data to describe the regional context (i.e., RSA) were collected through literature review (references reported in Chapter 13.0, whereas the local context (i.e., Aol) was assessed by both literature review and the gathering of field data.

Amphibians field surveys were conducted in all suitable habitats (e.g., puddles, irrigation channels, arcs, humid areas, etc.) within the appropriate Aol for this group. Observation efforts were concentrated especially at temporary riparian zones and at sites where the water flow was very low and/or stagnant. The bottoms of plants and stones were checked, the detected individuals were identified via direct observation, where a clear

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identification was not possible the individuals were captured, photographed, and released. Photo identification was carried out at a later date.



**Figure 6-13: Surveys in suitable habitats for amphibians.**

#### Regional context (RSA)

No CR or EN amphibian species were reported in the official IUCN lists within the RSA (IUCN; Kaya et al., 2012). A total of 35 amphibian species, including 12 endemics, are present in Türkiye with about ten species, of which one endemic *Triturus anatolicus* possibly occurring in the RSA.

#### Local context (AoI)

The data collection, both from the field and literature, within the Project's AoI confirmed the presence of 10 amphibian species in the area (Appendix F). Only one endemic species, *Triturus anatolicus* (Figure 6-14) was found and its presence in the Yenice River was confirmed by genetic material detected by eDNA analysis prior to construction works in the area. However, *Triturus anatolicus* species was not detected during the 2023-2024 field surveys.

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**Figure 6-14: *Triturus anatolicus* (image from Wielstra and Arntzen, 2016).**

The field investigations also identified the presence of areas, within the Project's AOL, deemed suitable for the spawning of the detected species. These areas should be carefully managed during spring seasons at the different Project phases.

### Sensitivity assessment

Sensitivity features	Supported by	Sensitivity value
Absence of threatened amphibian species	Primary data and secondary data	<b>Medium</b>
Presence of protected species (8)		
Limited presence (1) of endemic amphibian		
Presence of areas, within the Project's AOL, deemed suitable for the spawning of the amphibian		

### 6.2.5 Reptiles

Description	Cold-blooded vertebrate animals.
Study Area	<p><b>RSA:</b> The Western Euxine region within the “PA0422. Euxine-Colchic broadleaf forests and the freshwater ecoregion “430 Northern Anatolia”, which comprises temperate coastal rivers and estuaries of north-central and western Anatolian Türkiye.</p> <p><b>Rationale:</b> Based on literature review, these are the regional broad areas containing the geographically distinct terrestrial and freshwater habitats potentially occurring within and in the vicinity of the Project.</p> <p><b>AOL:</b> 1000 m buffer around the Project Area</p> <p><b>Rationale:</b> As per other taxonomic groups, reptiles include species with different distribution ranges and inhabiting different habitats. The AOL was selected, in a conservative manner, considering all species that could be negatively impacted by the different Project actions.</p>

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Data sources	<p><b>Primary sources:</b> field work campaigns:</p> <ul style="list-style-type: none"> <li>■ conducted in April and May 2021 by Armada.</li> <li>■ conducted in April and May 2022, July 2023 and July 2024 by local expert Dr. Şafak Bulut</li> <li>■ conducted in May 2022, July 2023 and July 2024 by local freshwater expert prof. Aydin Akbulut.</li> </ul>
	<p><b>Secondary sources:</b> Secondary sources came from scientific articles and grey literature.</p>

## Methodological approach

Data to describe the regional context (i.e., RSA) were collected through literature review (references reported in Chapter 13.0), whereas the local context (i.e., Aol) was assessed by both literature review and the gathering of field data.

Surveys were conducted mostly at areas with rocky-stony habitats and tree hollows to detect reptile species (turtles, lizards and snakes) at the study site. In accordance with the specific reptile study methodology bottoms of plants and stones were also checked, the detected individuals were collected by hand and catcher rod, when possible, and identified in the field to the lowest taxonomic level, before being photographed and released.

## Regional context (RSA)

The extent of the RSA for reptile species is reported in Figure 6-2. Of the 145 reptilian species that can be found in Türkiye, 22 are endemic, seven are EN, and 4 CR (Kurnaz, 2020). No EN or CR species were reported occurring within the RSA, according to the literature and IUCN lists, most of these species, in fact, were distributed in eastern Anatolia. Nevertheless, three endemic species could be present in the RSA (*Darevskia rudis*, *Darevskia bithynica*, and *Vipera (Pelias) barani*).

## Local context (Aol)

Survey data and literature sources identified 21 species of reptiles within the Project's Aol, amongst these two endemic species, *Darevskia bithynica* and *Vipera (Pelias) barani*, were present while no identified species had a CR or EN conservation status (IUCN).



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***Darevskia bithynica***

***Vipera barani*, male individual from kozluk,  
Zonguldak (Kumlutaş et al., 2013)**

**Figure 6-15: Endemic reptile species within the Project AOL.**

In addition to the results from the reptile specific field surveys, an individual of the European pond turtle *Emys orbicularis*, probably subspecies *hellenica*, has also been encountered in the costal pond during the freshwater fish survey campaign (Figure 6-16).



**Figure 6-16: *Emys orbicularis* (subspecies *hellenica*), dorsal and ventral view.**

A complete list of the species can be found in the Appendix F. Totally 19 species inhabiting the AOL result under protection according to the international conventions and or national regulations.

During the interviews with the personnel working in the field, Dr. Bulut determined that there was Tortoise activity in the field, from a species classified on IUCN's Red List as "VU" (*Testudo graeca*, Figure 6-17).



**Figure 6-17: Spur-thighed Tortoise (*Testudo graeca*).**

## Sensitivity Assessment

Sensitivity features	Supported by	Sensitivity value
Absence of threatened species	Primary data and secondary data	Medium
Presence of protected species (17)		
Limited presence (2) of endemic species		
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## 6.2.6 Birds

<b>General Overview</b>	Birds, including sea birds (or Marine birds) are any warm-blooded vertebrate of the class Aves, having a body covered with feathers, forelimbs modified into wings, scaly legs, a beak, and no teeth, and bearing young in a hard-shelled egg. Many birds are colonial, and some migrate after the breeding season.
<b>Study Area</b>	<p><b>RSA:</b> The Anatolian peninsula and the Black Sea coastal area</p> <p><b>Rationale:</b> As many birds migrate, the migration routes need to be taken into consideration when assessing the RSA area. The Project site is located along one of Türkiye's migratory routes and therefore, it has the potential of influencing the migration of birds across the country and the surrounding areas. In addition, seabirds can also spend most of their time feeding with similar species, and different groups of the same species, in open sea and then rest and breed along the whole Black Sea coast.</p> <p><b>Aol:</b> The Turkish Black Sea coastal area from Filyos Port to Adapazarı</p> <p><b>Rationale:</b> The Project site is located on a migratory route that runs east-to-west along the north coast of Türkiye, therefore any impact from a Project activity has the potential to influence the whole length of the route until it converges with the other routes from the south-east.</p>
<b>Data sources</b>	<p><b>Primary sources:</b> field work campaigns:</p> <ul style="list-style-type: none"> <li>■ conducted in April and May 2021 by Armada.</li> <li>■ eDNA analysis from water samples collected by WSP in February 2022</li> <li>■ conducted in January, February, March, and May 2022, July 2023 and July 2024 by local expert Dr. Şafak Bulut.</li> </ul> <p><b>Secondary sources:</b> Secondary sources came from scientific articles, grey literature, and databases.</p>

### Methodological approach

Data to describe the regional context (i.e., RSA) were collected through literature review (references reported in Chapter 13.0), whereas the local context (i.e., AOL) was assessed by both literature review and the gathering of field data.

Field studies were conducted in 2022, 2023 and 2024 at suitable habitats at the Project site and alternative areas to detect the bird species within the Study Area. The nests, eggs, youngster and adult birds in these areas were all recorded. The biological activities of the birds (breeding, feeding, on the move, etc.) at these areas were also recorded. Photographs of individuals of observed bird species were taken, when possible.

Bird surveys were based on observations from a fixed location from where the whole project area can be seen and all the birds flying can be detected, surveyors used a vantage point (VP) (on high ground) methodology for both migratory and breeding/resident species as described in the Onshore Wind Farm Guidance published by

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Scottish Natural Heritage (SNH). The VP methodology required a minimum of 36 hours of observations (SNH 2010).

### Regional context (RSA)

A representation of the migration routes across the Anatolian peninsula is reported in Figure 6-18.

According to IUCN lists, there are about 8 CR, and 15 EN bird species in the areas around the Black Sea that are included in the RSA, among these three CR and five EN can be found within the Turkish national territory.



**Figure 6-18: Main bird migration routes across Anatolian peninsula, with Project site (red dot).**

### Local context (Aol)

A total of 264 bird species were identified within the Project's Aol according to field observations and literature data. A complete list of the species can be found in the Appendix F.

Of these species, IUCN lists *Aquila nipalensis* (Steppe Eagle) and *Oxyura leucocephala* (White-headed Duck) (Figure 6-19) as EN category.

There are no endemic species identified within the Aol.

The Project's Aol is also included within the west boundary of an Important Bird Area (Amasra Coast KBA and IBA) the operation area and its vicinity appear to be used as staging post by the migratory birds.

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*Aquila nipalensis* (image from IUCN)



*Oxyura leucocephala* (image from [birdsoftheworld.org](http://birdsoftheworld.org))

Figure 6-19: Bird species from Project AoI.

### Sensitivity assessment

Sensitivity features	Supported by	Sensitivity value
Presence of threatened bird species (2).	Primary data and secondary data	<b>Medium-high</b>
Presence of protected species (175)		
Absence of endemic species.		

#### 6.2.7 Mammals

General Overview	Warm-blooded vertebrate animals of the class Mammalia, whose young feed on milk produced by the mother's mammary glands. Mammals have a diaphragm that separates the heart and lungs from the other internal organs, red blood cells that lack a nucleus, and usually hair or fur. All mammals but the monotremes bear live young. Mammals include rodents, cats, dogs, ungulates, cetaceans, and apes.
Study Area	<p><b>RSA:</b> The Western Euxine region within the “PA0422. Euxine-Colchic broadleaf forests”.</p> <p><b>Rationale:</b> Based on literature review, this is the regional broad area containing the geographically distinct plant species and habitats potentially occurring within and in the vicinity of the Project and therefore, including the mammal species adapted to live in these habitats.</p> <p><b>AoI:</b> 1000 m buffer around the Project Area</p>

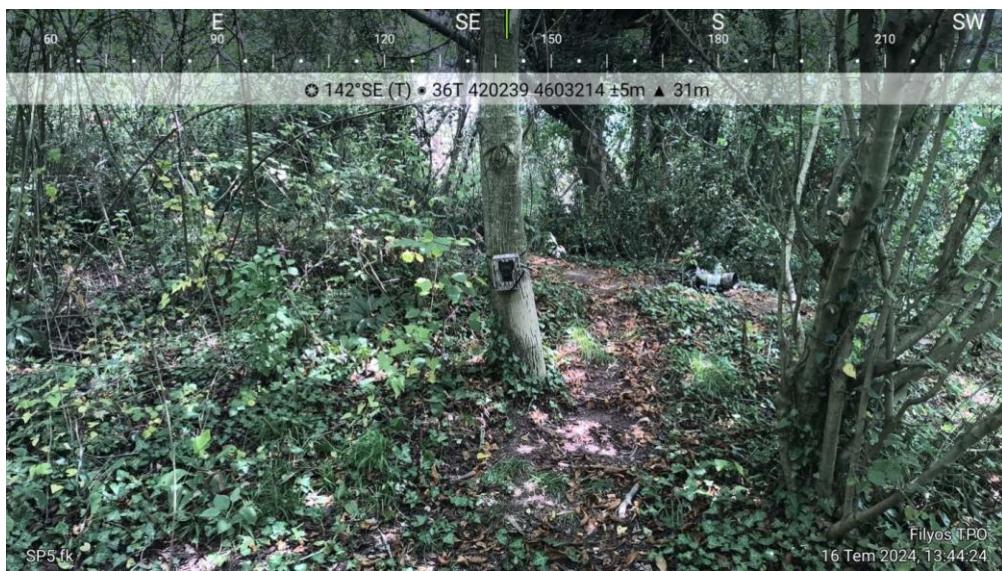
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	<p><b>Rationale:</b> This taxonomic group includes a variety of species with different distribution ranges and that can be found in a number of different habitats. The AOL was selected, in a conservative manner, considering all species that could be impacted by the different Project actions.</p>
<b>Data sources</b>	<p><b>Primary sources:</b> field work campaigns:</p> <ul style="list-style-type: none"> <li>■ conducted in April and May 2021 by Armada.</li> <li>■ conducted in January, February, March, and May 2022, July 2023 and July 2024 by local expert Dr. Şafak Bulut.</li> </ul>
	<p><b>Secondary sources:</b> Secondary sources came from scientific articles and grey literature.</p>

## Methodological approach

Data to describe the regional context (i.e., RSA) were collected through literature review (references reported in Chapter 13.0), whereas the local context (i.e., AOL) was assessed by both literature review and the gathering of field data.

Field studies were carried out in and around the project site for mammalian species using camera trap (Figure 6-2), positioned in point where mammals were determined to be more active (Figure 6-20). The device remained operative from 2022 and photographs were taken every 3 months.



**Figure 6-20: Camera trap within the AOL.**

## Regional context (RSA)

Only one mammal species of the over 100 that can be found within the RSA is listed as EN, *Myomimus roachi* (Mouse-tailed Dormouse). The RSA includes only about five “Vulnerable” species.

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### Local context (Aol)

Of the 44 species of mammals identified in the Project's Aol no endangered species were included. Only two "VU" bat species (i.e., *Myotis capaccinii* and *Miniopterus schreibersii*) were reported in the area. Although, the flying and feeding activities of bats have been determined to be more frequent around the Project site and not within it.

In addition to the IUCN classification the European Otter (*Lutra lutra*) is included in Appendix I of CITES as well as being recently assessed as "Largely Depleted" (IUCN, The Green Status Assessment). The photo traps also suggested that the area is frequented by different species of wild mammals, in particular predators, some examples are given Figure 6-21.



Golden Jackal (*Canis aureus*)



Red Fox (*Vulpes vulpes*)

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Stone Marten (*Martes foina*)



Wild Boar (*Sus scrofa*)



Hare (*Lepus europaeus*)

**Figure 6-21: Some photo-trap photos within the Project AOL.**

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A complete list of the species can be found in the Appendix F.

## Sensitivity Assessment

Sensitivity features	Supported by	Sensitivity value
Absence of threatened species	Primary data and secondary data	<b>Medium</b>
Presence of protected species (24) including bat species, predators and scavengers, and European otter.		
Absence of endemic species.		

### 6.2.8 Habitats

<b>Description</b>	Habitat is defined as a terrestrial, freshwater, or marine geographical unit or airway that supports assemblages of living organisms and their interactions with the non-living environment (IFC GN6).
<b>Study Area</b>	<p><b>RSA:</b> The Western Euxine region within the “PA0422. Euxine-Colchic broadleaf forests”. The freshwater ecoregion “430 Northern Anatolia”, which comprises temperate coastal rivers and estuaries of north-central and western Anatolian Türkiye.</p> <p><b>Rationale:</b> Based on literature review, this is the regional broad area containing the geographically distinct species and habitats potentially occurring within and in the vicinity of the Project. This freshwater ecoregion provides the general freshwater species and habitats potentially occurring within and in the vicinity of the Project Site.</p> <p><b>Aol:</b> 200 m buffer around the Project Area</p> <p><b>Rationale:</b> Flora and fauna species characterizing the different habitats are expected to be influenced by Project activities only in the immediate vicinity of the Project site.</p>
<b>Data sources</b>	<p>Primary sources: field work campaigns:</p> <ul style="list-style-type: none"> <li>■ conducted in April and May 2021 by Armada;</li> <li>■ conducted in February and May 2022, July 2023 and July 2024 by a local flora expert Prof. Hayri Duman on behalf of WSP.</li> <li>■ conducted in January, February, March, and May 2022, July 2023 and July 2024 by local expert Dr. Şafak Bulut;</li> <li>■ Freshwater fish surveys conducted in March and May 2022, July 2023 and July 2024 by local expert prof. Aydin Akbulut.</li> </ul> <p><b>Secondary sources:</b> Secondary sources came from scientific articles and grey literature.</p>

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## Methodological approach

Data to describe the regional context (i.e., RSA) were collected through literature review (references reported in Chapter 13.0), whereas the local context (i.e., Aol) was assessed by both literature review and the gathering of field data.

Alongside the general classification of the habitats obtained through the bibliography the field surveys carried out from the local experts provided an accurate description of the flora and fauna that was used to better characterize the habitats according to the international guidelines (EUNIS).

The Natural and Modified habitats present within the RSA and Aol were determined based on literature review, analysis of satellite images on Google Earth and field surveys.

## Regional context (RSA)

The Euxine-Colchic broadleaf forests (PA0422) is temperate broadleaf and mixed forests ecoregion located along the southern shore of the Black Sea. The ecoregion extends along the thin coastal strip from the south-eastern corner of Bulgaria in the west, across the northern coast of Türkiye, to Georgia in the east, where it wraps around the eastern end of the Black Sea (Ayyildiz et al., 2011).

The unique ecosystems of the plains around the Black Sea (Colchian forests), are one of the most valuable biosphere genetic resources in the world and shelter many relict species such as *Parrotia persica*, *Gleditsia caspica*, *Zelkova carpinifolia*, and *Pterocarya fraxinifolia* (Naqinezhad et al., 2018). The Colchic region has high rainfall, averaging 150–250 centimetres annually, with a maximum of more than 400 cm, and is home to some of Europe's temperate rainforests. The Euxine forests receive a little less rainfall with an average of 100 to 150 cm precipitation annually.

The Northern Anatolia (430) ecoregion comprises the drainages of north-central and western Anatolian Türkiye, from the Sakarya basin in the west to the Kizil and Kelkit basins in the east. The ecoregion is bounded by the Black Sea to the north, the Western Transcaucasia ecoregion (433) to the east, the Upper Tigris-Euphrates (442), Southern Anatolia (432), and Central Anatolia (431) to the south, and Western Anatolia (429) and Thrace (423) to the west. The ecoregion lies on the Anatolian Plateau, incised by rivers along minor coastal plains. The coast is steep and rocky and rivers cascade through the coastal range of the Pontus, which forms an interrupted chain paralleling the coast, rising eastwards to more than 3500 m. Between the Sakarya and Kizil rivers lie four main ridges of the western Pontic Mountains: Kure, Bolu, Ilgaz, and Koroglu mountains. The Kizil and Yesil Irmak rivers have built up deltas in the sea from their heavy silt load (Akbulut et al., 2022).

## Local context (Aol)

The flora surveys conducted within the Project's Aol have identified 11 different EUNIS habitat classes:

- B1.4c Black Sea coastal stable dune grassland (grey dunes)

This habitat consists of *Centaurea kilaea* Boiss, a regional endemic species and non-endemic but rarely occurring *Pancratium maritimum* and *Peucedanum obtusifolium*. The dominant species of the habitat are *Otanthus maritimus*, *Teucrium polium* and *Medicago marina*.

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B1.4c- Coastal stable dune grassland (grey dunes)

- B1.6: Costal dune scrub

This habitat represents the shrub habitat that develops on the seashore dunes. The dominant species of the habitat are *Hippophae rhamnoides* and *Rubus sanctus*.



B1.6: Costal dune scrub

- C1.2 Permanent mesotrophic lakes, ponds and pools

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This habitat was formed as a result of blockage of the branches of Filyos Creek. The habitat which resembles ponds consists of occasional *Phragmites australis*, *Thypha domingensis* and *Schoenoplectus lacustris* species.



C1.2-Permanent mesotrophic lakes, ponds and pools

- C2.3 Permanent non-tidal, smooth-flowing watercourses

This habitat type represents Filyos Creek. The creek which flows fast at some locations and slows down at others consists of trees and herbaceous species with high water demand.



C2.3-Permanent non-tidal, fast, turbulent watercourses

- C3.2 Water-fringing reedbeds and tall helophytes other than canes

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This habitat represents tall herbaceous species developing by the banks of Filyos Creek and the ponds. The dominant species of the habitat are *Phragmites australis* and *Thypha domingensis*.



#### C3.2-Water-fringing reedbeds and tall helophytes other than canes

- D5.2 Beds of large sedges normally without free-standing

This habitat occurs in the flood zones of Filyos Creek. It represents marshland habitats which are under water in winter months and devoid of water in summer months. The dominant species of the habitat are *Phragmites australis*, *Juncus littoralis*, *Juncus maritimus* and *Cyperus longus*. In addition, *Iris pseudacorus* was found in this habitat.

The riparian vegetation on the banks of the Filyos Creek (G1.1) was cleared by government authorities (DSI-State Hydraulic Works) for flood prevention purposes as part of stream improvement works outside the scope of the project. This habitat has been replaced over time by D5.2 habitat.

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D5.2-Beds of large sedges normally without free-standing

- G1.1 Riparian and gallery woodland, with dominant *Alnus*, *Betula*, *Populus* or *Salix*

This habitat represents the riparian gallery forestry occurring on the edge of the C2.3 habitat. The dominant species of the habitat are *Alnus glutinosa*, *Salix alba* and *Platanus orientalis*. *Heracleum platytaenium* which is widespread endemic is spread in the opening of this forests.

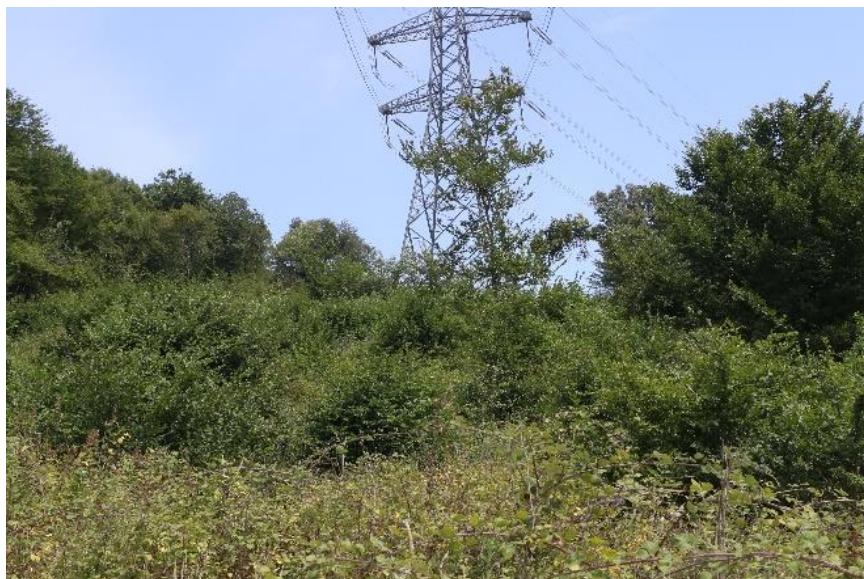
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G1.1 Riparian and gallery woodland, with dominant *Alnus*, *Betula*, *Populus* or *Salix*

- G1.A Meso-and eutrophic *Quercus*, *Fraxinus*, *Acer*, *Tilia*, *Ulmus* and related woodland

This habitat represents the deciduous forestry occurring in the periphery of the project area. The dominant species of the habitat are *Carpinus betulus*, *Quercus hartwissiana* and *Quercus frainetto*. The habitat consists of *Cyclamen coum* which is included in CITES App. 2 list.



G1.A-Meso-and eutrophic *Quercus*, *Fraxinus*, *Acer*, *Tilia*, *Ulmus* and related woodland

- G1.C Highly artificial broadleaved deciduous forestry

This modified habitat consists of *Fraxinus angustifolia* plantation.

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G1.C-Highly artificial broadleaved deciduous forestry

- G2.8 Highly artificial broadleaved evergreen forestry

This modified habitat consists of *Eucalyptus camaldulensis* plantation.



G2.8-Highly artificial broadleaved evergreen forestry

- J1.6 Urban and suburban construction and demolition sites

This modified habitat represents the areas where the facilities operate, and the ongoing construction works.

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J1.6- Urban and suburban construction and demolition sites

The resulting map of the AoI according to the flora assessment and characterization is reported in Figure 6-22.

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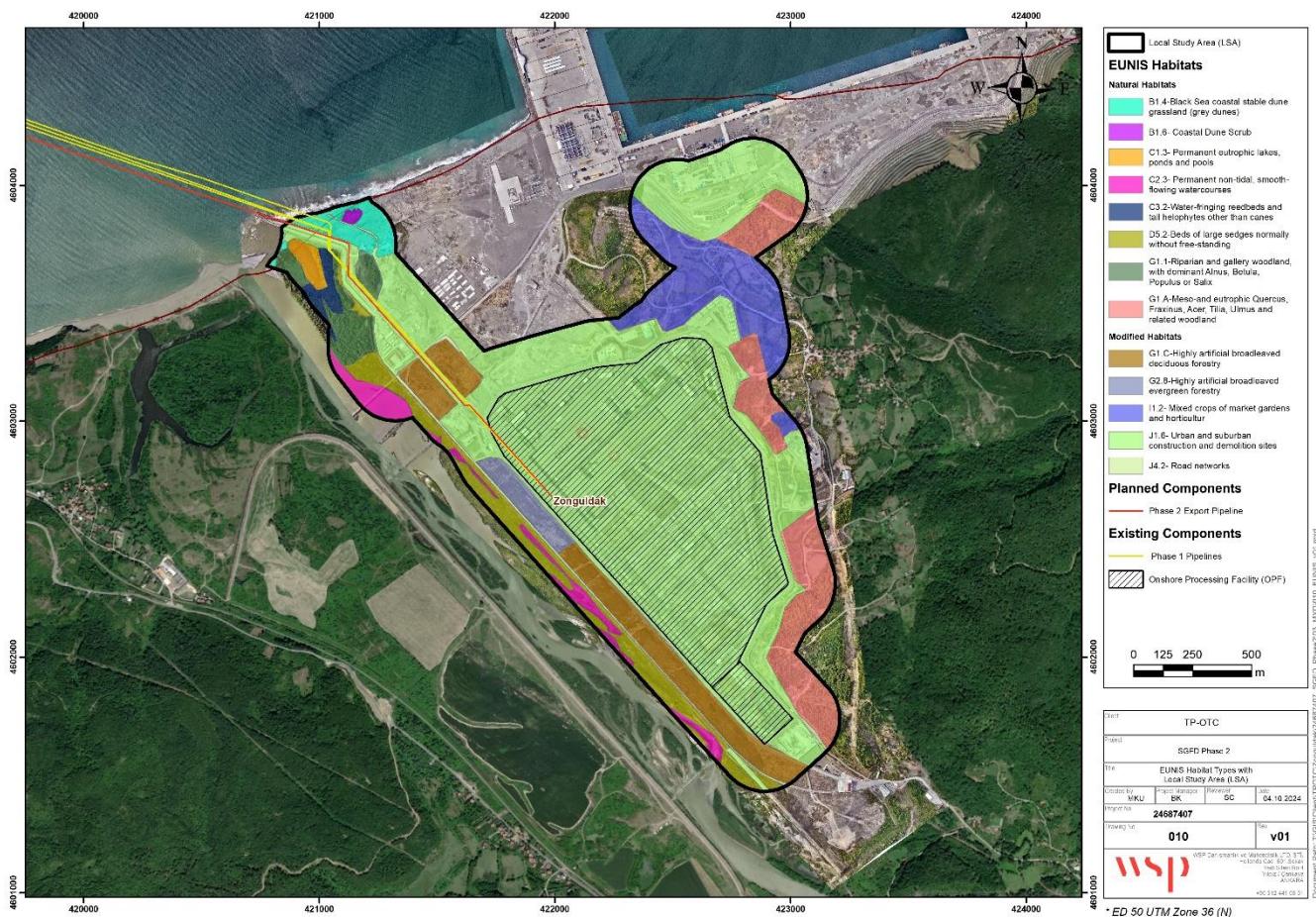


Figure 6-22: EUNIS Habitat Map of the Biodiversity Aol.

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One identified habitat is classified as critical, B1.4 (EN) as it contains rare and critical species and are threatened by increasing coastal development.

The additional classification of the freshwater habitats on the four sampling stations (Figure 6-7) is presented in the table below:

**Table 6-4: Freshwater habitat classification**

Station	EUNIS habitat type	Description
Freshwater Station_1	C2.3 - Permanent non-tidal, smooth-flowing watercourses	It has turbulent, irregular, and large water volume. It is a wide riverbed and a fast-flowing river with laminar flow. The bottom structure consists of sand or mud.
Freshwater Station_2	C2.3 - Permanent non-tidal, smooth-flowing watercourses	It has turbulent, irregular, and large water volume. It is a wide riverbed and a fast-flowing river with laminar flow. The bottom structure consists of sand or mud. There are trees and bushes around the sampling point.
Freshwater Station_3	C2.3 - Permanent non-tidal, smooth-flowing watercourses	It has turbulent, irregular, and large water volume. It is a wide riverbed and a fast-flowing river with laminar flow. The bottom structure consists of sand or mud. There are trees and bushes around the sampling point.
Freshwater Station_4	C1.3 - Permanent eutrophic lakes, ponds and pools	It has a stagnant lake ecosystem. It is a lagoon lake that is filled with water during the flood periods of the river waters. It is surrounded by dense reeds.

The excessive ecological impoverishment of the coastal pond habitat could have adverse effects especially on the birds living in the area as well as those migrating across the north coast of Türkiye and using Yenice estuary as an occasional stop for feeding during their migration.

According to the habitat classification more than 70% of the AoI consists of “Modified habitats” (J1.6; J4.2; I1.2; G1.C; G2.8 of Figure 6-22).

## Sensitivity Assessment

Sensitivity features	Supported by	Sensitivity value
Presence of threatened and/or protected habitats (Habitat: B1.4)	Primary data and secondary data	Medium-high

### 6.2.9 Legally Protected Areas and Internationally Recognized Areas

Description	Legally Protected Areas and Internationally Protected Areas are “clearly defined geographical spaces, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature	

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	with associated ecosystem services and cultural values" (IUCN Definition 2008).
<b>Study Area</b>	<p><b>RSA:</b> Türkiye national territory.</p> <p><b>Rationale:</b> Based on literature review, this is the regional broad area containing the geographically distinct species and habitats potentially occurring within and in the vicinity of the Project. This freshwater ecoregion provides the general freshwater species and habitats potentially occurring within and in the vicinity of the Project Site.</p> <p><b>AoI:</b> 10 km buffer around the Project Area</p> <p><b>Rationale:</b> Türkiye does not have regulations on distances from the boundaries of a protected area where a project can be implemented. Therefore, using a precautionary approach, a 10-km buffer is considered as appropriate.</p>
<b>Data sources</b>	<ul style="list-style-type: none"> <li>■ Primary sources: no primary sources were required</li> </ul> <p><b>Secondary sources:</b> Secondary sources came from scientific articles and grey literature.</p>

## Methodological approach

Data to describe the regional context (i.e., RSA) and the AoI were collected through literature review (references reported in Chapter 13.0). Local expert communications were also considered.

### Regional context (RSA)

Türkiye has the 8.9% of its territory under protection through a system of 15 different categories of Protected Areas (Birben, 2019). These categories include “National Parks”, “Nature Parks”, “Natural Monuments” and “Nature Protection Areas”, “Wildlife Protection Areas”, “Wildlife Development Areas”, and “Wildlife Settlement Areas”, under the national legislation.

### Local context (AoI)

There are no Protected Areas, as per those categories mentioned above, within the Project's AoI. The Filyos Bird Sanctuary (personal communication Dr. Bulut) – local bird expert) is reported within the IBA immediately north-west of the Project Area. The closest PA is Göldağı Nature Park at approximately 18 km south-west from the Project Site, with four more at distances of 24 to 70 km.

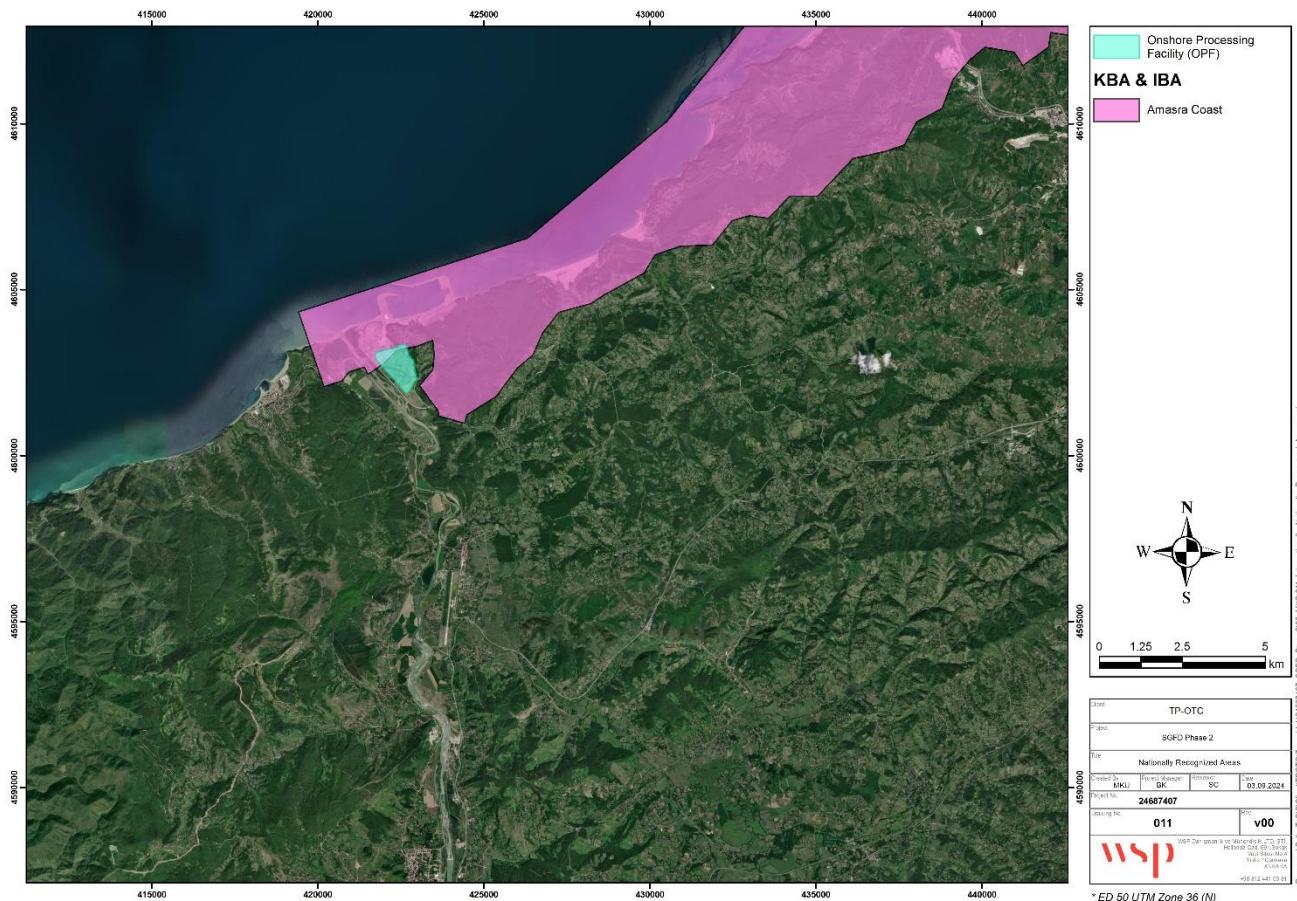
The Amasra Coast KBA and IBA is partially includes the Project Area. In 2004, Amasra Coast was designated a KBA covering 173,807,295 m<sup>2</sup>. There are deciduous forests, maquis communities, agricultural areas, and coastal dunes in the KBA. There are well-preserved small sand beaches and steep rocky slopes along the coastline. *Phalacrocorax aristotelis* is the habitat-acquiring species in the area, which triggers the KBA and IBA criteria<sup>45</sup>. Fishing, mining, agriculture, and animal husbandry are the main human activities. In recent years,

<sup>4</sup> <https://datazone.birdlife.org/site/factsheet/24290>

<sup>5</sup> <https://www.keybiodiversityareas.org/site/factsheet/24290>

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Amasra has become a popular destination for domestic tourism. There is no known threat in the region. However, there is a possibility that tourism activities developed in the region may damage the natural values of the region<sup>6</sup>.



**Figure 6-23: Internationally recognized areas in and around the Project AOL.**

### Sensitivity assessment

Sensitivity features	Supported by	Sensitivity value
Absence of protected areas within the Project's AOL	Secondary data	<b>Medium</b>
Presence of one Key Biodiversity Areas and one relevant area for biodiversity (according to national/local regulation)		

<sup>6</sup> <https://dogadernegi.org/amasra-kiyilari/>

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### 6.2.10 Critical Habitats

Based on the information reported in the sections above, 12 species and two habitats are considered eligible to potentially trigger Critical Habitat (CH) according to the definitions, criteria and thresholds provided by IFC Performance Standard 6 (PS6, 2019). The identified species are reported in Table 6-5.

**Table 6-5: Shortlist of species potentially eligible for the Critical Habitat determination under IFC PS6 Criteria**

Species	National conservation status	IUCN Classification (Criterion I)	Endemism and/or Restricted range (Criterion II)	Migratory or Congregator (Criterion III)	Habitat (Criterion IV)
<b>Flora</b>					
<i>Centaurea kilaea</i>	EN	NE	Endemic	-	-
<i>Peucedanum obtusifolium</i>	VU	NE	-	-	-
<i>Pancratium maritimum</i>	VU	LC	-	-	-
<b>Freshwater Fish</b>					
<i>Alburnoides turani</i>	-	NE	Endemic	-	-
<i>Capoeta tinca</i>	-	LC	Endemic	-	-
<i>Cobitis simplicispina</i>	-	LC	Endemic	-	-
<b>Amphibians</b>					
<i>Triturus anatolicus</i>	-	LC	Endemic	-	-
<b>Reptiles</b>					
<i>Darevskia bithynica</i>	-	LC	Endemic	-	-
<i>Vipera barani</i>	-	NT	Endemic	-	-
<b>Birds</b>					
<i>Aquila nipalensis</i>	-	EN	-	Migrant	-
<i>Oxyura leucocephala</i>	-	EN	-	Migrant	-
<b>Mammals</b>					
<i>Miniopterus schreibersii</i>	-	VU	-	Migrant	-

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Species	National conservation status	IUCN Classification (Criterion I)	Endemism and/or Restricted range (Criterion II)	Migratory or Congregator (Criterion III)	Habitat (Criterion IV)
<i>Myotis capaccinii</i>		VU		Migrant	
<b>Habitats</b>					
B1.4c Coastal stable dune grassland (grey dunes)	-	-	-	-	EN

**Criterion 1: Habitats of significant importance to Critically Endangered and/or Endangered species**

To evaluate those species potentially triggering this criterion the following guidelines from IFC GN6 applied:

**i) Habitats of significant importance to endangered or critically endangered species**

The presence of species having Endangered (EN) or Critically Endangered (CR) conservation status according to Global IUCN criteria shall be considered. In the absence of a Global IUCN assessment (i.e. Not Evaluated NE or Data Deficient DD), local assessments (i.e. RF Red Data Book and YNAO Red Data Book) shall be considered.

In order to assess the importance of the LSA for these species, the following thresholds shall be applied (Guidance Note 6, GN72, IFC 2019):

- areas that support globally important concentrations of an IUCN Red-listed EN or CR species ( $\geq 0.5\%$  of the global population AND  $\geq 5$  reproductive units of a CR or EN species);
- areas that support globally important concentrations of an IUCN Red-listed VU species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds in GN72(a).
- as appropriate, areas containing important concentrations of a nationally or regionally listed EN or CR species.

According to the definitions above, from Table 6-5 three species of flora (*Centaurea kilaea*, *Peucedanum obtusifolium*, and *Pancratium maritimum*), two species of birds (*Aquila nipalensis* and *Oxyura leucocephala*), and two mammalian species (*Miniopterus schreibersii* and *Myotis capaccinii*) were evaluated for this criterion. While not critically endangered or endangered, *Peucedanum obtusifolium* and *Pancratium maritimum* were also included as these species are found to be locally vulnerable with diminishing populations due to the loss of habitat which is identified as B1.4 in EUNIS classification and reported as an endangered habitat. Similarly, *Miniopterus schreibersii* and *Myotis capaccinii* are a vulnerable bat species with declining and highly fragmented populations, the loss of which could result in the change of the IUCN Red List status to EN and meet the thresholds in GN72(a), it was therefore included in the Criterion I evaluation.

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Since for most eligible species an exact numerical estimation of the local populations does not exist, it was adopted the use of an Ecologically Appropriate Area of Analysis (EAAA), which was identified for each species and used to determine the presence of CHs.

Once the EAAA was selected it was then compared with the Extent of Occurrence (EOO) of each species, which represents the global population distribution, in order to identify if that area could potentially meet Criterion I threshold: if the EAAA is  $\geq 0.5\%$  of the EOO, the area is defined as triggering Critical Habitat (CH).

The only exception is represented by the three plant species mentioned above, as these were assessed against Criterion I threshold from the local expert Prof. Duman. He compiled the required information and local knowledge to estimate a correct population size and obtain the concentration value to compare to the 0.5% threshold.

Prof. Duman data (local expert) indicated that *Centaurea kilaea* was the only plant species that was found to have an estimated impacted population of up to 1% of the global Turkish population, with 4000 reproductive individuals present within the AoI. This triggered the Critical Habitat for the relative area of influence for this species, identified as the grey dune area within the Project's boundaries (B1.4 of **Table 6-6**). The results for *C. kilaea*, and the other two plant species analyzed, are reported in **Table 6-6**.

**Table 6-6: Critical Habitat assessment data for endangered plant species**

Species	National conservation status	IUCN Classification	Status of population within the AoI	Ratio to Turkish population
<i>Centaurea kilaea</i>	EN	NE	3500	0,5-1%
<i>Peucedanum obtusifolium</i>	VU	NE	20	0,01-0,2%
<i>Pancratium maritimum</i>	VU	LC	4000	0,1-0,2%

The EAAA identification for each of the remaining species is reported below:

- d) *Aquila nipalensis* has been reported as a possible occasional sighting on the AoI defined for bird species. It has also been classified as Endangered on a global scale by IUCN. The analysis of biological and ecological data available on this wide-spread species identified the Project Site as sitting in a minor route for migratory birds across the Anatolian peninsula, which is even omitted in some studies (Hacıoğlu *et al.*, 2017; Birben, 2019). According to the data provided by the local expert Dr. Bulut, this minor route connects two other located in the region around Belyaka on the east and Düzce on the west (see also Figure 6-18). It was then assumed that the individuals potentially occurring within the Project Site and its AoI would correspond to those selecting this particular route, the EAAA was then identified as the coastal area between these two locations (Figure 6-24).
- e) *Oxyura leucocephala* was directly observed and detected by eDNA analysis prior to Phase 1 construction, but these species were not observed in the 2024 surveys within the Project AoI. *Oxyura leucocephala* is globally classified as Critically Endangered by the IUCN. As it is migratory species with an extended range,

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a similar approach to that used for *Aquila nipalensis* was adopted, with the EAAA defined as the same as for the previous species.



**Figure 6-24: EAAA for bird species (ref: Phase 1 ESIA).**

The results obtained from the comparison of the EAAA defined for the three species and their EOO, showed that none of these triggers the Critical Habitat for endangered bird species under the Criterion I of the IFC PS6.

The data with the relative EAAA, EOO and the proportion of EAAA over EOO, for each species are reported in Table 6-7.

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**Table 6-7: Critical Habitat assessment data for endangered bird species**

Species	Common name	IUCN Global Red List Status	Potentially Present/ Observed [P/O]	EOO (km <sup>2</sup> )	EAAA (km <sup>2</sup> )	% of EOO	EAAA is ≥ 0.5% of EOO [Y/N]	Trigger Critical Habitat [Y/N]
<i>Aquila nipalensis</i>	Steppe Eagle	EN	P	12,600,000	11011,06	0,008	N	N
<i>Oxyura leucocephala</i>	White-Headed Duck	EN	O	17,600,000	11011,06	0,006	N	N

f) *Miniopterus schreibersii* and *Myotis capaccinii* are two mammals included in Criterion I analysis, the estimated EAAA for this species was obtained by using the available ecological and biological information (IUCN, 2024). Given that the foraging area of maternity colonies was estimated around 200,000 ha (2000 km<sup>2</sup>) this provided an EAAA of about 1,070 km<sup>2</sup> to be compared to an EOO of nearly 19,946,710 km<sup>2</sup>. The calculated percentage EAAA was 0,005%. The EOO for *Myotis capaccinii* is 5,3870,222 km<sup>2</sup> and calculated percentage of EAAA was 0,002%. Calculations are resulting below the 0,5% threshold for Criterion I, and therefore, not triggering the CH.

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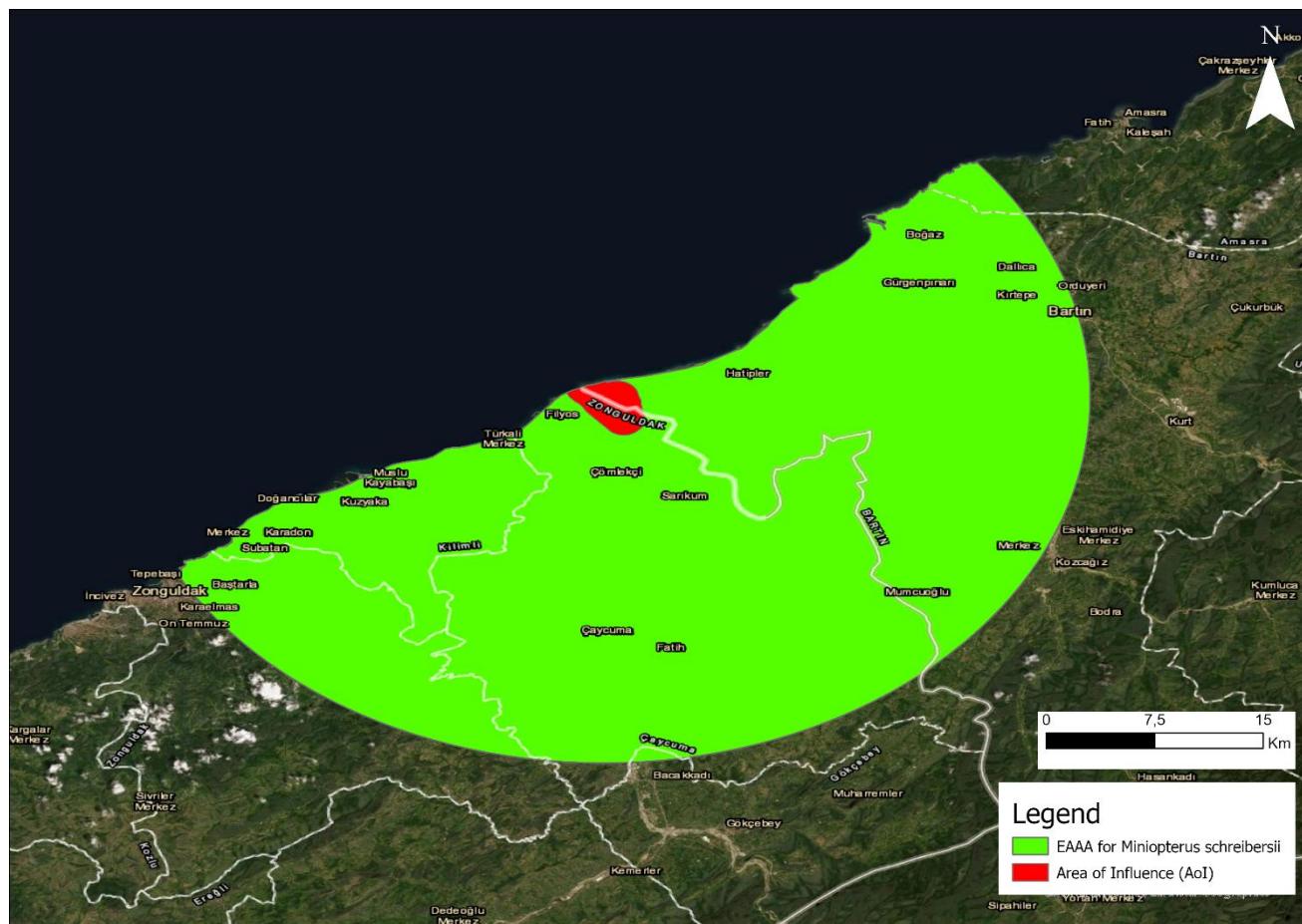


Figure 6-25: EAAA and AoI for bat species (ref: Phase 1 ESIA).

### Criterion 2: Habitats of significant importance to Endemic and/or Restricted-range species

According to IFC PS6 GN74, the term endemic is defined as Restricted range. Restricted range refers to a limited extent of occurrence (EOO).

- g) For terrestrial vertebrates and plants, restricted-range species are defined as those species that have an EOO less than 50,000 square kilometres ( $\text{km}^2$ ).
- h) For marine systems, restricted-range species are provisionally being considered those with an EOO of less than 100,000  $\text{km}^2$ .
- i) For coastal, riverine, and other aquatic species in habitats that do not exceed 200 km width at any point (for example, rivers), restricted range is defined as having a global range of less than or equal to 500 km linear geographic span (i.e., the distance between occupied locations furthest apart).

The threshold for Criterion 2 (as reported in GN75) is the following:

- a) Areas that regularly hold  $\geq 10\%$  of the global population size AND  $\geq 10$  reproductive units of a species.

Seven species were reported as endemic from local experts although, some of these species were not meeting the definition of restricted range as per the guidelines in GN74. Those that met the EOO requirements were evaluated according to the parameters for the CH evaluation of Criterion 2 (GN74, IFC 2019).

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A description of the rationale behind the calculation of EAAA and EOO for the different species is given below.

Of the three freshwater fish species listed in Table 6-5, only *Alburnoides turani* was considered truly endemic according to IFC definitions (GN74). This species has only recently been described (Kaya, 2020) and therefore limited ecological data are available. The species was detected by eDNA analysis prior to Phase 1 construction and was not detected during the 2023-2024 surveys. The detection of its presence using eDNA analysis from river water samples provided a range of 12 km, which is the approximate maximum detection limit for this method, therefore it was assumed that individuals of this species were present within 12 linear km of the project area and as a conservative measure an additional 15 km was added to this distance. The last 27 km of the Yenice River, including its tributaries, was then adopted as the EAAA for the species. In addition, *A. turani* has only been described from the Yenice Basin and therefore this was considered as its EOO (Figure 6-26).

In the case of the endemic amphibian *Triturus anatolicus*, a similar approach was used. However, while its EAAA was described as per *A. turani*, this species mobility and ability to inhabit smaller and temporary water bodies (e.g., puddles, seasonal streams, artificial ponds, etc.) required the inclusion of all general suitable habitats around the last 24 km of Yenice River and its tributaries (Figure 6-27). The decision was also made to evaluate this species as a terrestrial vertebrate. In addition, the EOO of *T. anatolicus* was not limited to Yenice Basin but resulted being still below the 50.000 km<sup>2</sup> threshold from GN74.

The lizard *Darevskia bithynica* is a Turkish endemic species reported as potentially occurring in the Project's AOL, an EAAA corresponding to all suitable habitats within a 5 km radius was established according to the general home range of lizard species of similar body size (Figure 6-28). The EOO for this species was obtained from a recent study by Kurnaz and Hosseinian (2020).

*Vipera barani* is endemic of the Black Sea coastal area but given the limited ecological information available its presence is limited to specific areas resulting in an EOO below the GN74 threshold. The EAAA for this species was selected as per *D. bithynica* with a 5 km radius around the Project Area (Figure 6-28).

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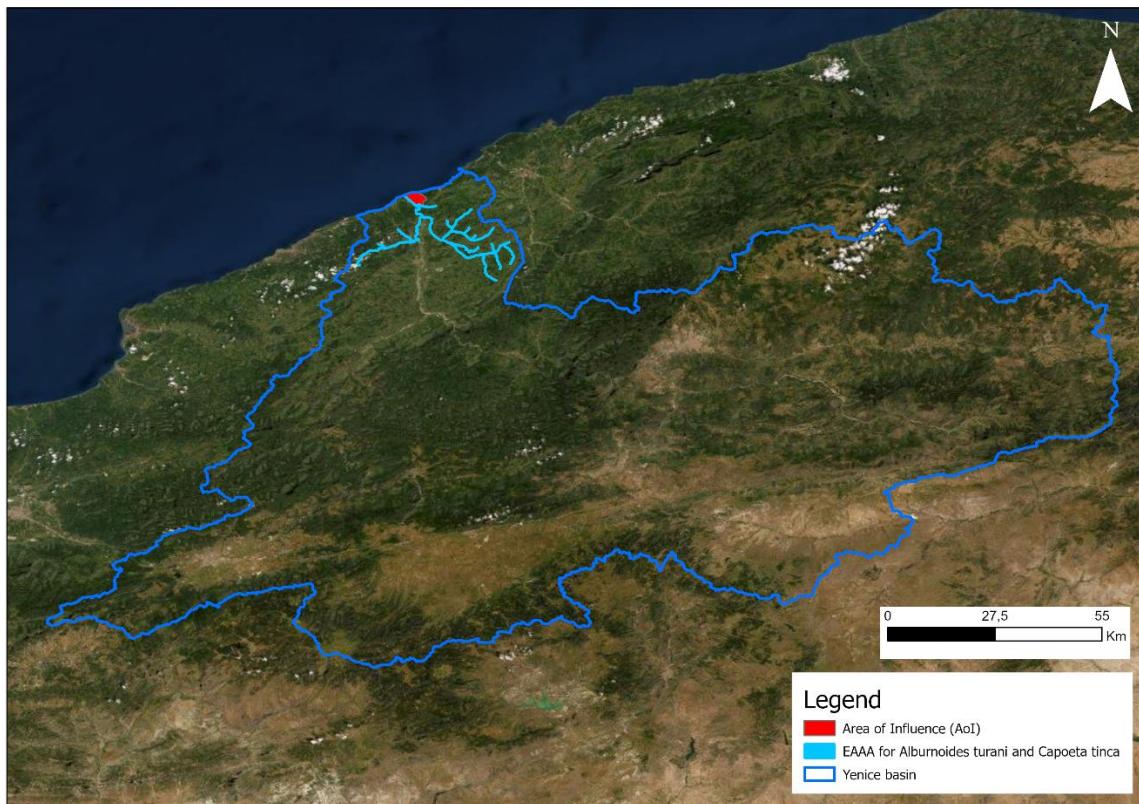
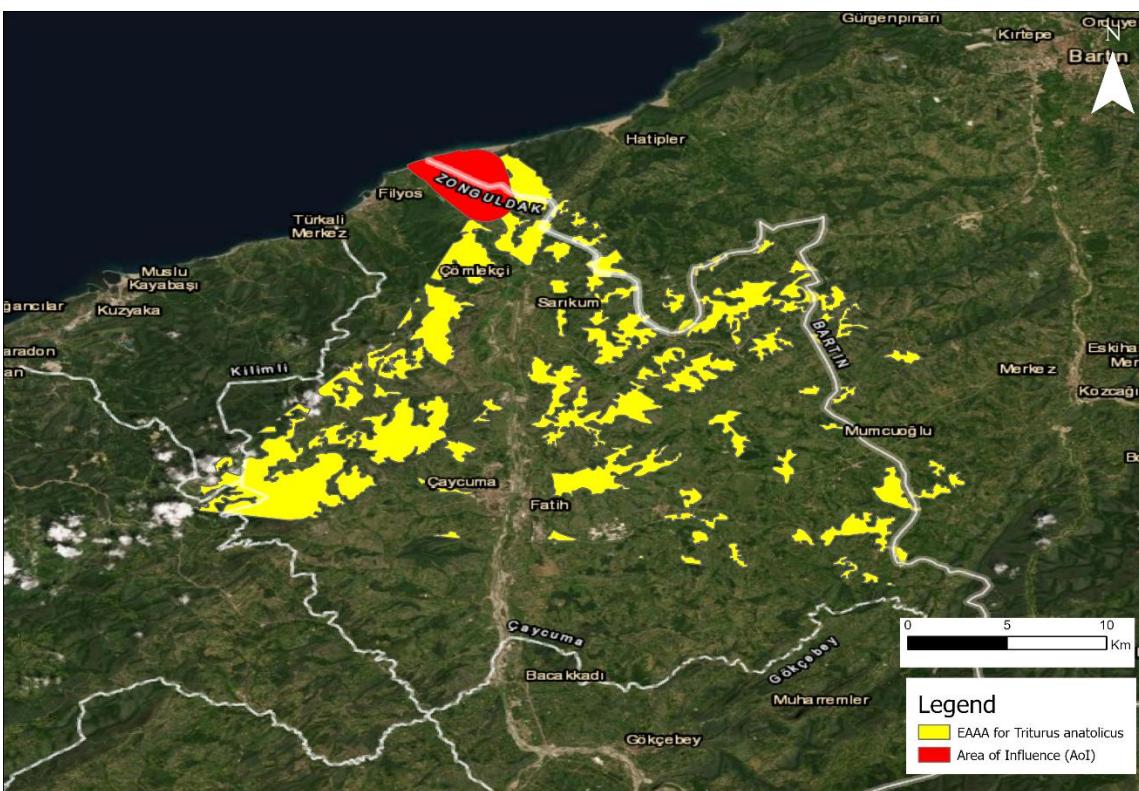


Figure 6-26: EAAA and EOO for *Alburnoides turani* (ref: Phase 1 ESIA).



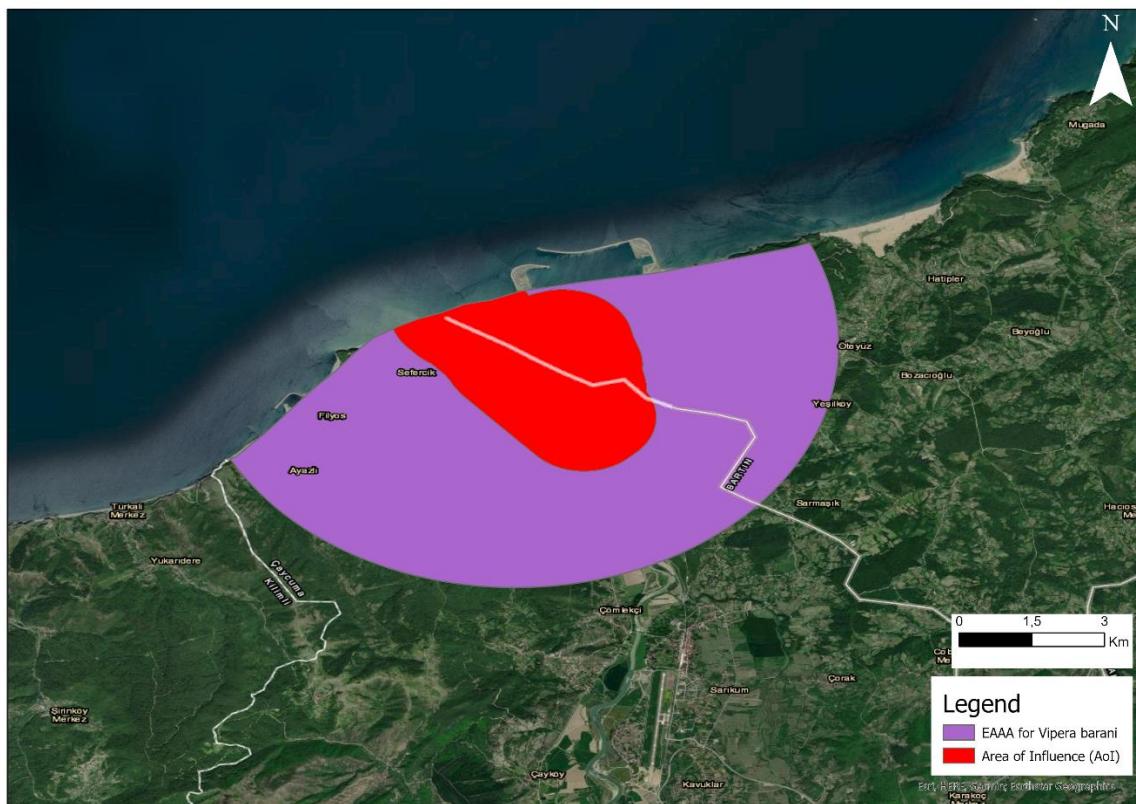
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Figure 6-27: EAAA for *Triturus anatolicus* (ref: Phase 1 ESIA).



Figure 6-28: EAAA for *Darevskia bithynica* (ref: Phase 1 ESIA).

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**Figure 6-29: EAAA for Vipera barani (ref: Phase 1 ESIA).**

No endemic species here identified and assessed met the requirement to trigger a Critical Habitat status under Criterion 2.

A summary of the data on endemic species obtained for the evaluation of Criterion 2 is provided in the table below.

**Table 6-8: Critical Habitat Assessment data for Endemic Species**

Species	Common name	IUCN Global Red List Status	Potentially Present/ Observed [P/O]	EOO (km <sup>2</sup> )	EAAA (km <sup>2</sup> )	% of EOO	EAAA is ≥ 10% of EOO [Y/N]	Trigger Critical Habitat [Y/N]
<b>Terrestrial Plants and Vertebrates</b>								
<i>Centaurea kiliaea</i>	-	EN	O	>50.000	-	-	N	N
<i>Darevskia bithynica</i>	-	-	P	27.875	24,2	0,1	N	N
<i>Vipera barani</i>	-	NT	P	39.322	44,8	0,1	N	N
<i>Triturus anatolicus</i>	Anatolian crested newt	LC	O	38.811	89,54	0,23	N	N

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Species	Common name	IUCN Global Red List Status	Potentially Present/ Observed [P/O]	EOO (km <sup>2</sup> )	EAAA (km <sup>2</sup> )	% of EOO	EAAA is ≥ 10% of EOO [Y/N]	Trigger Critical Habitat [Y/N]
<b>Riverine and Aquatic species</b>								
<i>Alburnoides turani</i>	-	NE	O	17,3 km <sup>2</sup> <500 (linear km)	0,5	3	N	N
<i>Capoeta tinca</i>	Western Fourbarbel Scraper	LC	O	>500 (linear km)	-	-	N	N
<i>Cobitis simplicispina</i>	Galatian Spined Loach	LC	O	>500 (linear km)	-	-	N	N

**Criterion 3: Habitats supporting globally significant concentrations of Migratory and/or Congregatory species**

GN76 of IFC P6 defines Migratory species as “any species of which a significant proportion of its members cyclically and predictably move from one geographical area to another (including within the same ecosystem)”.

GN77 also indicates as Congregatory species those “whose individuals gather in large groups on a cyclical or otherwise regular and/or predictable basis”, giving the following examples:

- Species that form colonies.
- Species that form colonies for breeding purposes and/or where large numbers of individuals of a species gather at the same time for non-breeding purposes (for example, foraging and roosting).
- Species that utilize a bottleneck site where significant numbers of individuals of a species occur in a concentrated period of time (for example, for migration).
- Species with large but clumped distributions where a large number of individuals may be concentrated in a single or a few sites while the rest of the species is largely dispersed (for example, wildebeest distributions).
- Source populations where certain sites hold populations of species that make an inordinate contribution to recruitment of the species elsewhere (especially important for marine species).

The thresholds for Criterion 3 provided in GN78 are the following:

- (a) Areas known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of a migratory or congregatory species at any point of the species’ lifecycle.
- (b) Areas that predictably support ≥10 percent of the global population of a species during periods of environmental stress.

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The data collected in the field and literature suggested that of 263 bird species observed or potentially occurring around the Project Area, the majority is migratory. Among these the two endangered and one critically endangered bird species listed in the section concerning Criterion 1 (i.e., *Oxyura leucocephala* and *Aquila nipalensis*) are also identified as migratory species.

Only one species of mammal, the Schreiber's Bent-winged Bat (*Miniopterus schreibersii* and *Myotis cappacini*), was identified as a migratory species.

For migratory birds, in particular, the area adopted as EAAA, according to the rationale used above for Criterion 1, was assumed to be the same for all species (Figure 6-24). This was because it includes the migration route crossing the Project Area and covers a wider area than the two KBAs including a IBA (see Chapter 6.2.2.9). It was also assumed that migratory birds generally have an extended EOO crossing different countries and according to the local expert only a few species (34) use the EAAA for nesting and feeding.

No Critical Habitat was identified for migratory or congregatory species (Criterion 3), based on the approach used for Criterion 1, and the percentage values of EAAA over the EOO obtained for these species in the previous sections (**Table 6-7** and page 40).

#### **Criterion 4: Highly Threatened and/or Unique Ecosystems**

In GN80 of IFC PS6 the thresholds for Criterion 4 are defined as the following:

- a) Areas representing  $\geq 5\%$  of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN.
- b) other areas not yet assessed by IUCN but determined to be of high priority for conservation by regional or national systematic conservation planning.

The Criterion 4 application (GN79, IFC 2019) foresees the use of the “Red List of Ecosystems (RLE)” where formal IUCN assessments have been conducted, however no evaluation were performed within the Anatolian Peninsula area as shown in the IUCN RLE Database<sup>7</sup>. The “European Red List of Habitats – Part 2” was used to assess the conservation level of the habitats identified within the Project’s AoI, resulting in the area identified as “B1.4c Black Sea coastal dune grassland (grey dune)” resulting as EN.

The area used for the CH assessment was identified as per the AoI in Chapter 6.2.2.8 in an area of 0,9 km<sup>2</sup> that, when compared to the EOO of 64,21 km<sup>2</sup> for this habitat, resulted being 0.14% of the global extent.

This resulted in no Critical Habitat identified under Criterion 4.

#### **Criterion 5: Areas associated with Key Evolutionary Processes**

The AoI is not known to contain landscape features that may influence evolutionary processes, as described in IFC PS6 GN81, giving rise to regional configurations of species and ecological properties. In fact, no species and/or subpopulations of species is characterized by a particular level of isolation, spatial heterogeneity, and wealth of environmental gradients or edaphic interfaces. Moreover, the areas are not considered to be of demonstrated importance as to climate change adaptation or as biological corridor. These considerations suggest that the AoI does not support any key evolutionary processes. Thus, no Critical Habitat is triggered under Criterion 5.

<sup>7</sup> <http://assessments.iucnrle.org/>

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