# KIZILDERE -I JES FACILITY BIODIVERSITY ACTION PLAN

## 1.1 Introduction

**Kızıldere Geothermal Power Plant** is located in the Sarayköy district of Denizli. Operated by Zorlu Natural Electricity Generation Inc., a subsidiary of Zorlu Energy, the plant has an installed capacity of 15 MWe, making it Turkey's 671st largest power plant and Denizli's 14th largest energy facility. Additionally, it ranks as Turkey's 43rd largest geothermal power plant. The Kızıldere (Zorlu) GPP generates an average of 78,793,377 kilowatt-hours of electricity, sufficient to meet the daily electricity needs of approximately 21,694 people, covering residential, industrial, metro transportation, governmental offices, and street lighting requirements. When considering only residential electricity consumption, Kızıldere (Zorlu) GPP can supply the energy needs of approximately 26,379 households.

The Kızıldere-I GPP site is located about 7 km away from the village of Sarayköy. Additionally, the project area is approximately 8 km from the village of Buharkent, 9 km from the village of Buldan, and 15 km from the village of Yayla. The project site is also around 22 km from Denizli, 24 km from Pamukkale, and 43 km from the significant center of Nazilli (Figure 3-4).

There are notable wetlands around the Kızıldere-I GPP site. The site is approximately 36.5 km away from Afşar Dam, 20 km from Derbent Dam, 38 km from Adıgüzel Dam, 50 km from Kemer Dam, 82 km from Salda Lake, and 77 km from Acıgöl Lake (Figure 5).

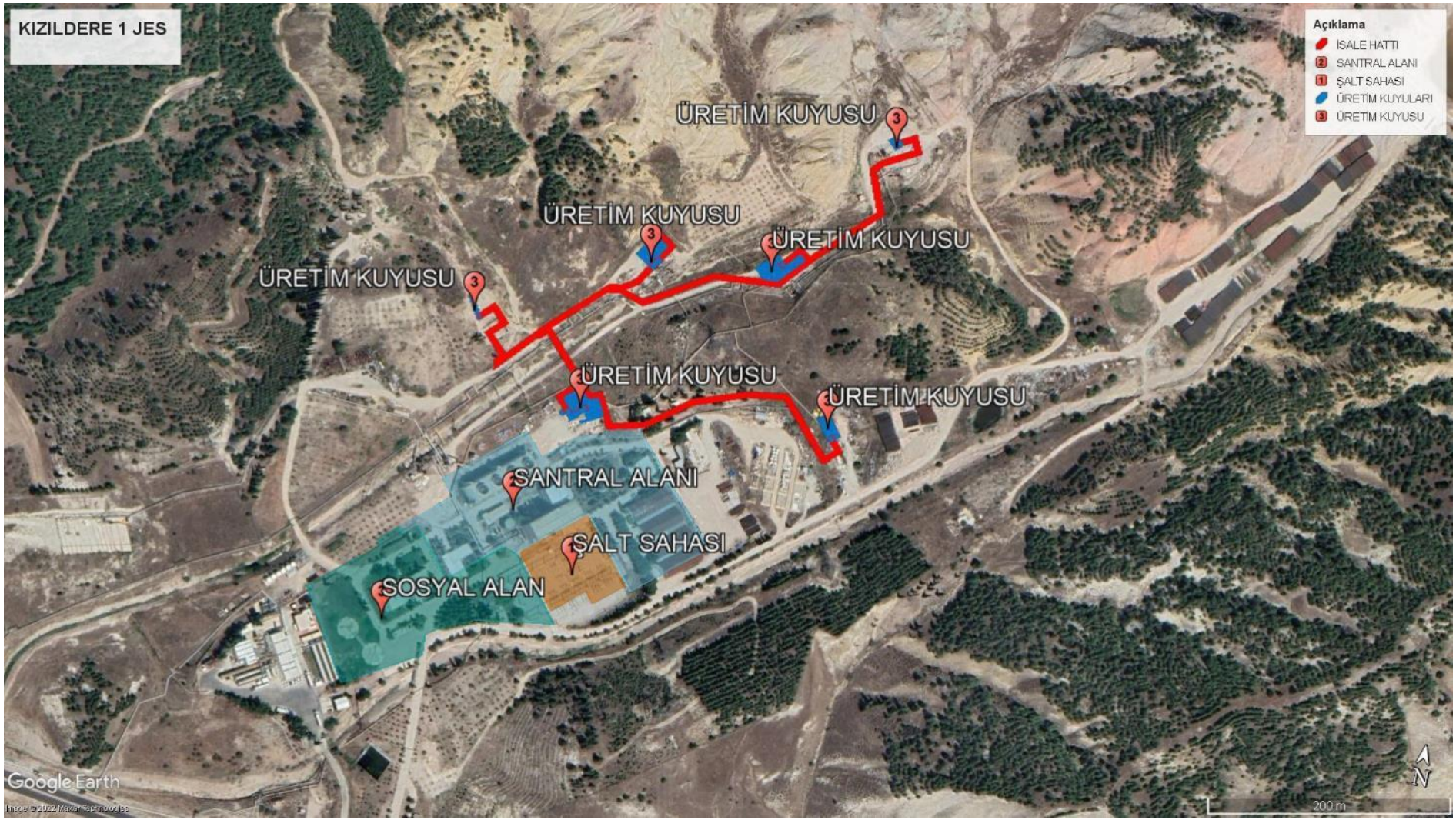


**Figure 1:** Satellite Image of the Project Site


**Figure 2:** Satellite Image of the Project Site - 2

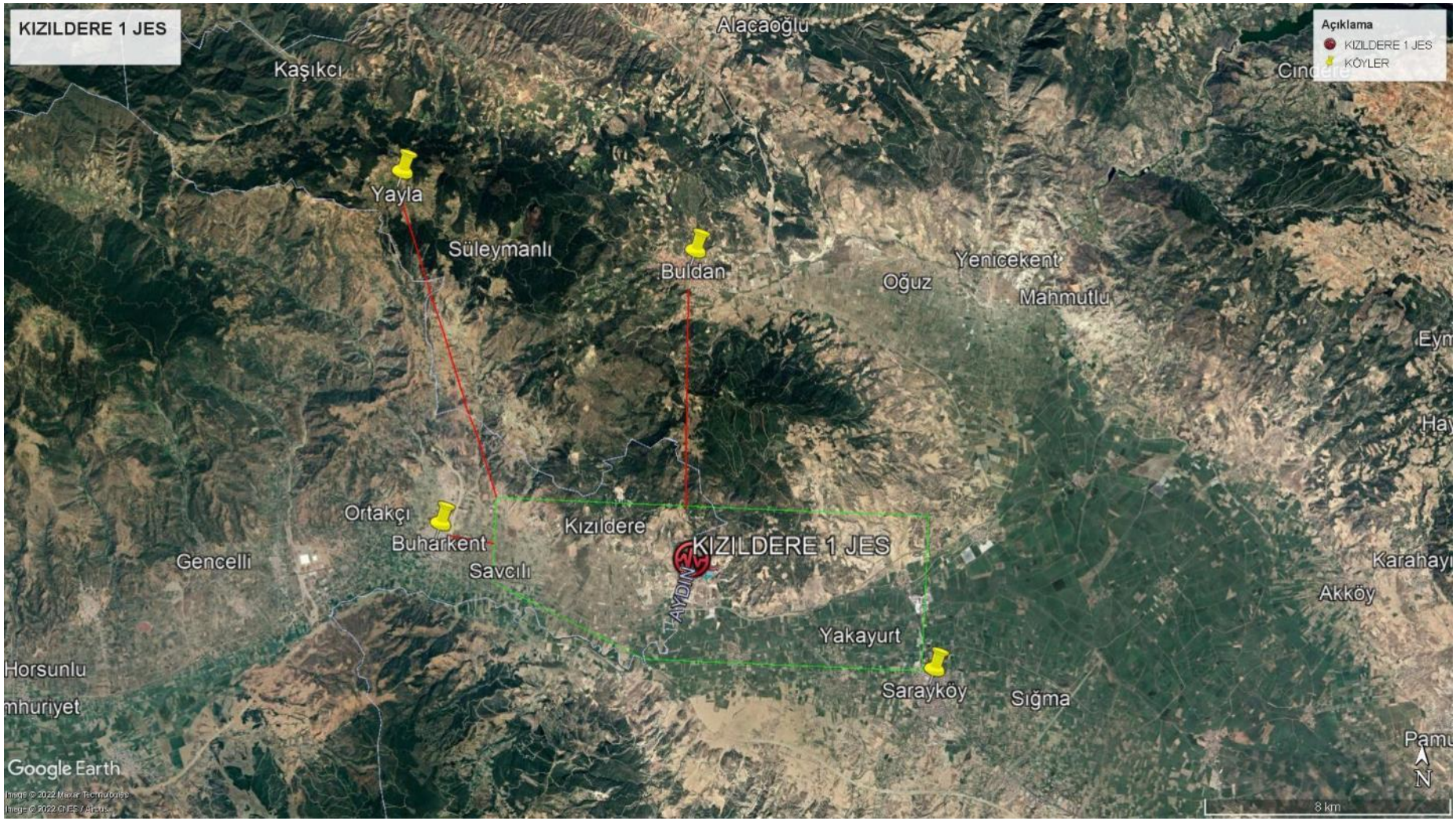


**Figure 3:** Villages (Neighborhoods) in the Vicinity of the Project Site

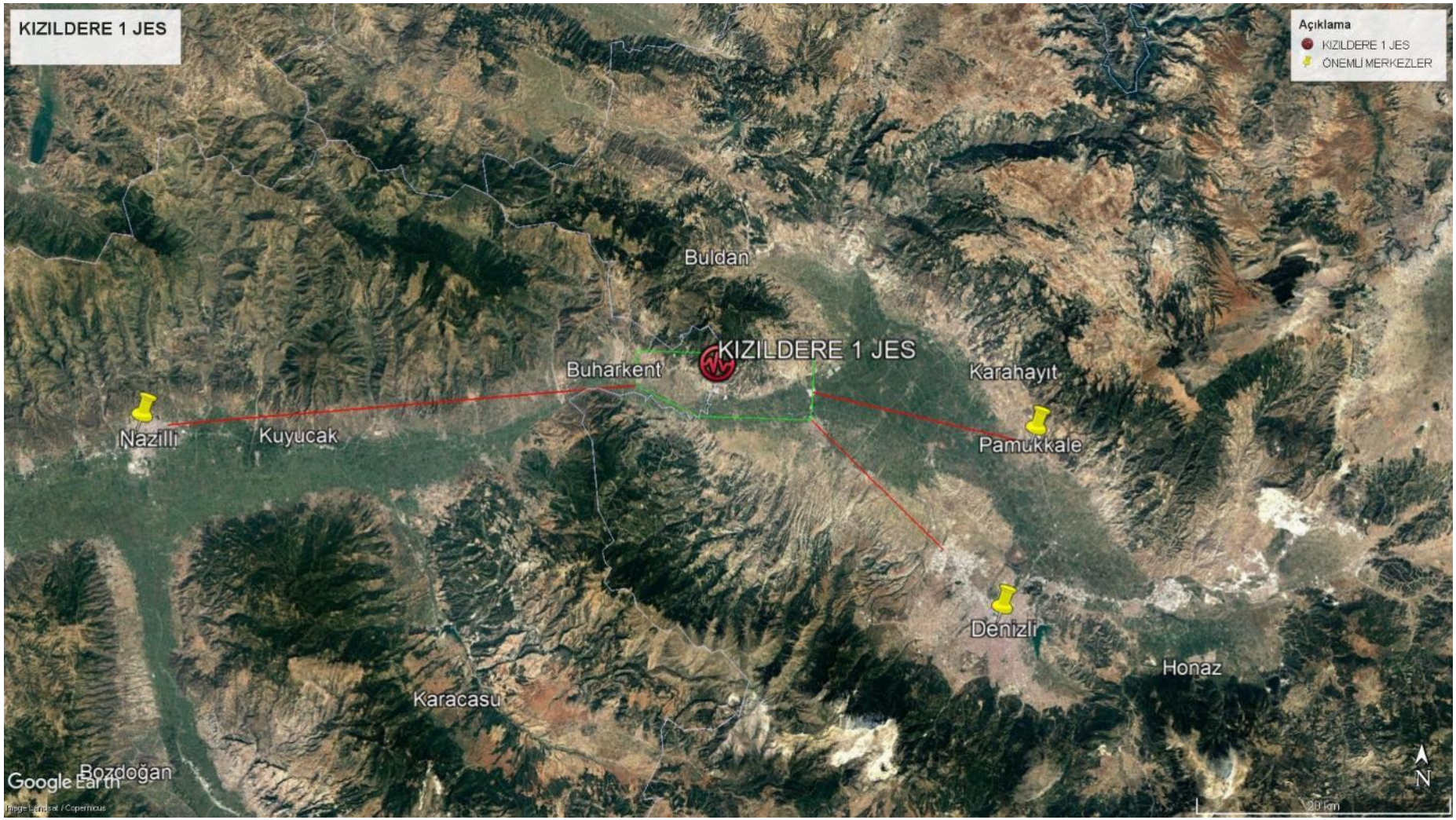


**Figure 4:** Settlements Near the Project Site

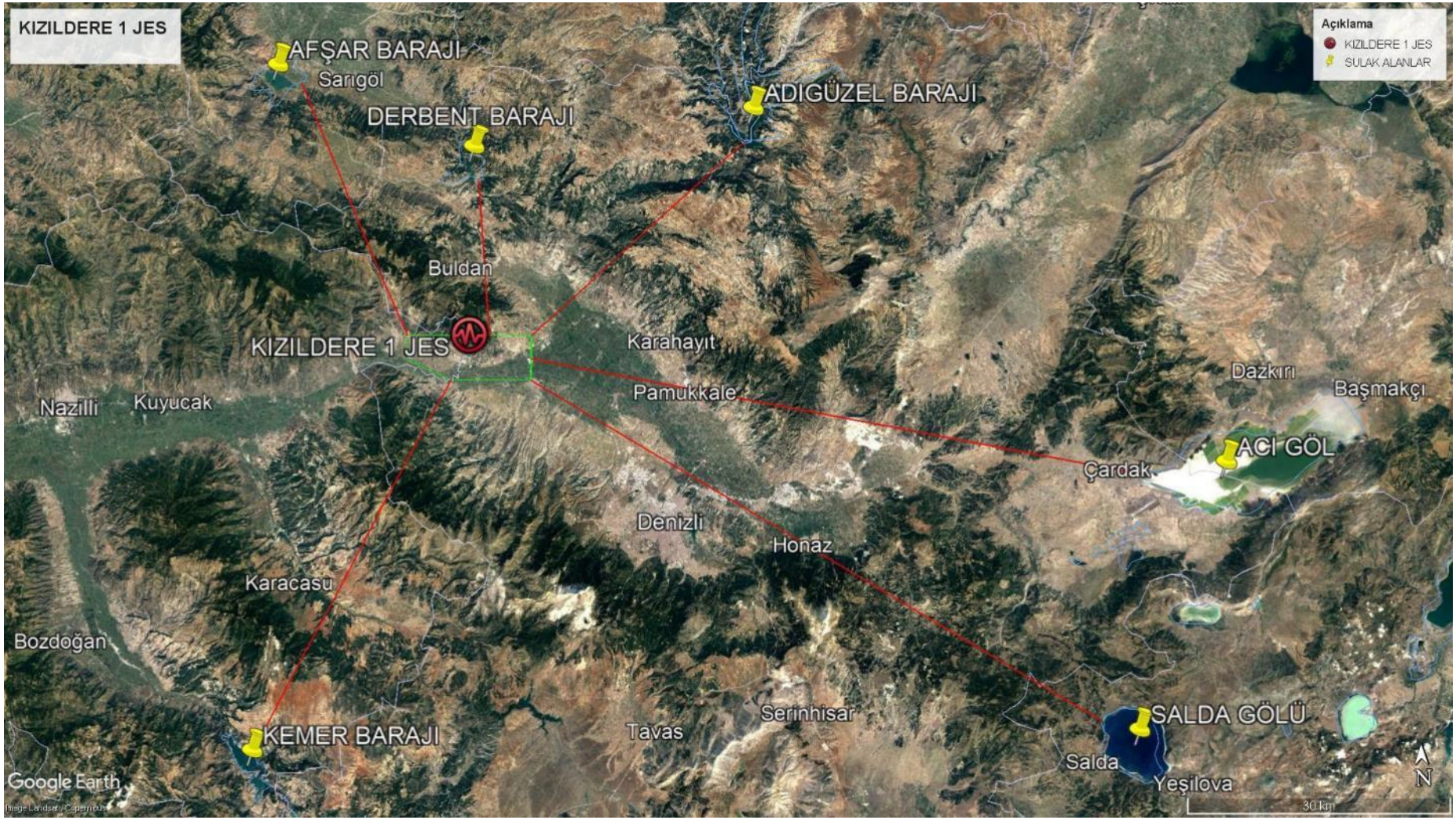


**Figure 5:** Significant Water Bodies Surrounding the Project Site

## 1.2 Relationship of the Area with Protected and Special Status Areas

When evaluating the Kızıldere 1 Geothermal Power Plant (GPP) site in relation to nearby protected areas and important natural sites, Honaz Mountain National Park is located approximately 39 km away, and Honaz Mountain (small area) is about 40 km away in a straight line from the project site. Additionally, the Bozdağlar Important Natural Area is approximately 36 km away in a straight line (Figures 6-7).


**Figure 6:** Satellite Image Showing the Relationship Between the Project Site and Protected Areas

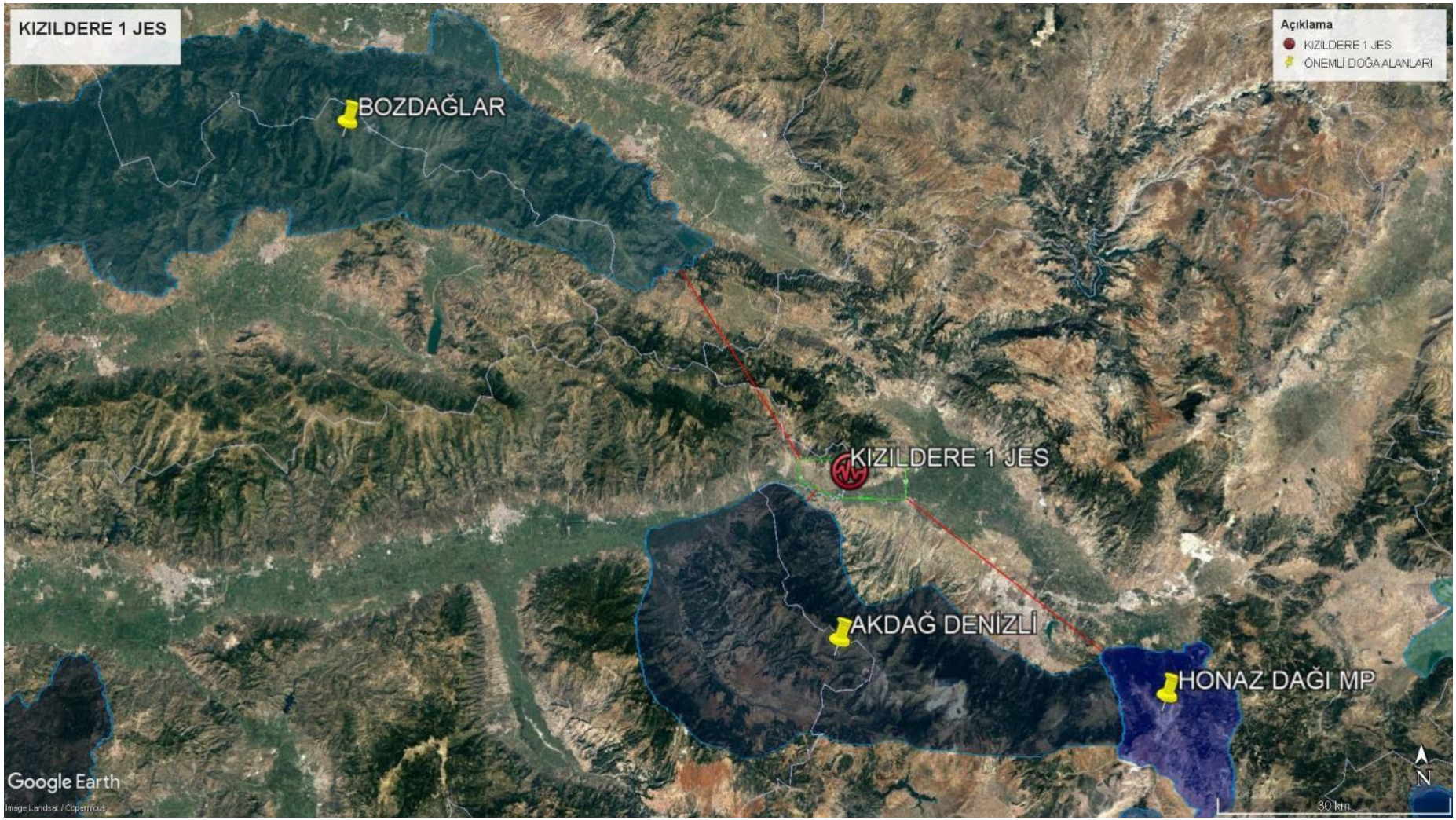


**Figure 7:** Satellite Image Showing the Relationship Between the Project Site and Protected Areas

## 1.3 Identification and Classification of Habitats in the Impact Area of the Kızıldere-I Geothermal Power Plant Facility

The Kızıldere-I Geothermal Power Plant (GPP) project, operated by Zorlu Doğal Elektrik Üretimi A.Ş., is located within the borders of Sarayköy district in Denizli province.

There are 11 different habitat types within the project area. Of these habitats, 3 are natural, while the remaining 8 are classified as modified habitats. The vegetation types that have developed in the natural areas are classified according to the EUNIS Habitat Classification with 1st, 2nd, and 3rd Level codes, as detailed below (Figure 8).

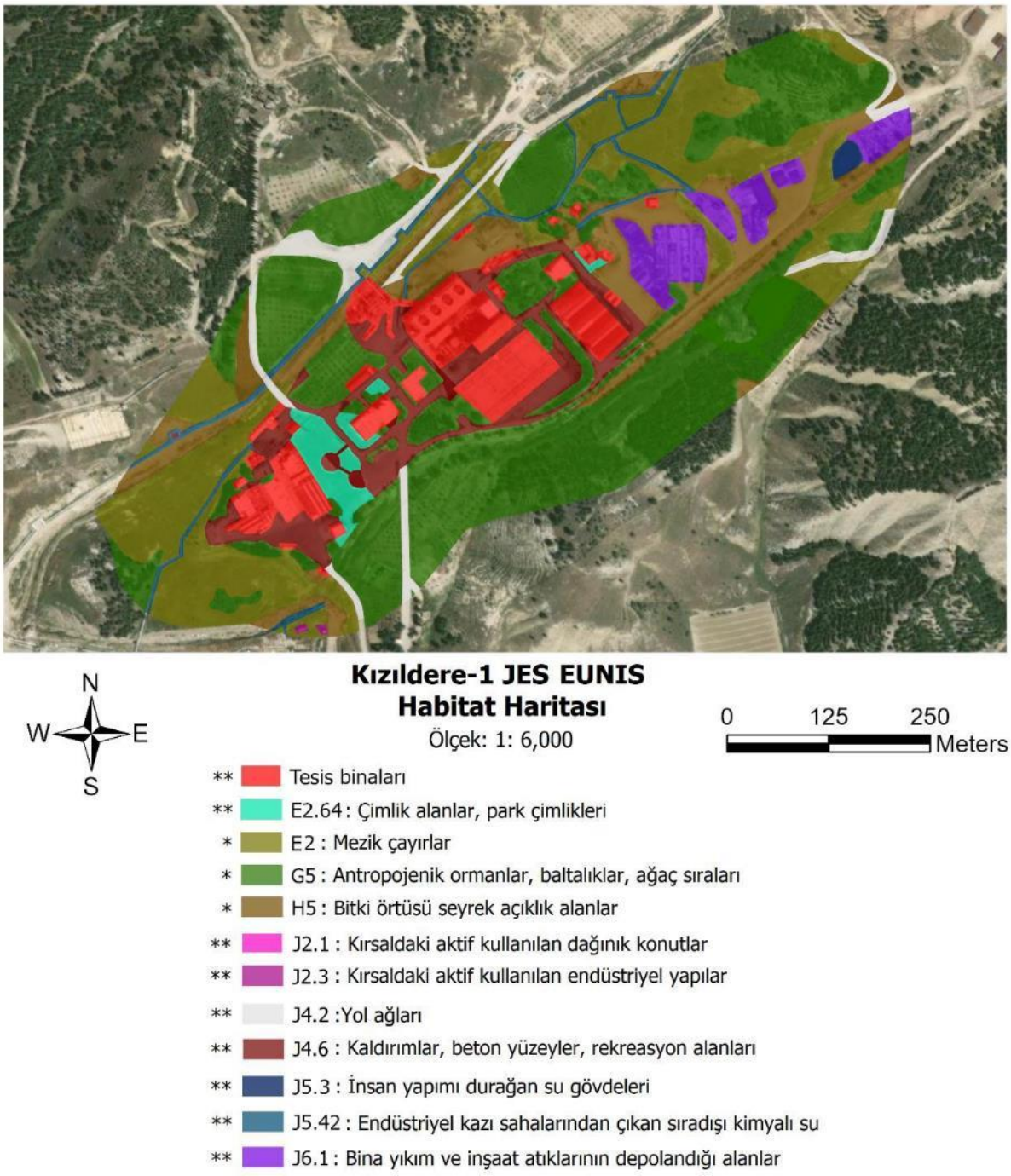


**Figure: 8 Kızıldere-I JES EUNIS habitat Map one**

- **Natural Habitats E2**

**Mezik Meadows**

In this habitat observed at an altitude of 180 m within the facility area; *Barbarea plantaginea , Oenothera glazioviana , Inula aucherana , Gnaphalium luteo-album subsp.leuto -album , Conyza canadensis , Cirsium creticum subsp. creticum , Centaurea hierapolitana , Periploca graeca there is. graeca , Myosotis sylvatica subsp.cyanea , Prunella vulgaris, Euphorbia falcata subsp.macrostegia , Galium rivale* plant taxa were identified.

**Photos1: Mezik meadows ( EUNIS:E 2)**

**G5 anthropogenic Forests, coppice Forests**

In the habitat that starts within the 250 m facility area and continues outside; *genista acanthoclada ; Pinus Nigra subsp.nigra var. caramanica , Alyssum sibiricum , Cistus laurifolius , Vicia cuspidata , Lathyrus digitatus , Dorycnium pentaphyllum subsp.anatolicum , Bunium ferulaceum , Helichrysum plicatum subsp.plicatum , Cirsium vulgare , Centaurea solstitialis subsp.solstitialis , Xeranthemum inapertum , Crepis foetida subsp . commutata , Jasminum fruticans , Onosma aucheranum , Scrophularia floribunda , Veronica cymbalaria , Veronica triloba , Scutellaria orientalis subsp.alpina var. glandulosissima , Origanum sipyleum , Salvia frigida , plantago major subsp . intermedia, Viscum album subsp . austriacum , Allium atroviolaceum* There are plant taxa.

**Photos2: Anthropogenic Forests, coppices, Tree rows ( EUNIS:G 5)**

**H5 Herb Cover Rare Openness Fields**

The facility is at an altitude of 230 m; *consolida regalis subsp.paniculata var. paniculata , Isatis glauca subsp . glauca , Alyssum dasycarpum var. dasycarpum , Fumana procumbens , Gypsophila perfoliata var. perfoliata , Atriplex rosea , Linum tenuifolium , Peganum harmala , Haplophyllum buxbaumii subsp . buxbaumii , Echinophora tournefortii , Bunium ferulaceum , Anthemis cretica subsp. tenuiloba , Achillea biebersteinii , Jurinea consanguinea , Carthamus dentatus , Tragopogon latifolius var. latifolius , Crepis foetida subsp . commutata , Marrubium parviflorum subsp . parviflorum , Ecballium elaterium , Inula viscosa , Phragmites australis , Tamarix tetrandra , Juncus acutus* plant taxa were identified.

**Photos3: plant Cover Rare Openness Fields (EUNIS:H5)**

- **Modified Habitats**

J2.1, J2.3, Areas with habitat codes J4.2, J5.42, J6.1 are concrete, chemical water and asphalt and do not have floral content. However, cleaning the seeds that germinate in the cracks in these structures is important for the integrity of the system. Care should be taken to ensure that the plants used for landscaping and food purposes in the habitat coded E2.64 and J4.6 are not invasive species .

**Photos 4 :Path networks With sidewalks And Recreation Fields (EUNIS: J4.2 And J4.6)**

**Photos 5 :Person making Salty Non This channels (EUNIS: J5.41)**

**Photos 6 :Person making Underground Stream lines (EUNIS: J5.43)**

**Photos 7: *ecballium elaterium***

**Photos 8 :*inula viscose***

**Photos 9: *juncus acutus***

**Photos 10:** ***phragmites australis***

**Photos 11: th** ***tamarix tetrandra***

### 1.4 Kızıldere-I JES facility Effect in the field floristic biodiversity Definition

When we look at the vegetation of the project site and its surroundings; Most of it has a steppe character with open areas with sparse vegetation. While there are reeds, reeds and tamarisks in the seasonally flowing dry stream beds of the area, there are degraded coppice forests towards the hilly areas. In areas where surface flow is high and affected by construction activities at the establishment stage, ruderal vegetation prevails.

Guidance in terms of floristics at the KIZILDERE-I GPP facility site Considering the Note 6 criteria when taken C.R. And MOST in status herb taxon available because it is not IFC No critical species and habitat assessment has been made within the scope of this study.

There are hilly areas along the borders of the facility that may be affected by surface flows, and terracing works to be carried out in these areas will allow the formation of a more stable vegetation cover both inside and outside the facility. It is important for this area to carry out such applications on sloping areas within the facility, which will slow down the surface flow rate due to excessive rainfall .

The same applies to seasonally flowing dry stream beds. With the rehabilitation works to be carried out in dry stream beds, mud, stone and silt accumulations will be better drained. will be done.

### 1.5 Kızıldere-I JES facility Effect in the field faunistic Defining Biodiversity

#### 1.5.1 Amphibian

There is no endangered and/or endemic amphibian species in the project area. located in the area amphibian types widespread species. Project in the field amphibians in terms of One immortality and the precautions to be taken are not foreseen. On the contrary, during the transportation of project-sourced water to some areas, water leaking into the ground at some points creates suitable spots for amphibians .

**Criterion 1: Refers to** Critically Endangered (CR) and /or Endangered (EN) Species. There are no amphibian species in the CR and/or EN category in the project area.

**Criterion 2:** Refers to Endemic and/or Narrowly Ranged Species. There are no endemic and/or narrow-range amphibian species in the project area.

**Criterion 3:** Refers to Migratory and/or Community Concentrated Species. There is no amphibian species in the project area that meets this criterion.

**Criterion 4:** Refers to Highly Threatened and /or Uniquely Rare Ecosystems. Important habitats for amphibian species in the project area are aquatic habitats. The project has been operating in the area for many years. Life water is released into the stream bed. The river environment is largely composed of natural habitats. is formed. In the current situation, it is not possible to say that the river habitat and its immediate surroundings are under high threat.

### 1.5.2 Reptiles

The only reptile species in the project area that is vulnerable to extinction according to IUCN lists **is the Tortoise ( *Testudo graeca* )** and is listed in the VU category. Tortoise is also included in the BERN Convention ANNEX-II and CITES ANNEX-II lists. Also in the region **is the Anatolian lizard ( *Anatololacerta)*** , a largely endemic lizard. ***anatolicus*** **)** is distributed. This species has a wide distribution from the Büyük Menderes River northward to the Marmara Region. The IUCN category is LC .

There are no reptile species that are likely to be directly affected by the project. The facilities have been operating in the region for many years. Although there may be species affected by the project during the construction phase, the facilities do not emit any emissions such as noise, dust, or polluted air into the environment during the current operation phase.

In this context, if we make a critical habitat assessment of the project area in line with faunistic data;

**Criterion 1: Refers to** Critically Endangered (CR) and /or Endangered (EN) Species. **There are no** reptile species in the CR and/or EN category in the project area .

**Criterion 2:** Refers to Endemic and/or Narrowly Ranged Species. It refers to Endemic and/or Narrowly Ranged Species. It refers to Endemic and/or Narrowly Ranged Species. **Anatolian lizard ( *Anatololacerta)*** , which is endemic to the project site ***anatolicus*** **)** is distributed. The distribution area of this endemic species is more than 50,000 square kilometers (km2 ) . is too much. Project area This your species spherical population the size of ≥10% And One your species reproductive of unit
It is not possible to say that there is an area that regularly hosts ≥10 of them. This According to the available information, the project site **does not meet the threshold value for Criterion 2.**

**Criterion 3:** Refers to Migratory and/or Community Concentrated Species. **There is no** reptile species in the project area that meets this criterion .

**Criterion 4:** Refers to Highly Threatened and /or Uniquely Rare Ecosystems. The important habitat types for reptile species in the project area are the natural habitats in the region. The project has been operating in the area for many years. Natural habitats in the project area have not been negatively affected by the project. Since the project has been in operation for many years, the negative effects that occurred during the construction phase seem to have largely returned to normal. Currently, no adverse effects **have been observed on the reptile species widespread in the region** .

### 1.5.3 Mammals

in the region generation in danger and/or endemic One mammal There is no type .

**Criterion 1: Refers to** Critically Endangered (CR) and /or Endangered (EN) Species. **There are no** mammal species in the CR and/or EN category in the project area .

**Criterion 2:** Refers to Endemic and/or Narrowly Ranged Species. There are no endemic and/or narrow-range mammal species in the project area.

**Criterion 3:** Refers to Migratory and/or Community Concentrated Species. **There is no** mammal species in the project area that meets this criterion .

**Criterion 4:** Refers to Highly Threatened and /or Uniquely Rare Ecosystems. The important habitat types for mammal species in the project area are the natural habitats and stream beds in the region. The project has been operating in the area for many years. Natural habitats in the region have not been negatively affected by the project. Since the project has been in operation for many years, the negative effects that occurred during the construction phase seem to have largely returned to normal. Currently, no adverse effects **have been observed on mammal species distributed in the region** .

**Criterion 5:** Topography, geology, soil, temperature, vegetation, and combinations of these factors One of the region structural features species local to take shape And ecological features It can affect the evolutionary processes that lead to In some cases, distinctive spatial features form populations or subpopulations of genetically unique plant and animal species. associated with their populations. Physical or spatial features have been identified as spatial catalysts for evolutionary and ecological processes, and such features are often associated with species diversity. Species (or subpopulations of species) that emerge due to the maintenance of basic evolutionary processes inherent in an area have become the main focus in recent years, along with the conservation of biodiversity, especially the process of preserving genetic diversity. By maintaining species diversity in an area, the genetic diversity within species as well as the processes that drive speciation ensure evolutionary resilience in a system, which is especially important in rapidly changing climate conditions.

For illustrative purposes, here are some potential examples of areal features associated with evolutionary processes,

Regions with high spatial heterogeneity are a positive force for speciation, as species are naturally selected for their ability to adapt and diversify.

Environmental gradients, also known as ecotones , produce transitional habitat that is associated with the process of speciation and high species and genetic diversity.

edaphic interfaces are areas of soil types (e.g. serpentine outcrops, limestone) that lead to the formation of unique plant communities characterized by both rarity and endemism. and gypsum sediments) are special sequences.

Connection between habitats (e.g. biological corridors), especially fragmented It is important in the maintenance of habitats and metapopulations and ensures species migration and gene flow. This connection also extends across elevation and climate gradients and across crest-to- coast to coast )" also includes biological corridors.

Areas with proven importance for adaptation to climate change for both species and ecosystems are also included in this criterion.

The importance of structural features in an area that can influence evolutionary processes will be determined on a case-by-case basis, and the determination of critical habitat will be largely based on scientific knowledge. In many cases, this criterion will apply to areas that have been previously investigated and are known or suspected to be associated with unique evolutionary processes. Although systematic methods exist to measure and prioritize evolutionary processes in a field , these methods are beyond the reasonable conditions of evaluations typically conducted by the private sector.

Criterion 5 was evaluated together for Amphibians, Reptiles and Mammals. Criterion 5 involves evaluating whether the region generally contains significant evolutionary processes. The area where Kızıldere-I GPP is located does not show a special evolutionary process. The region does not have a special geological structure or a special history and therefore does not contain a large number of critical and/or endemic species. In this regard, the area **does not meet** Criterion 5 .

### 1.5.4 Ornithology

As a result of the studies, a total of 151 bird species were identified in the project area and its immediate surroundings. The list of these species, their global Red List status, and the status of the species in BERN, CITES and MAK decisions of 2022 are given in Table 1 below.

Facility around found bird from types 3 of grain generation spherical on scale threatening is below. These species are Elmabaş Patka ( *Aythya ferina* ), Küçük Sakarca ( *Anser erythropus* ) and turtle dove ( *Streptopelia turtur )* species, and the most current Red List assessments of all of these species are in the "VU" category, that is, sensitive (IUCN, 2022). Of the species found around the facilities, 102 are in BERN Agreement Annex-2, 39 are in BERN Agreement Annex-3, 1 of them is included in CITES Annex-1 and 13 of them are included in CITES Annex-2.

In this context, if we make a critical habitat assessment of the project area in line with faunistic data;

**Habitats Important to Critically Endangered (CR) or Endangered (EN) Species**

No "CR" or "EN" category bird species were detected around the facilities. Therefore, this criterion is not triggered.

**Criterion 2: endemic And Narrow widespread Species For Important Habitats**

Facility These are the birds around criterion It does not trigger.

**Criterion 3: Habitats Hosting Globally Significant Numbers of Migratory and Foraging Species**

It has been determined that there are migratory birds among the listed species in and around the facility area. Considering the topographic location of the facility, the project is not expected to cause a serious problem for migratory bird populations.

**Criterion 4: High at level Threatening under And /Or Unique Rare Ecosystems**

None of the habitats around the site are listed as high level or unique ecosystems on the IUCN Red List of Ecosystems and therefore this criterion will not be triggered.

**Criterion 5: Important Evolutionary Processes With identified habitats**

The Kızıldere-I GPP site does not differ significantly from the surrounding region in terms of elevation, moisture gradients, or any other geological, ecological, or evolutionary factor that indicates that the region is vital for sustaining unique or distinctive evolutionary processes. Therefore, none of the habitats around the facility trigger Criterion 5.

**Table1: Project in the field Found and Finding Likely Bird Types**

| Type Scientific First Name | English Name | endemism | IUCN (Spherical) | BERN | MAKK | CITES |
|---|---|---|---|---|---|---|
| ***Accipiter nisus*** | Eurasian Sparrowhawk | Not Endemic | LC | Annex 2 | KD | Annex 2 |
| ***Acrocephalus arundinaceus*** | Great Reed Warbler | Not Endemic | LC | Annex 2 | KD | KD |
| ***Acrocephalus melanopogon*** | Moustached Warbler | Not Endemic | LC | Annex 2 | KD | KD |
| ***Acrocephalus schoenobaenus*** | Sedge Warbler | Not Endemic | LC | Annex 2 | KD | KD |
| ***Acrocephalus scirpaceus*** | Eurasian Reed Warbler | Not Endemic | LC | Annex 2 | KD | KD |
| ***Actitis hypoleucos*** | Common Sandpiper | Not Endemic | LC | Annex 2 | KD | KD |
| ***Alauda arvensis*** | Eurasian Skylark | Not Endemic | LC | Annex 3 | Annex 1 | KD |
| ***Alcedo atthis*** | Common Kingfisher | Not Endemic | LC | Annex 2 | KD | KD |
| ***Anas acuta*** | Northern Pintail | Not Endemic | LC | Annex 3 | Annex 2 | KD |
| ***Anas crecca*** | Eurasian Teal | Not Endemic | LC | Annex 3 | Annex 2 | KD |
| ***Anas platyrhynchos*** | Mallard | Not Endemic | LC | Annex 3 | Annex 2 | KD |
| ***Anser albifrons*** | Greater White-fronted Goose | Not Endemic | LC | Annex 3 | Annex 2 | KD |
| ***Anser erythropus*** | Lesser White-fronted Goose | Not Endemic | VU | Annex 2 | KD | KD |
| ***Anthus cervinus*** | Red-throated Pipit | Not Endemic | LC | KD | KD | KD |
| ***Anthus pratensis*** | Meadow Pipit | Not Endemic | LC | Annex 2 | KD | KD |
| ***Anthus spinoletta*** | Water Pipit | Not Endemic | LC | Annex 2 | KD | KD |
| ***Apus apus*** | Common Swift | Not Endemic | LC | Annex 3 | KD | KD |
| ***Apus melba*** | Alpine Swift | Not Endemic | LC | Annex 2 | KD | KD |
| ***Ardea alba*** | Great Egret | Not Endemic | LC | Annex 2 | KD | KD |
| ***Ardea cinerea*** | Grey Heron | Not Endemic | LC | Annex 3 | Annex 1 | KD |
| ***Ardea purpurea*** | Purple Heron | Not Endemic | LC | Annex 2 | KD | KD |
| ***Ardeola ralloides*** | Squacco Heron | Not Endemic | LC | Annex 2 | KD | KD |
| ***Athene noctua*** | Little Owl | Not Endemic | LC | Annex 2 | KD | Annex 2 |

| Type Scientific First Name | English Name | endemism | IUCN (Spherical) | BERN | MAKK | CITES |
|---|---|---|---|---|---|---|
| ***Aythya ferina*** | Common Pochard | Not Endemic | VU | Annex 3 | Annex 2 | KD |
| ***Aythya nyroca*** | Ferruginous Duck | Not Endemic | NT | Annex 3 | KD | KD |
| ***Botaurus stellaris*** | Great Bittern | Not Endemic | LC | Annex 2 | KD | KD |
| ***Buteo buteo*** | Common Buzzard | Not Endemic | LC | Annex 2 | KD | Annex 2 |
| ***Buteo rufinus*** | Long-legged Buzzard | Not Endemic | LC | Annex 2 | KD | Annex 2 |
| ***Calidris alba*** | Sanderling | Not Endemic | LC | Annex 2 | KD | KD |
| ***Calidris alpina*** | Dunlin | Not Endemic | LC | Annex 2 | KD | KD |
| ***Calidris minuta*** | Little Stint | Not Endemic | LC | Annex 2 | KD | KD |
| ***Calidris pugnax*** | Ruff | Not Endemic | LC | Annex 3 | Annex 1 | KD |
| ***Carduelis carduelis*** | European Goldfinch | Not Endemic | LC | Annex 2 | KD | KD |
| ***Cecropis daurica*** | Red-rumped Swallow | Not Endemic | LC | Annex 2 | KD | KD |
| ***Cettia cetti*** | Cetti's Warbler | Not Endemic | LC | Annex 2 | KD | KD |
| ***Charadrius alexandrinus*** | Kentish Plover | Not Endemic | LC | Annex 2 | KD | KD |
| ***Charadrius dubius*** | Little Ringed Plover | Not Endemic | LC | Annex 2 | KD | KD |
| ***Charadrius hiaticula*** | Common Ringed Plover | Not Endemic | LC | Annex 2 | KD | KD |
| ***Chlidonias hybrida*** | Whiskered Tern | Not Endemic | LC | Annex 2 | KD | KD |
| ***Chlidonias leucopterus*** | White-winged Tern | Not Endemic | LC | Annex 2 | KD | KD |
| ***Chloris chloris*** | European Greenfinch | Not Endemic | LC | Annex 2 | KD | KD |
| ***Chroicocephalus ridibundus*** | Black-headed Gull | Not Endemic | LC | Annex 3 | Annex 1 | KD |
| ***Ciconia ciconia*** | White Stork | Not Endemic | LC | Annex 2 | KD | KD |
| ***Ciconia nigra*** | Black Stork | Not Endemic | LC | Annex 2 | KD | Annex 2 |
| ***Circaetus gallicus*** | Short-toed Snake Eagle | Not Endemic | LC | Annex 2 | KD | Annex 2 |
| ***Circus aeruginosus*** | Western Marsh Harrier | Not Endemic | LC | Annex 2 | KD | Annex 2 |
| ***Circus cyaneus*** | Hen Harrier | Not Endemic | LC | Annex 2 | KD | Annex 2 |

| Type Scientific First Name | English Name | endemism | IUCN (Spherical) | BERN | MAKK | CITES |
|---|---|---|---|---|---|---|
| ***Cisticola juncidis*** | Zitting Cisticola | Not Endemic | LC | KD | KD | KD |
| ***Clamator glandarius*** | Great Spotted Cuckoo | Not Endemic | LC | Annex 2 | KD | KD |
| ***Columba livia*** | Rock Dove | Not Endemic | LC | Annex 3 | Annex 2 | KD |
| ***Columba palumbus*** | Common Wood Pigeon | Not Endemic | LC | KD | Annex 2 | KD |
| ***Coracias garrulus*** | European Roller | Not Endemic | LC | Annex 2 | KD | KD |
| ***Corvus corax*** | Common Raven | Not Endemic | LC | Annex 3 | Annex 1 | KD |
| ***Corvus cornix*** | Hooded Crow | Not Endemic | LC | KD | Annex 2 | KD |
| ***Corvus frugilegus*** | Rook | Not Endemic | LC | KD | Annex 2 | KD |
| ***Corvus monedula*** | Eurasian Jackdaw | Not Endemic | LC | KD | Annex 2 | KD |
| ***Curruca melanocephala*** | Sardinian Warbler | Not Endemic | LC | Annex 2 | KD | KD |
| ***Cyanistes caeruleus*** | Eurasian Blue Tit | Not Endemic | LC | Annex 2 | KD | KD |
| ***Cygnus columbianus*** | Tundra Swan | Not Endemic | LC | KD | KD | KD |
| ***Delichon urbicum*** | Common House Martin | Not Endemic | LC | Annex 2 | KD | KD |
| ***Dendrocopos syriacus*** | Syrian Woodpecker | Not Endemic | LC | Annex 2 | KD | KD |
| ***Egretta garzetta*** | Little Egret | Not Endemic | LC | Annex 2 | KD | KD |
| ***Emberiza caesia*** | Cretzschmar's Bunting | Not Endemic | LC | Annex 2 | KD | KD |
| ***Emberiza calandra*** | Corn Bunting | Not Endemic | LC | Annex 3 | Annex 1 | KD |
| ***Emberiza cirlus*** | Cirl Bunting | Not Endemic | LC | Annex 2 | KD | KD |
| ***Emberiza citrinella*** | Yellowhammer | Not Endemic | LC | Annex 2 | KD | KD |
| ***Emberiza melanocephala*** | Black-headed Bunting | Not Endemic | LC | Annex 2 | KD | KD |
| ***Emberiza schoeniclus*** | Common Reed Bunting | Not Endemic | LC | Annex 2 | KD | KD |
| ***Erithacus rubecula*** | European Robin | Not Endemic | LC | Annex 2 | KD | KD |
| ***Falco columbarius*** | Merlin | Not Endemic | LC | Annex 2 | KD | Annex 2 |
| ***Falco eleonorae*** | Eleonora's Falcon | Not Endemic | LC | Annex 2 | KD | Annex 2 |

| Type Scientific First Name | English Name | endemism | IUCN (Spherical) | BERN | MAKK | CITES |
|---|---|---|---|---|---|---|
| ***Falco peregrinus*** | Peregrine Falcon | Not Endemic | LC | Annex 2 | KD | Annex 1 |
| ***Falco tinnunculus*** | Common Kestrel | Not Endemic | LC | Annex 2 | KD | Annex 2 |
| ***Ficedula hypoleuca*** | Pied Flycatcher | Not Endemic | LC | Annex 2 | KD | KD |
| ***Fringilla coelebs*** | Common Chaffinch | Not Endemic | LC | Annex 3 | Annex 1 | KD |
| ***Fulica atra*** | Eurasian Coot | Not Endemic | LC | Annex 3 | Annex 2 | KD |
| ***Galerida cristata*** | Crested Lark | Not Endemic | LC | Annex 3 | Annex 1 | KD |
| ***Gallinago gallinago*** | Common Snipe | Not Endemic | LC | Annex 3 | Annex 2 | KD |
| ***Gallinula chloropus*** | Common Moorhen | Not Endemic | LC | Annex 3 | Annex 2 | KD |
| ***Garrulus glandarius*** | Eurasian Jay | Not Endemic | LC | KD | Annex 2 | KD |
| ***Gelochelidon nilotica*** | Gull-billed Tern | Not Endemic | LC | Annex 2 | KD | KD |
| ***Himantopus himantopus*** | Black-winged Stilt | Not Endemic | LC | Annex 2 | KD | KD |
| ***Hirundo rustica*** | Barn Swallow | Not Endemic | LC | Annex 2 | KD | KD |
| ***Iduna pallida*** | Eastern Olivaceous Warbler | Not Endemic | LC | Annex 2 | KD | KD |
| ***Ixobrychus minutus*** | Little Bittern | Not Endemic | LC | Annex 2 | KD | KD |
| ***Lanius collurio*** | Red-backed Shrike | Not Endemic | LC | Annex 2 | Annex 1 | KD |
| ***Lanius minor*** | Lesser Grey Shrike | Not Endemic | LC | Annex 2 | KD | KD |
| ***Lanius senator*** | Woodchat Shrike | Not Endemic | LC | Annex 2 | KD | KD |
| ***Linaria cannabina*** | Common Linnet | Not Endemic | LC | Annex 2 | KD | KD |
| ***Lullula arborea*** | Woodlark | Not Endemic | LC | Annex 3 | Annex 1 | KD |
| ***Mareca penelope*** | Eurasian Wigeon | Not Endemic | LC | Annex 3 | Annex 2 | KD |
| ***Mareca strepera*** | Gadwall | Not Endemic | LC | Annex 3 | Annex 2 | KD |
| ***Melanocorypha calandra*** | Calandra Lark | Not Endemic | LC | Annex 2 | KD | KD |
| ***Merops apiaster*** | European Bee-eater | Not Endemic | LC | Annex 2 | KD | KD |
| ***Motacilla alba*** | White Wagtail | Not Endemic | LC | Annex 2 | KD | KD |

| Type Scientific First Name | English Name | endemism | IUCN (Spherical) | BERN | MAKK | CITES |
|---|---|---|---|---|---|---|
| ***Motacilla cinerea*** | Grey Wagtail | Not Endemic | LC | Annex 2 | KD | KD |
| ***Motacilla flava*** | Yellow Wagtail | Not Endemic | LC | Annex 2 | KD | KD |
| ***Muscicapa striata*** | Spotted Flycatcher | Not Endemic | LC | Annex 2 | KD | KD |
| ***Netta rufina*** | Red-crested Pochard | Not Endemic | LC | Annex 3 | Annex 2 | KD |
| ***Oenanthe finschii*** | Finsch's Wheatear | Not Endemic | LC | Annex 2 | KD | KD |
| ***Oenanthe isabellina*** | Isabelline Wheatear | Not Endemic | LC | Annex 2 | Annex 1 | KD |
| ***Oenanthe melanoleuca*** | Eastern Black-eared Wheatear | Not Endemic | LC | Annex 2 | KD | KD |
| ***Oenanthe oenanthe*** | Northern Wheatear | Not Endemic | LC | Annex 2 | Annex 1 | KD |
| ***Parus major*** | Great Tit | Not Endemic | LC | Annex 2 | KD | KD |
| ***Passer domesticus*** | House Sparrow | Not Endemic | LC | KD | Annex 2 | KD |
| ***Passer hispaniolensis*** | Spanish Sparrow | Not Endemic | LC | Annex 3 | Annex 1 | KD |
| ***Passer montanus*** | Eurasian Tree Sparrow | Not Endemic | LC | Annex 3 | Annex 1 | KD |
| ***Petronia petronia*** | Rock Sparrow | Not Endemic | LC | Annex 2 | KD | KD |
| ***Phalacrocorax carbo*** | Great Cormorant | Not Endemic | LC | Annex 3 | Annex 1 | KD |
| ***Phoenicopterus roseus*** | Greater Flamingo | Not Endemic | LC | Annex 2 | KD | Annex 2 |
| ***Phoenicurus ochruros*** | Black Redstart | Not Endemic | LC | Annex 2 | KD | KD |
| ***Phylloscopus collybita*** | Common Chiffchaff | Not Endemic | LC | Annex 2 | KD | KD |
| ***Phylloscopus trochilus*** | Willow Warbler | Not Endemic | LC | Annex 2 | KD | KD |
| ***Pica pica*** | Eurasian Magpie | Not Endemic | LC | Annex 2 | KD | KD |
| ***Platalea leucorodia*** | Eurasian Spoonbill | Not Endemic | LC | Annex 2 | KD | KD |
| ***Plegadis falcinellus*** | Glossy Ibis | Not Endemic | LC | Annex 2 | KD | KD |
| ***Podiceps grisegena*** | Red-necked Grebe | Not Endemic | LC | Annex 2 | KD | KD |
| ***Podiceps nigricollis*** | Black-necked Grebe | Not Endemic | LC | Annex 2 | KD | KD |
| **Motacilla cinerea** | Grey Wagtail | Not Endemic | LC | Annex 3 | Annex 1 | KD |

| Type Scientific First Name | English Name | endemism | IUCN (Spherical) | BERN | MAKK | CITES |
|---|---|---|---|---|---|---|
| ***Recurvirostra avosetta*** | Pied Avocet | Not Endemic | LC | Annex 2 | KD | KD |
| ***Regulus regulus*** | Goldcrest | Not Endemic | LC | Annex 2 | KD | KD |
| ***Remiz pendulinus*** | Eurasian Penduline Tit | Not Endemic | LC | Annex 3 | KD | KD |
| ***Saxicola rubetra*** | Whinchat | Not Endemic | LC | Annex 2 | KD | KD |
| ***Saxicola rubicola*** | Common Stonechat | Not Endemic | LC | Annex 2 | KD | KD |
| ***Serinus serinus*** | European Serin | Not Endemic | LC | Annex 2 | KD | KD |
| ***Sitta neumayer*** | Rock Nuthatch | Not Endemic | LC | Annex 2 | KD | KD |
| ***Spatula clypeata*** | Northern Shoveler | Not Endemic | LC | Annex 3 | Annex 1 | KD |
| ***Spatula querquedula*** | Garganey | Not Endemic | LC | Annex 3 | Annex 2 | KD |
| ***Streptopelia decaocto*** | Eurasian Collared Dove | Not Endemic | LC | Annex 3 | Annex 1 | KD |
| ***Streptopelia senegalensis*** | Laughing Dove | Not Endemic | LC | Annex 3 | Annex 1 | KD |
| ***Streptopelia turtur*** | European Turtle Dove | Not Endemic | VU | Annex 3 | Annex 2 | KD |
| ***Sturnus vulgaris*** | Common Starling | Not Endemic | LC | KD | Annex 1 | KD |
| ***Sylvia atricapilla*** | Eurasian Blackcap | Not Endemic | LC | Annex 2 | KD | KD |
| ***Tachybaptus ruficollis*** | Little Grebe | Not Endemic | LC | Annex 2 | KD | KD |
| ***Tadorna ferruginea*** | Ruddy Shelduck | Not Endemic | LC | Annex 2 | KD | KD |
| ***Tadorna tadorna*** | Common Shelduck | Not Endemic | LC | Annex 2 | KD | KD |
| ***Tringa erythropus*** | Spotted Redshank | Not Endemic | LC | Annex 2 | KD | KD |
| ***Tringa glareola*** | Wood Sandpiper | Not Endemic | LC | Annex 2 | KD | KD |
| ***Tringa nebularia*** | Common Greenshank | Not Endemic | LC | Annex 3 | Annex 1 | KD |
| ***Tringa ochropus*** | Green Sandpiper | Not Endemic | LC | Annex 2 | KD | KD |
| ***Tringa stagnatilis*** | Marsh Sandpiper | Not Endemic | LC | Annex 2 | KD | KD |
| ***Tringa totanus*** | Common Redshank | Not Endemic | LC | Annex 3 | Annex 1 | KD |
| ***Troglodytes troglodytes*** | Eurasian Wren | Not Endemic | LC | Annex 2 | KD | KD |

| Type Scientific First Name | English Name | endemism | IUCN (Spherical) | BERN | MAKK | CITES |
|---|---|---|---|---|---|---|
| ***Turdus merula*** | Common Blackbird | Not Endemic | LC | Annex 3 | Annex 2 | KD |
| ***Turdus philomelos*** | Song Thrush | Not Endemic | LC | Annex 3 | Annex 2 | KD |
| ***Turdus viscivorus*** | Mistle Thrush | Not Endemic | LC | Annex 3 | Annex 1 | KD |
| ***Tyto alba*** | Barn Owl | Not Endemic | LC | Annex 2 | KD | Annex 2 |
| ***Upupa epops*** | Eurasian Hoopoe | Not Endemic | LC | Annex 2 | KD | KD |
| ***Vanellus spinosus*** | Spur-winged Lapwing | Not Endemic | LC | Annex 2 | KD | KD |
| ***Vanellus vanellus*** | Northern Lapwing | Not Endemic | NT | Annex 3 | Annex 1 | KD |
| ***Zapornia parva*** | Little Crake | Not Endemic | LC | Annex 2 | KD | KD |

## 1.6 Identification of Hydrobiological Biodiversity in the Kızıldere-I GPP Facility Impact Area

In the study conducted at Kızıldere I GPP facilities, no algae, zooplankton, benthic aquatic organisms or fish were found. However, it has been determined that there is seasonal flow in the stream beds within the facility. These flows generally occur in the spring and occur after rainfall. occurred for when the rains are over It is drying. This for this reason Any aquatic creature cannot show signs of life.

the seasonal flow carries sediment , an embankment dam was created in the area close to the starting point of the stream, with the intention of creating a measure to prevent floods, floods and similar situations within the facility (Photo 12).

**Photos 12: View from the Filling Dam Built on the Seasonal Stream Passing through the Facility**

by water from the mountains because of erosion caused by rain, especially during seasonal flows. comes with It also holds other materials (soil, stone, plants, etc.) and prevents them from coming into the facility (Photo 13).

**Photos 13: View from Behind the Anti-Efill Dam Built on the Seasonal Stream Passing through the Facility**

## 1.7 Biodiversity Risk Evaluation

### 1.7.1 Flora

Guidance in terms of floristics at the KIZILDERE-I GPP facility site Considering the Note 6 criteria when taken C.R. And MOST in status herb taxon available because it is not IFC No critical species and habitat assessment has been made within the scope of this study.

There are hilly areas along the borders of the facility that may be affected by surface flows, and terracing works to be carried out in these areas will allow the formation of a more stable vegetation cover both inside and outside the facility. It is important for this area to carry out such applications on sloping areas within the facility, which will slow down the surface flow rate due to excessive rainfall .

The same applies to seasonally flowing dry stream beds. With the rehabilitation works to be carried out in dry stream beds, mud, stone and silt accumulations will be better drained. will be done.

However, sloping areas that do not have a stable soil structure along the borders of the facility These are areas open to material drift after high rainfall. Carrying out terracing works here will provide the opportunity for a more stable vegetation structure to be formed both in these areas and in the areas within the facility where drift will continue.

At the same time, the rehabilitation of dry stream beds with seasonal flow is an important criterion for environmental cleaning.

Intensive surface runoff in habitats increases the risk of spread of invasive species. For this reason organised One tracing system with invader type of the risk spread control under should be kept.

- **Invasive Species**

Alien invasive species, either accidentally or intentionally, move beyond their natural geographic range and become problematic. They often arise due to the globalization of the economy through the movement of people and goods, such as ship transportation, shipments of wood products, consignments carrying insects, or transportation of ornamental plants to new regions. The EU developed ***Regulation (EU) 1143/2014*** to actively deal with alien invasive species .

Alien invasive species (IAS) can cause serious ecological impacts on invaded environments. They may lack natural predators in their new environment, allowing them to increase their abundance and spread rapidly. They can carry diseases, compete with or prey on native species, alter food chains, and even alter ecosystems, for example by altering soil composition or creating habitats that encourage wildfires. These impacts can lead to local or global extinction of native species and ultimately ecological destruction.

IAS can also have significant socio -economic impacts. The European Union (EU) faces losses worth EUR 12 billion annually due to the effects of IAS on human health, infrastructure damage and agricultural damage.

There are more than 12,000 alien species in Europe, 15% of which are invasive. IAS, European threat It is the third most serious threat to the species below. According to a report published in 2015, 354 endangered species (229 animals, 124 plants and 1 fungus) are among all threatened species in Europe. It is clearly affected by IAS, accounting for 19% of the species under it . The newly adopted EU Biodiversity Strategy highlights the importance of tackling this threat by proposing to manage established alien invasive species and reduce the number of Red List species they threaten by 50% by 2030.

In 2013, the European Commission (EC) put forward a legislative proposal within the framework of an EU Directive on IAS, addressing the issues of preventing their introduction, early warning/rapid response and effective and coordinated management. forward It lasted. A range of services with IUCN, EC In cooperation with the convention and the IUCN Invasive Species Expert Group (ITUG) , it has been providing technical and scientific support to the implementation of the EU IAS Regulation since 2016.

of the project effect in the field invader flora types detection has been (Table 2). biodiversity Action The plan must be followed.

Energy investment areas are areas shaped by human influence. Construction activities arising from the nature of the investment in these areas have been tried to be rehabilitated through landscape planning around the roads and buildings. Some of the plant species used here Their ability to survive and spread in the area causes them to be called invasive species. Apart from rehabilitation studies, species carried by floods or faunistic sources may also have the same nature. For these reasons, in order to preserve the existence of the natural areas within the energy investment area, the individuals and diaspores (reproductive units) of these plants must be cleared from the area.

Timing: Controlling invasive plant species should be done before the plant goes to seed. If the plant is known for its above-ground parts before flowering, the removal is done in the spring; otherwise, it is removed immediately after flowering.

**Table 2: Project in the field Found And Availability Possibility of The one which Invader Species**

| | |
|---|---|
| *Acer negundo* (ash tree leafy maple) andropogenic areas susceptible to influence |  |
| *agropyron repens* (Separate herb) Field, open area |  |

| | |
|---|---|
| *ailanthus altissima* ( Kokarağaç ) andropogenic to the effect open spaces |  |
| *amaranthus retroflexus* (Fox dry ) Field, open area |  |
| *Boreava orientalis* ( Sariot ) Field, roadside |  |
| *chenopodium album* ( While crying ) Flood, flood bearings |  |
| *Cirsium arvense* (Köygöçüren) Flood, flood bearings |  |

| | |
|---|---|
| *conyza canadensis* ( cypress ) andropogenic to the effect open fields |  |
| *conyza bonariensis* ( Coyote ) andropogenic to the effect open fields |  |
| *conyza albida* ( Maplewort ) andropogenic to the effect open spaces |  |
| *Cuscuta campestris* (Turkish) meadow-pasture habitats |  |

| | |
|---|---|
| *Lepidium draba* ( Diğnik ) andropogenic to the effect open spaces |  |
| *nasturtium officinale* (Suteresi) streamside |  |
| *Reseda lutea* (Love flower) Path edge, field |  |
| *rumex acetocella* (Sorrel) Path edge, field And barren places |  |

| | |
|---|---|
| *Senecio vernalis* (Canary herb) Path edge And person Fields shaped by the influence |  |
| *Sicyos angulatus* ( Itdolanbacı ) humid areas |  |
| *Solanum americanum* (Push grape) This edge And damp shady places |  |
| *portulaca oleracea* (Purslane) Field, open area |  |
| *phytolacca americana* (Candymaker's paint) Stream beds and moist habitats |  |

| | |
|---|---|
| *paspalum distichum* (This discrete) This communities inside on channels |  |
| *Robinia pseudoacacia* (White flowering liar acacia) roadsides |  |
| *xanthium strumarium* (Big Pıtrak) Flood, flood bearings |  |
| *xanthium spinosum* (Yellow Pıtrak) Flood, flood bearings |  |

| | |
|---|---|
| *Viscum album* (Lime herb) to the trees interference |  |

### 1.7.2 Fauna

Since there is no energy production in the Kızıldere 1 area, there is less activity and human impact in this area. Accordingly, it was observed that the fences surrounding this area were old, rusty and some areas were opened. It is deemed necessary to renew the fences of the Kızıldere 1 area with plastic-coated or painted cage wires. When fencing the area , barbed wires that may harm wild animals should not be preferred. In addition, it is deemed necessary to collect the coarse garbage seen here and there and to cut and clean the dried grass seen in some parts of the area . As a matter of fact, it was observed that a local fire broke out in one section caused by these dry grasses, and in another section the grass on the ground burned.

IFC PS-6 and Guidance Considering the Note 6 criteria, the "critical species" evaluation and "critical habitat" evaluation were made in section 5 , and there is no Critical species in terms of fauna (Amphibia, Reptile, Mammal) in the region, and accordingly, there is no critical habitat .

Tortoise ( *Testudo graeca* ): This species has been seen around the area. Its presence in the region has been assessed sparsely. It would be useful to raise awareness about the species and take some precautions to prevent harm to the species, especially in human-tortoise encounters. These issues are detailed in the Biodiversity Action Plan.

### 1.7.3 Ornithology

IFC PS-6 and Guidance Taking into account the Note 6 criteria, the “critical species” evaluation and “critical habitat” evaluation were made in section 5 , and there are no Critical species in terms of birds in the region.

Many water birds have been identified in the wetlands around the facility, and 2 of these water birds are threatened on a global scale. These species are Elmabaş Patka ( *Aythya ferina* ) and Little Clumsy ( *Anser erythropus* ). Currently, the facilities will not have a major impact on the birds.

### 1.7.4 Hydrobiology

In the study conducted at Kızıldere I GPP facilities, no algae, zooplankton, benthic aquatic organisms or fish were encountered. However, it has been determined that there is seasonal flow in the stream beds within the facility. These flows generally occur in the spring and occur after rainfall. occurred for when the rains are over It is drying. This for this reason Any aquatic creature cannot show signs of life.

The underground water temperature used in the environment is around 100 $^{o}$ C. There are no species that can be considered important in terms of biodiversity in underground geothermal water. However, in case of any possible negativity  This hot water, which will mix with nature (necessary precautions have been taken against all kinds of negativities in the facility), may harm other living things around it.

## 1.8 Biodiversity Action plan

| Kızıldere-I JES facility biodiversity Action plan | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Action Code** | **Habitat Class** | **Action Subject** | **Action Zone** | **Action Rationale** | **Action/Application Details** | **Action Period** | **Action Duration** |
| KD1 | Business | Fauna Conservation of Species | Project Area And surroundings | Tortoise ( *Testudo* Facility Employees Should Be Provided Training About *Graeca ) Species.* Pay Attention to Certain Points of the Project Area Tortoise may come out Signs Should Be Placed. | Biologists who are experts on the subject Training Should Be Provided by | During Operation | April-May 2024 one Times |
| KD2 | Business | Fauna Conservation of Species | Project Area And surroundings | Tortoise ( *Testudo* Facility Employees Should Be Provided Training About *Graeca ) Species.* Pay Attention to Certain Points of the Project Area Tortoise may come out Signs Should Be Placed. | Biologists who are experts on the subject Training Should Be Provided by | During Operation | April-May 2024 one Times |
| KD3 | Business | Fauna Conservation of Species | Project Area And surroundings | tortoises and other animals from being crushed by vehicles while crossing the roads, vehicle speeds should be limited to 30 km/h within the facility. With Limitation, Transition your priority Each Time to Give to Animals It is necessary. | Company By | During Operation | Continually |
| KD4 | Business | Fauna Conservation of Species | Project Area And surroundings | around you fences Must be renewed And Barbed Wires Should Be Removed. | Company By | During Operation | 2023 May |

| Kızıldere-I JES facility biodiversity Action plan | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Action Code** | **Habitat Class** | **Action Subject** | **Action Zone** | **Action Rationale** | **Action/Application Details** | **Action Period** | **Action Duration** |
| KD5 | Business | Fauna Conservation of Species | Project Area And surroundings | Pet Cats Should Never Be Keeped in the Facility. Although it is recommended not to have a pet dog, Even Especially at Night Free to their wanderings Permission should not be given | Company By | During Operation | April-May 2024 |
| KD6 | All Habitats | Invader Blocking Species | Project Area And surroundings | Investigation of Invasive Species Found in the Project Area and Surroundings Project Area And Around by watching Dismantling Plan Must Be Prepared | Population by Expert Biologists Level Monitoring | During Operation | one Year Duration in July and August |
| KD7 | Business | Live Species Conservation | E2, H5 Habitats | Inclined In the fields Terracing Activities Need to Be Done | In the Coordination of Biologists Expert on the Subject By Company | During Operation | 2022 December |
| KD8 | Business | Stream Protection of Beds | E2, H5 Habitats | Stone And Pouring concretes With Creek of your bed stable Making It is necessary. | Biologists who are experts on the subject In coordination By Company | During Operation | one Year Duration: July In August |
| KD9 | Business | Fish Conservation of Species | Project Area | Some Fish Species Have Long Distance and Some Have Short Distance Distance Migration They are the species that can . Particularly Gene Diversity of Fish Not shrinking Construction of Fish Passage for It is important. | In the Coordination of Biologists Expert on the Subject By Company | During Operation | 2023 May-August |

| Kızıldere-I JES facility biodiversity Action plan | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Action Code** | **Habitat Class** | **Action Subject** | **Action Zone** | **Action Rationale** | **Action/Application Details** | **Action Period** | **Action Duration** |
| KD10 | Business | Prevention of Environmental Pollution | Project Area | Licensed in accordance with the Waste Codes for Hazardous Wastes Generated within the Business Companies Delivery to Recycling / Disposal Facilities by It should be done. | Company By | During Operation | 6 on the moon one |
| KD11 | Business | Prevention of Environmental Pollution | Project Area | Licensed in accordance with the Waste Codes for Non-Hazardous Wastes Generated within the Business Companies Delivery to Recycling / Disposal Facilities by It should be done. | Company By | During Operation | per year one |

**PROJECT TEAM**

| Name- Surname /Title | In Report/Study Department He is Assigned to | Sign ature |
|---|---|---|
| ***Specialist Biologist Tariq BATUHAN*** | Project And Report Coordination Ecological Assessment | |
| ***Prof. Dr. Mustafa SÖZEN*** | Fauna Evaluation | |
| ***Prof. Dr. Tahir SHOOTER*** | hydrobiological Evaluation | |
| ***Dr. Lecturer Member of Karim SOUTH*** | Flora And Vegetation Evaluation | |
| ***Kaan ÖZGENCİL*** | Ornithological Evaluation And GIS Studies | |
| ***Biologist Mehmet Ali YUKSEL*** | Ecological Studies And Land Coordination | |
| ***Experienced Bird Observer Ayhan BATUHAN*** | Bird observation | |