

## **KUZGUN DAM and HPP BIODIVERSITY ACTION PLAN**

### **1.1 Introduction**

Kuzgun Dam and Hydroelectric Power Plant (HEPP) is located on the Berçeme Stream within the borders of Erzurum Province in the Eastern Anatolia Region of Turkey. Kuzgun HEPP is located 45 km from Ilica District and 60 km from Erzurum Province. Kuzgun HEPP receives the required water from the reservoir formed by Kuzgun Dam. The water coming from the water intake structure through a 2.5 m diameter tunnel, a part of which is covered with steel sheet, to the Butterfly Valve, which is the main cut valve, passes through the butterfly valve, which is a control equipment, and is transmitted to the turbines through a 2.5 m diameter penstock pipe divided into four at the entrance of the power plant building.

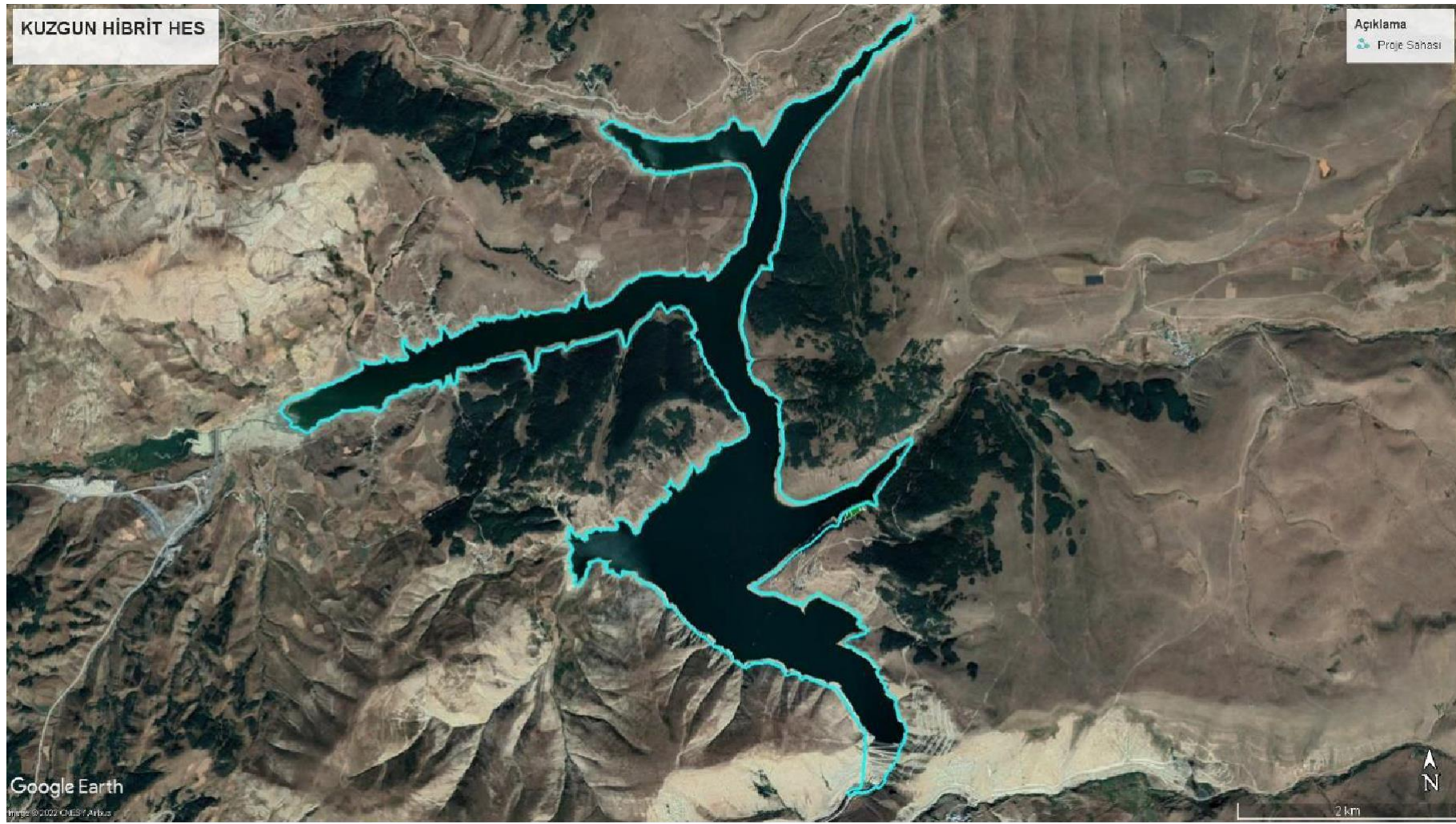
Erzurum province, where the project is located, is located in the northeastern part of the Eastern Anatolia region, at the beginning of the Çoruh, Euphrates and Aras basins. With an area of 25,066 km<sup>2</sup>, the province is surrounded by the Kargapazarı (3,288 m) and Dumlu (3,250 m) mountains and the Soğanlı mountains. The deep valleys opened by the Çoruh and its tributaries and the plains formed by them provide transportation from our province to the Eastern Black Sea provinces. From the west through the Tercan Mountains to the north through the Keşiş Mountains, from there to the Kelkit valley through the Kop Mountain and Kop Pass, to the southwest through the Sansa Strait to the Erzincan plain, and to the south of it through the Mercan Mountains to the Munzur range. In the south, through the Palandöken range, it reaches the Şakşak and Bingöl mountains and the Murat basin.

Located in the northeastern part of the Eastern Anatolia Region, it is the largest province in this region and the 4th largest province in Turkey with an area of 25,066 km<sup>2</sup>. Located at the starting point of the Çoruh, Euphrates and Aras basins, the province borders Rize and Artvin to the north, Bayburt and Erzincan to the west, Bingöl and Muş to the south, Kars and Ağrı to the east, Ardahan to the northeast and Trabzon to the northwest.

Approximate bird's eye view of the project area is 2.2 km to Ağaçkent village, 3.3 km to Eşinkaya village, 5.4 km to Rizekent village, 8.8 km to Çırıklı village, 7.1 km to Kızılkale

village, 4.2 km to Karakale village, 9.4 km to Kapılı village, 12.5 km to Başkurtdere village, 14.7 km to Güllüce village, 20.3 km to Cıbalı village and 19 km to Değirmendere village, Kirik village 18.4 km, Bozan village 13.7 km, Toprakkale village 3.4 km, Akdag village 6.1 km, Cayirbasi village 16.5 km, Leylekkoy village 17.9 km, Goyuneykoy village 14.2 km, Yesilvadi village 5.7 km, Akseki village 6.5 km, Zeyrek village 9.2 km, Alacabuk village 11.8 km, Akpınar village 13,1 km , Karahan village 12 km, Incesu village 9.8 km, Karakaya village 11.3 km, Ortaören village 9.9 km, Çatak village 0.1 km, Başovacık village 2.9 km, Başkent village 5.4 km, Bingöze village 4.9 km, Akırcık village 6.8 km, Kabaktepe village 5.5 km, Kuzuluk village 3.5 km, Sırlı village 2.4 km, İfti village 10.9 km, Elmalı village 5.7 km, Sarkunlu village 14.3 km, Eskipolat village 15.8 km, Yükarıcaören village 16.9 km, Ocak village 15.8 km, Dağdagül village 14.2 km, Kavakdere village 11.3 km, Kumluyazı village 15.6 km, Yazıpınarı village 16.2 km, Uzunyayla village 13.4 km and Arıbahçe village 14.7 km (Figure 3-5).

There are important wetlands in and around the Project site. The Project site is located on Kuzgun Dam. Aygır Lake 14.2 km, Kazan Lake 16.7 km, Kağans Lakes 12.6 km, Kurt Stream 13.4 km, Big Lake 13.5 km, Double Lakes 14.6 km and Başyatağın Lake 11.9 km from the Project site (Figure 6 - 8).



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



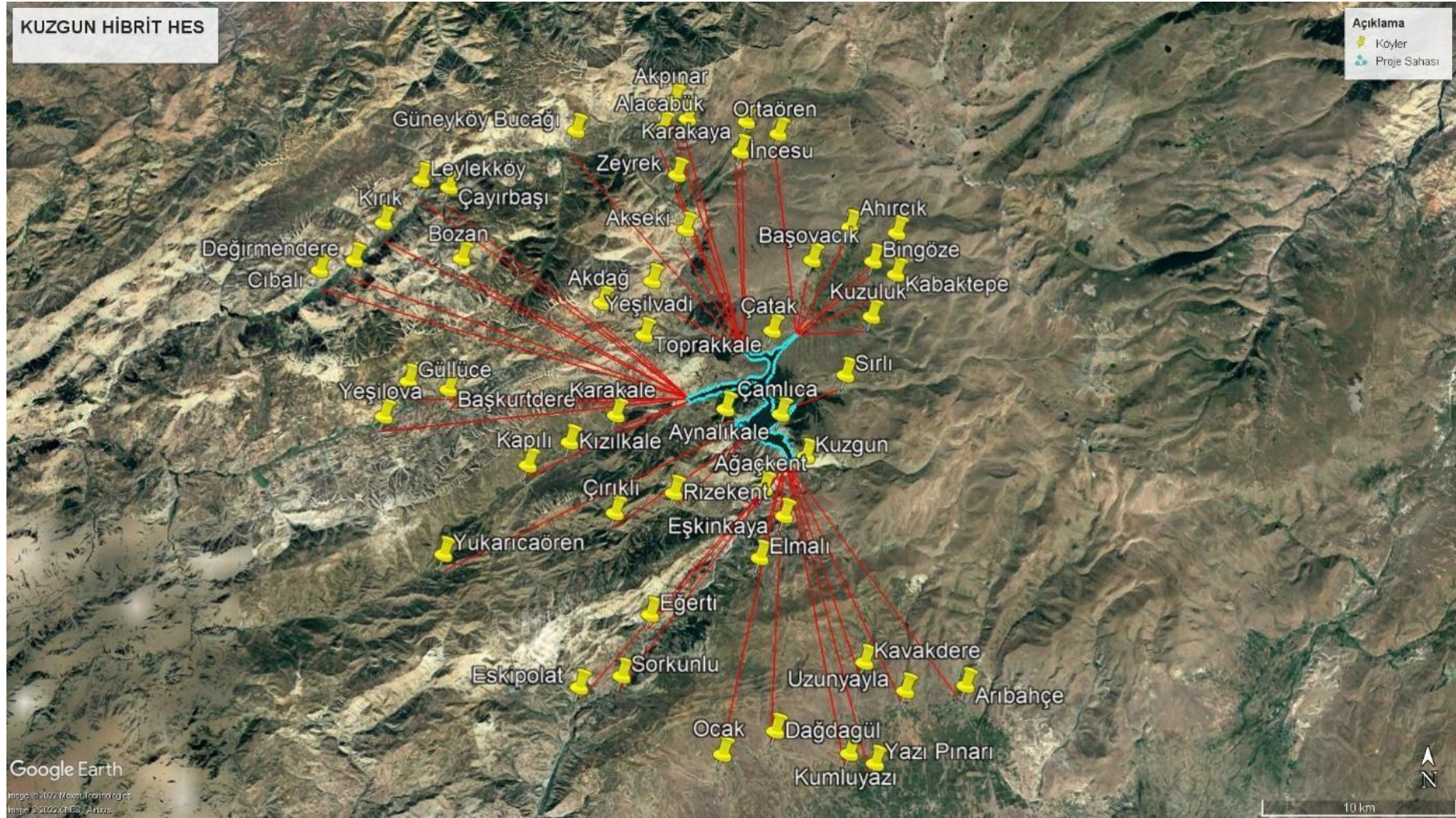
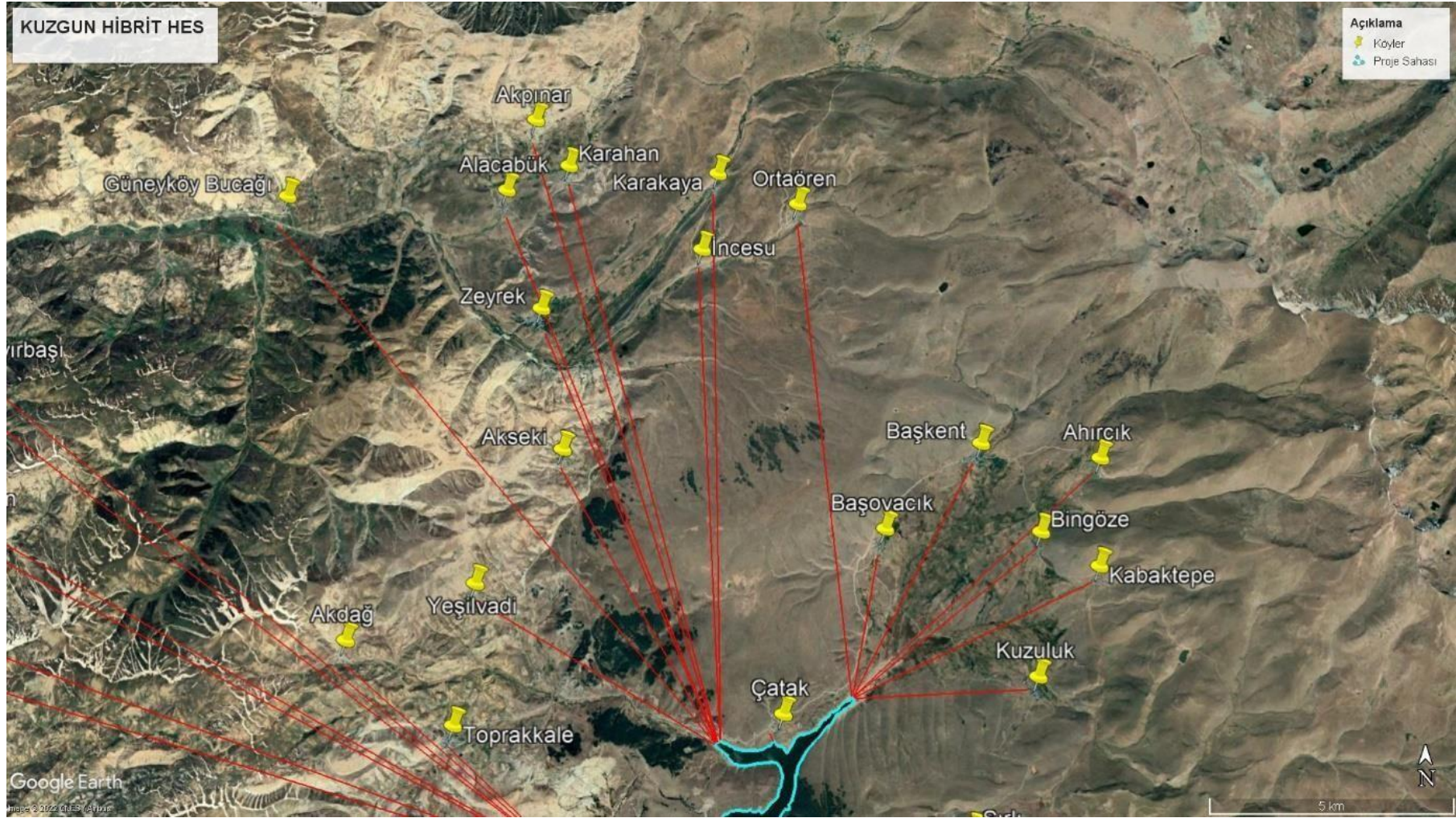


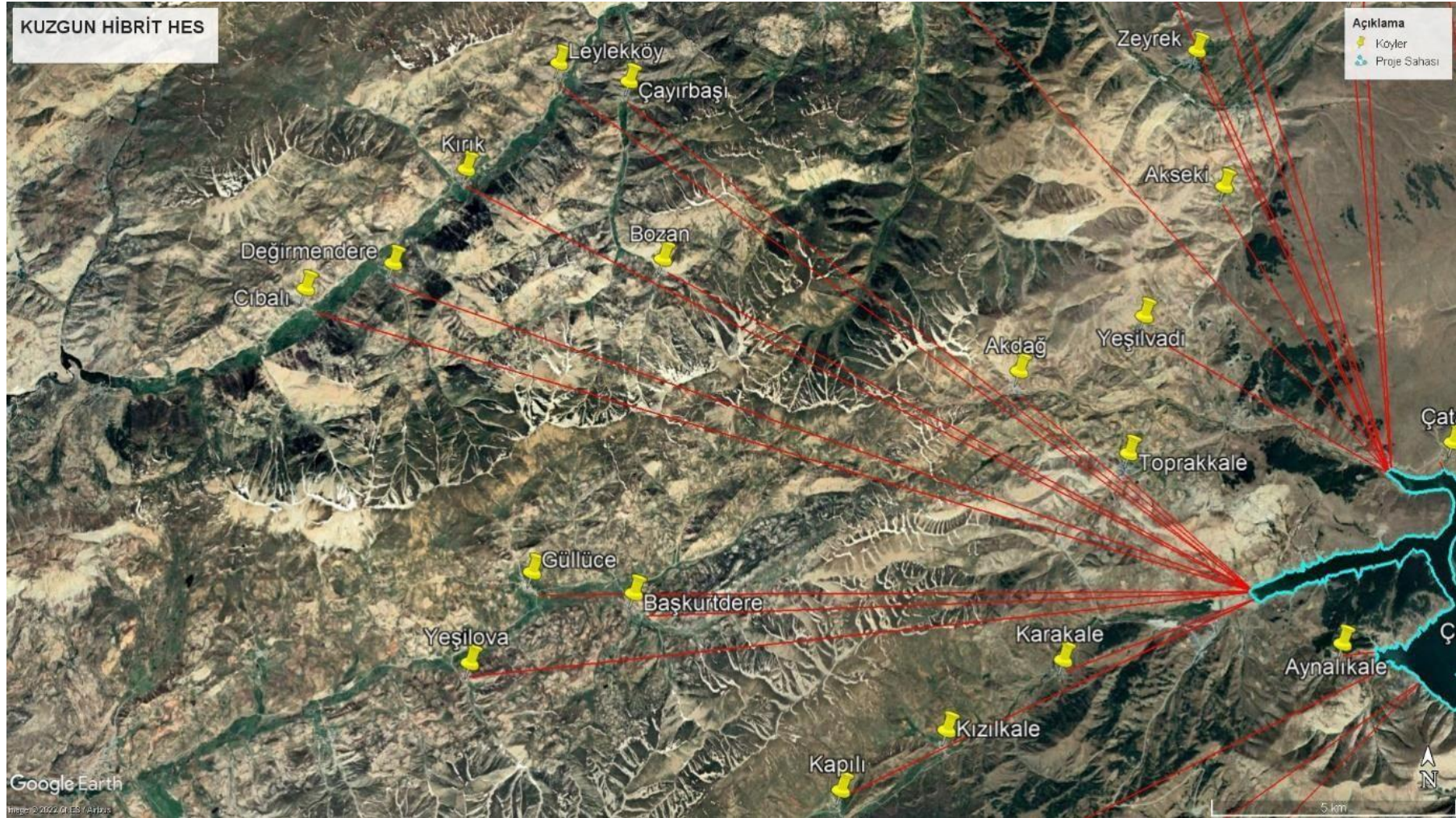
Figure 2 Village (Neighborhood) Settlements in the Vicinity of the Project Site





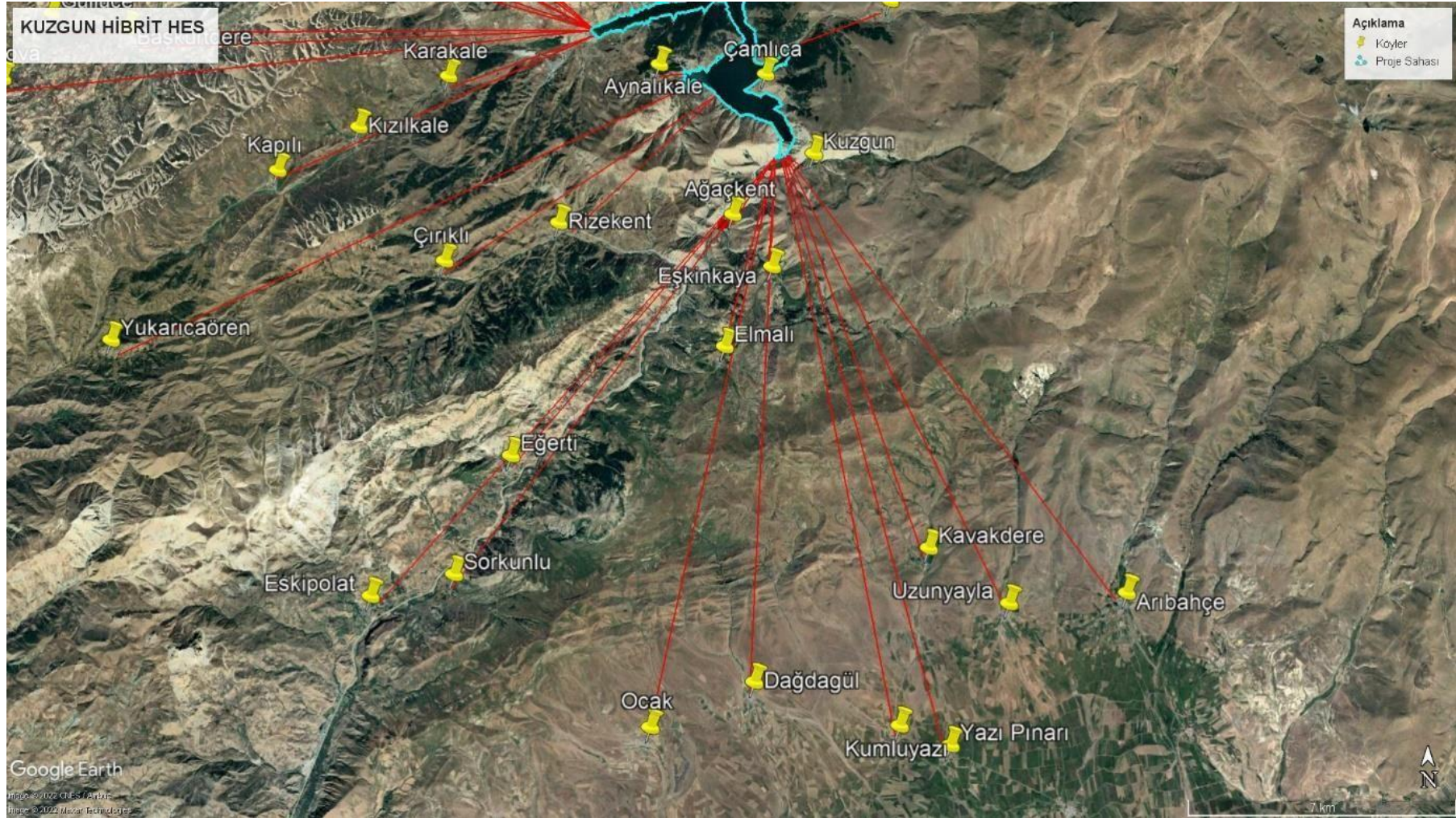
**Figure 3 Village (Neighborhood) Settlements in the Vicinity of the Project Site**





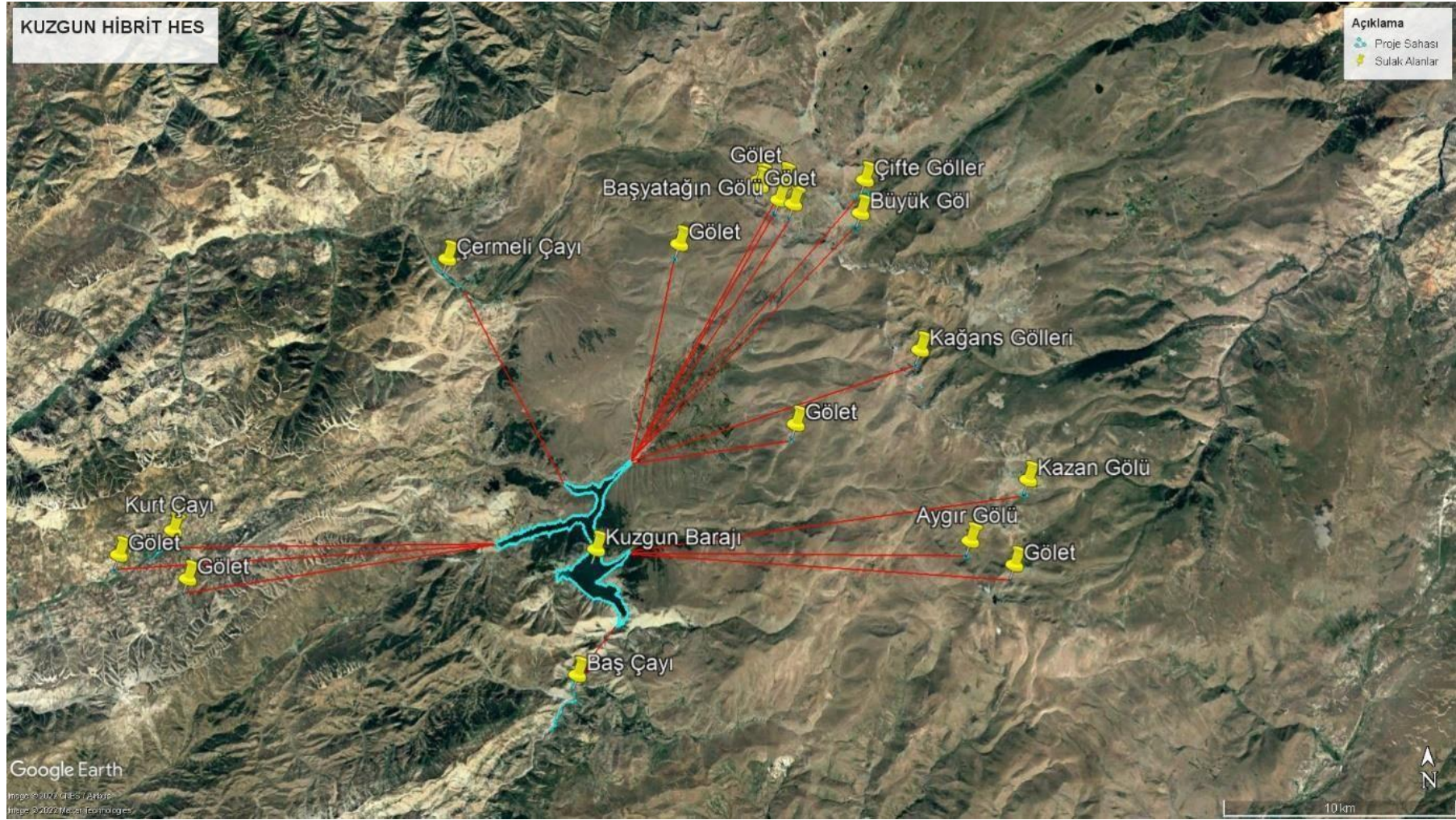
**Figure 4 Village (Neighborhood) Settlements in the Vicinity of the Project Site**





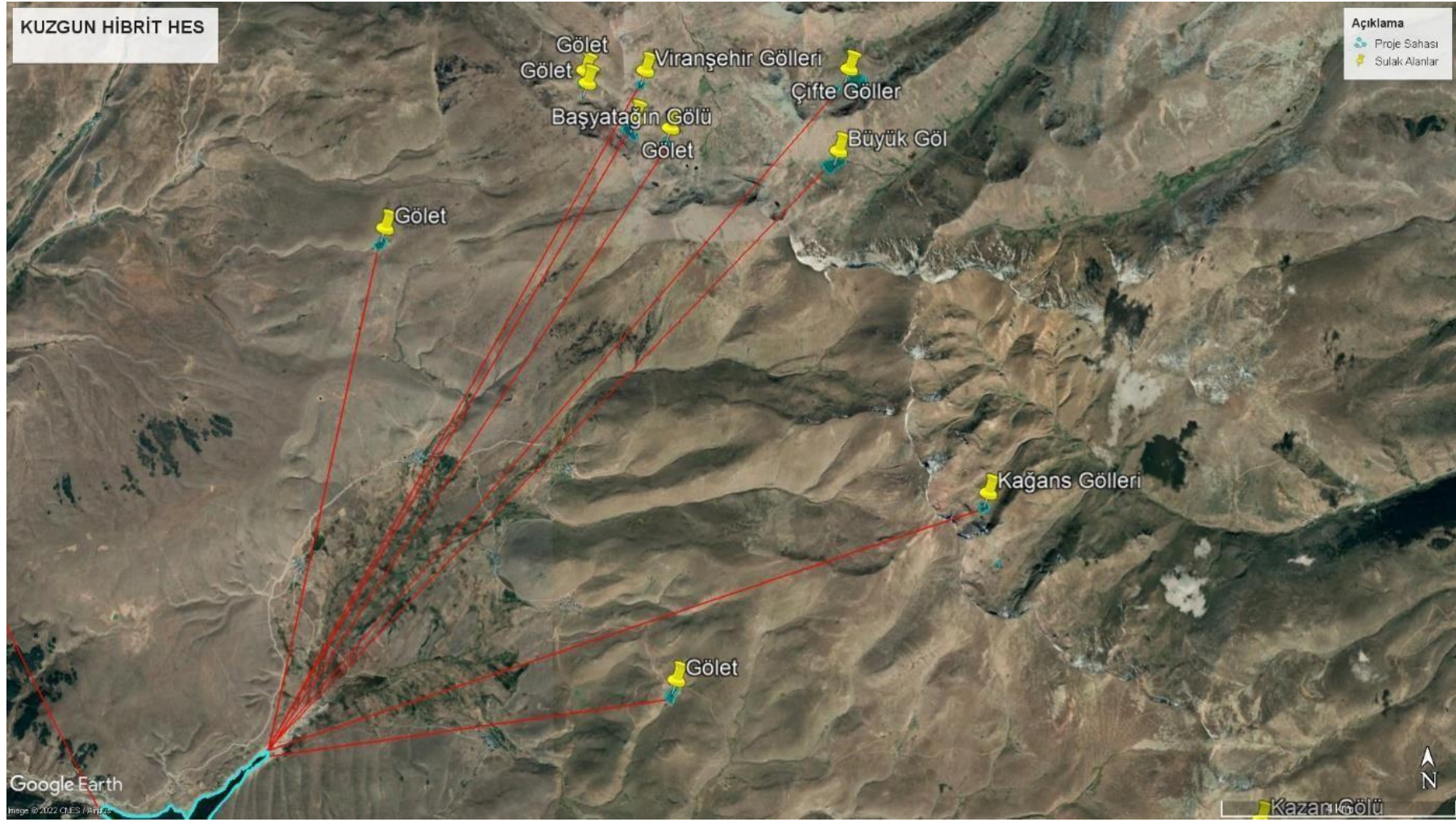
**Figure 5 Settlements in the immediate vicinity of the Project Site**





**Figure 6 Important Water Bodies in the Project Environment**





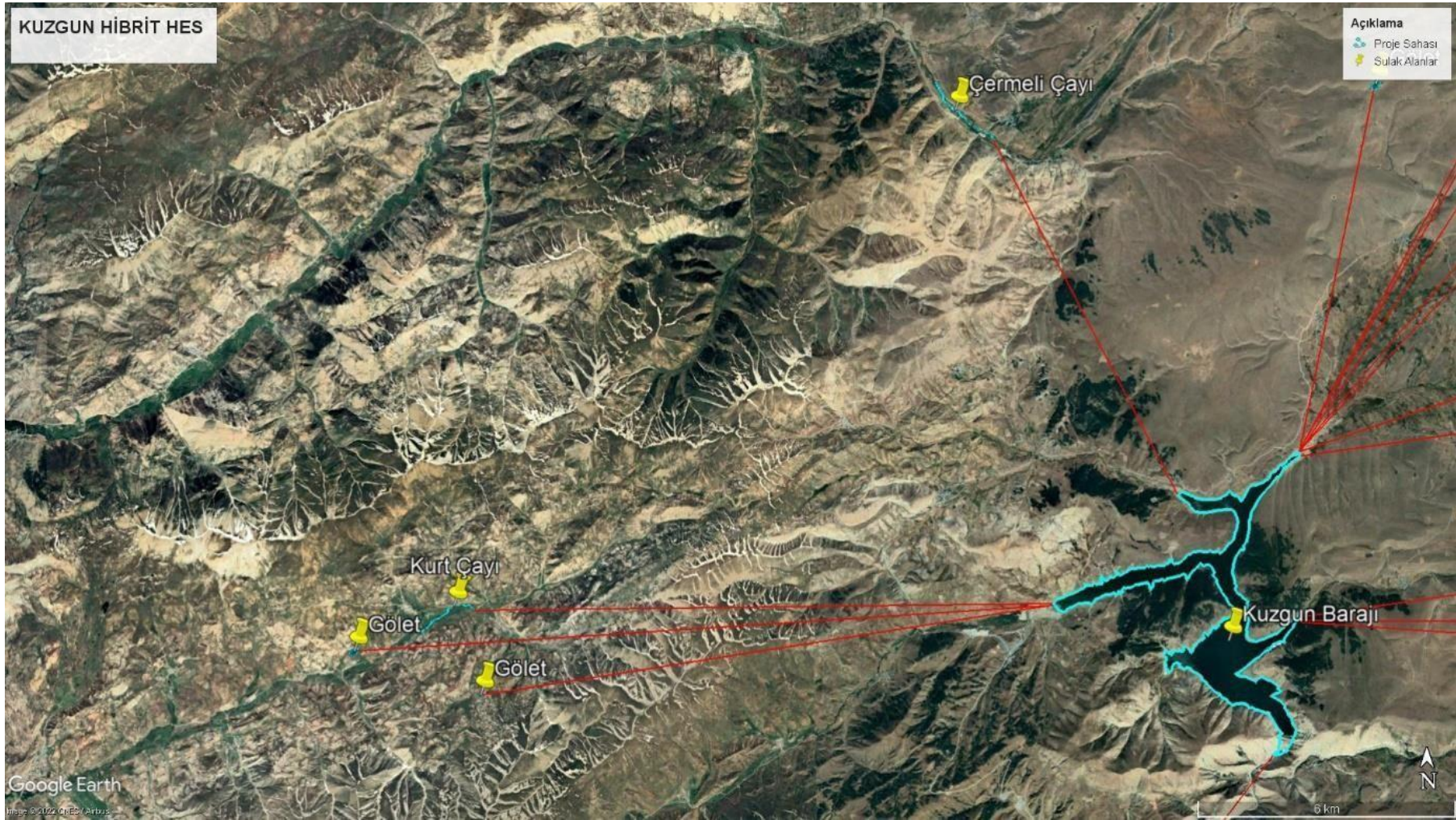
**Figure 7 Important Water Bodies in the Project Environment**





**Figure 8 Important Water Bodies in the Project Environment**





**Figure 9 Important Water Bodies in the Project Environment**



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

If the protected areas and important nature areas in the vicinity of Kuzgun Dam HEPP site are evaluated; there is Tortum Basin KBA at a distance of approximately 9.8 km as the crow flies. There are no protected areas in the immediate vicinity of the project site (Figure 9).



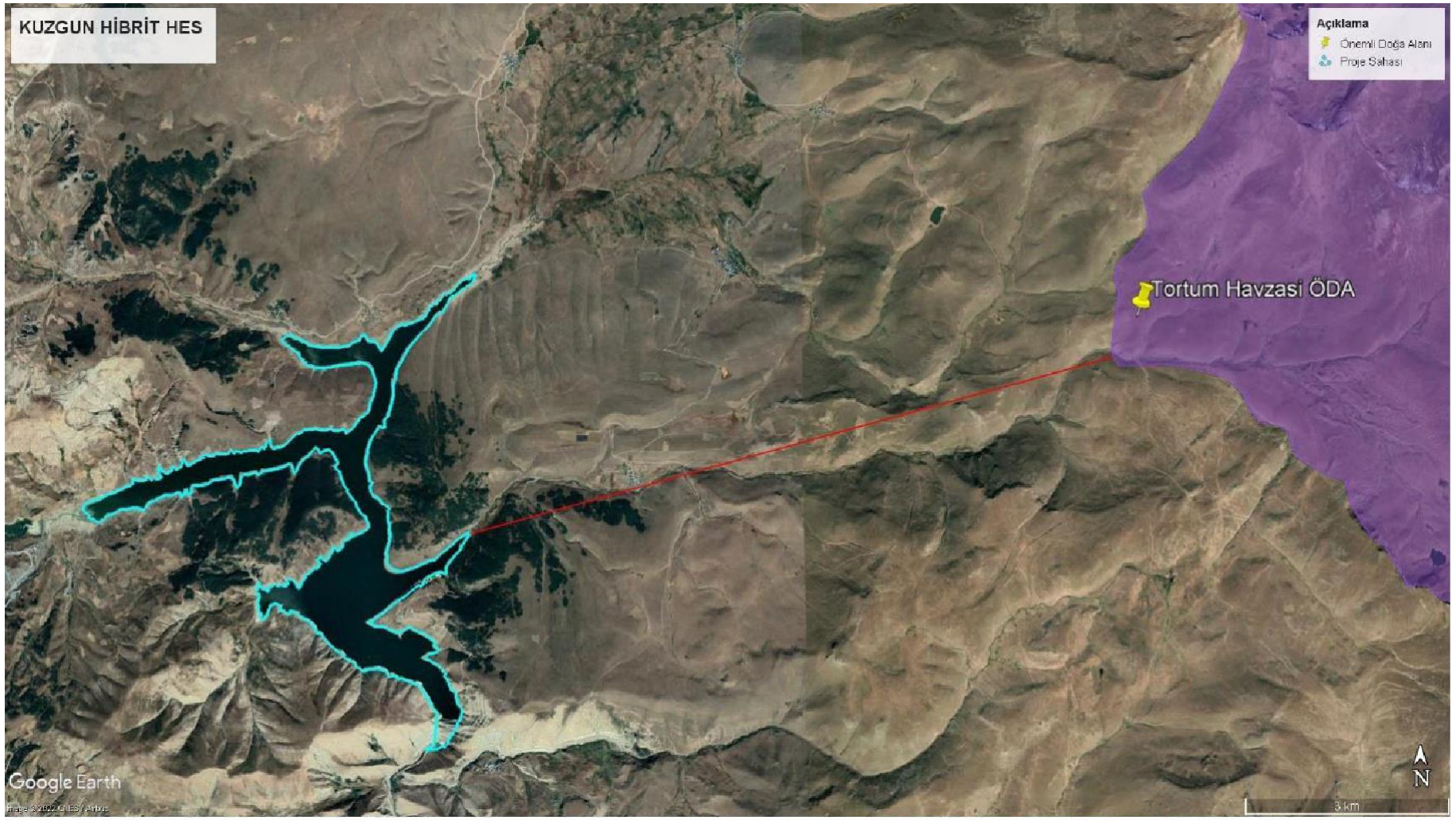


Figure 10 Satellite Image Showing the Relationship between the Project Area and Protected Areas



### **1.3 Identification and Classification of Habitats in the Impact Area of Kuzgun Dam and HEPP Facility**

Operated by Zorlu Dođal Elektrik Üretimi A.Ş., Kuzgun Dam and HEPP is located on Serçeme Creek in Ispir district of Erzurum. The power plant, owned by Zorlu Enerji, is the 551st largest power plant in Turkey and the 551st largest power plant in Erzurum with an installed capacity of 20.90 MWe. It is also the 222nd largest hydroelectric power plant in Turkey.

There are 12 different habitat types in the Project area. 7 of these habitats are natural habitats and the remaining 5 are modified habitats, and the 1st, 2nd and 3rd level codes and vegetation types of the vegetation types developed in natural areas according to EUNIS Habitat Classification are given below (Figure 11).



## Kuzgun HES EUNIS Habitat Haritası

Ölçek: 1:10,000



- \*\* Tesis binaları
- \* C1.1 : Kalıcı oligotrofik göller, göletler ve rezervuarlar
- \* C2.2 : Mevsimsel olmayan, hızlı akan akarsular
- \* E2.64 : Çimlik alanlar, park çimlikleri
- \* E4 : Subalpin ve alpin çayırlar
- \* H3 : Sarp yamaçlar, ana kayanın yüzeye çıktığı taşlık alanlar
- \* H5 : Bitki örtüsü seyrek açıklık alanlar
- \* G1 : Yaprak döken ormanlar
- \* G5 : Antropojenik ormanlar, baltalıklar, ağaç hatları
- \*\* J4.2 : Yol ağları
- \*\* J4.6 : Kaldırımlar, beton yüzeyler ve rekreasyon alanları
- \*\* J5.41 : İnsan yapımı tatlı su kanalları
- \*\* J6.5 : Endüstriyel atık depolama sahası



0 200 400  
Meters

Figure 11 EUNIS Habitat Map of Kuzgun HEPP 1



## Natural Habitats

### C1.2 Permanent Mesotrophic Lakes, Ponds and Reservoirs

At an altitude of 2100 m, Kuzgun Pond was formed by human influence and its water mirror shows ups and downs due to the variability in the annual precipitation balance sheet. For this reason, a stable vegetation structure is not formed on the lakeside. However, there is a vegetation cover consisting of water loving plants and shaped according to the water mirror; *Polygonum amphibium*, *Sophora alopecuroides* var. *alopecuroides*, *Potentilla erecta*, *Epilobium parviflorum*, *Hippuris vulgaris*, *Inula helenium* subsp. *turcoracemosa*, *Arctium tomentosum* var. *glabrum*, *Primula auriculata*, *Calystegia sepium* subsp. *sepium*, *Veronica poljensis*, *Mentha aquatica*.



**Photos 1 Permanent Mesotrophic Lakes, Ponds and Reservoirs (EUNIS:C1.2)**



## C2.2 Non-seasonal, fast flowing streams

At an altitude of 2030 m, the plant communities around the continuously flowing stream bed. These are *Cleome steveniana*, *Lathyrus pratensis*, *Trifolium spadiceum*, *Rubus caesius*, *Potentilla palustris*, *Agrimonia repens*, *Epilobium parviflorum*, *Epilobium minutiflorum*, *Saxifraga cymbalaria* var. *cymbalaria*, *Ribes orientale*, *Pimpinella peucedanifolia*, *Heracleum apiifolium*, *Cirsium arvense* subsp. *vestitum*, *Primula auriculata*, *Lysimachia vulgaris*, *Periploca graeca* var. *graeca*, *Swertia longifolia*, *Heliotropium circinatum*.



Photos 2 Non-seasonal, Fast Flowing Streams (EUNIS:C2.2)



## G1 Deciduous Forests

The dominant plant taxa that make up the composition of these forests spread at altitudes of 2150 m are *Quercus macranthera*, *Cerasus prostrata* var. *prostrata*, *Sorbus roopiana*, *Sorbus kusnetzovii*, *Sorbus umbellata* var. *cretica*, *Pyrus syriaca* var. *syriaca*, *Lathyrus cicera*, *Trigonella fischeriana*, *Medicago rigidula* var. *rigidula*, *Crataegus pontica*, *Scandix iberica*.



Photos 3 Deciduous Forests (EUNIS:G1)

## G5 Anthropogenic Forests, Coppice Forests

At 2000 m, it consists of coniferous and deciduous plant taxa. It was shaped by the anthropogenic impact of plant taxa present in the G1 habitat.

## H5 Sparsely Vegetated Open Areas

At 2000 m altitude, the plants distributed in these habitats are *Grammosciadium pterocarpum*, *Evax anatolica*, *Galatella punctata*, *Senecio racemosus*, *Artemisia splendens*, *Serratula radiata* subsp. *biebersteiniana*, *Thymus leucotrichus* var. *leucotrichus*, *Crucianella exasperata*, *Asperula laxiflora*, *Allium dictyoprasum*.

### H3 Steep Slopes, Stony Areas where the Bedrock Rises to the Surface

At an altitude of 2150 m, there are fragmented rocky and stony areas formed by surface runoff. The plant taxa distributed in these habitats are *Delphinium albiflorum*, *Ranunculus brachylobus* subsp. *brachylobus*, *Ranunculus dissectus* subsp. *glabrescens*, *Glaucium grandiflorum* var. *grandiflorum*, *Papaver pseudo-orientale*, *Lepidium perfoliatum*, *Aethionema cordatum*, *Alyssum stapfii*, *Alyssum longistylum*, *Hesperis bicuspidata*, *Murbeckiella huetii*, *Dianthus calocephalus*, *Saponaria prostrata* subsp. *calvertii*, *Silene italica*, *Silene ampullata*, *Atraphaxis billardieri* var. *tournefortii*, *Hypericum elongatum* subsp. *elongatum*, *Hypericum linarioides*, *Linum austriacum* subsp. *glaucescens*, *Oxytropis persica*, *Vicia sativa* subsp. *sativa*, *Medicago minima* var. *minima*, *Hedysarum hedysaroides*



Photos 4 Stony Areas where Bedrock Rises to the Soil Surface (EUNIS:H3)



## E4 Subalpine and Alpine Meadows

At 2500 m altitude, the plant taxa identified in the alpine and sub-alpine layer are *Ranunculus brachylobus* subsp. *brachylobus*, *Ranunculus dissectus* subsp. *glabrescens*, *Alyssum murale* var. *alpinum*, *Astragalus onobrychis*, *Astragalus alyssoides*, *Vicia dadianorum*, *Trifolium canescens*, *Coronilla orientalis* var. *balansae*, *Potentilla argaea*, *Potentilla crantzii* var. *crantzii*, *Carum meifolium*, *Pastinaca armena* subsp. *armena*, *Valeriana alpestris*, *Gnaphalium sylvaticum*, *Senecio eriospermus* var. *eriospermus*, *Tripleurospermum caucasicum*, *Taraxacum crepidiforme* subsp. *crepidiforme*, *Campanula aucheri*, *Primula elatior* subsp. *pallasii*, *Gentiana aquatica*, *Nonea pulla* subsp. *scabrisquamata*, *Scrophularia chlorantha*, *Pedicularis caucasica*, *Pedicularis nordmanniana*, *Salvia staminea*, *Plantago atrata*, *Daphne glomerata*, *Asperula glomerata* subsp. *condensata* var. *condensata*, *Allium schoenoprasum*.



**Photos 5 Subalpine and Alpine Meadows (EUNIS:E4)**

## Modified Habitats

Modified habitats in the Project area include grassy areas, park lawns (E2.64), road networks (J4.2), sidewalks, concrete surfaces, recreation areas (J4.6), man-made freshwater canals (J5.41), industrial landfill (J6.5) and facility buildings.



**Photos 6 Switchyard**

When the vegetation cover of the project area and its surroundings is examined, a large part of it consists of lakeside and riverside vegetation and alpine and subalpine mountain vegetation plants. In addition to deciduous and mixed forests, coppice deciduous forests due to human impact, steep slopes and stony areas and steppe character openings between them constitute the general vegetation structure of the area.



## Aquatic Habitats

Habitat degradation and loss in aquatic ecosystems is increasing day by day due to anthropogenic and climate change. Interventions in the water regime, deterioration of water quality, poaching, uncontrolled activities harm aquatic organisms and the habitats around them. In order to understand and control human impact on aquatic ecosystems, it is important to have information about the spatial distribution of habitats and to map habitats.

The classification of aquatic habitats in the area was based on the most recent version of the EUNIS Habitat Classification. This classification method allows for a broader analysis of habitats in relation to ecoregions, climate, soil and environmental pressures, as well as species, and is a way of comparing data with other countries. The system is currently organized into 10 main categories and their sub-categories according to a standardized terminology.

No special habitat types were found in the Kuzgun HEPP area during the surveys and studies. Semi-natural habitats stand out in the regulator and power plant areas. Other areas are natural habitats along the river. Fish, which feed on algae, zooplankton or benthic organisms living in the area, are at the top of the chain in the water. Fish habitats in the Kuzgun HEPP area are given in Table 1.

**Table 1 Raven HEPP Aquatic Habitat and Characteristics**

EUNIS CODE	HABITAT NAME	CHARACTERISTICS	DOMINANT SPECIES
C2	Surface Rivers	Other Perennial or Seasonal Streams in the Area are Representatives of this Habitat Type in the Area	Upper Trout Zone; <i>Salmo macrostigma</i> , Lower Trout Zone; Trout and Golyan (Pearl) fish ( <i>Alburnoides bipunctatus</i> ) Whiskered Fish Belt: Mustache fish ( <i>Barbus lacerta</i> ), plank fish ( <i>Acanthobrama marmid</i> ), and pufferfish ( <i>Chondrostoma regium</i> ), freshwater mullet ( <i>Squalius cephalus</i> ) species diversity is higher.

The stream bed generally looks like a natural habitat (Photograph 8). The degraded habitat structures in the vicinity of Kuzgun HEPP have adapted to the natural environment since there has been no external impact until today.



**Photos 7 Semi-natural Habitat Structure around the Outflow Water in Kuzgun HEPP Area**





**Photos 8 Natural Aquatic Habitat Structure Near the Project Area**

## **1.4 Identification of Floristic Biodiversity in the Impact Area of Kuzgun Dam and HEPP Facility**

When the vegetation cover of the project area and its surroundings is examined, a large part of it consists of lakeside and riverside vegetation and alpine and subalpine mountain vegetation plants. In addition to deciduous and mixed forests, coppice deciduous forests due to human impact, steep slopes and stony areas and steppe character openings between them constitute the general vegetation structure of the area.

Considering the IFC PS-6 and Guidance Note 6 criteria, there are no plant taxa with CR and EN status under the IUCN convention and no critical habitats and plant taxa under the Bern and CITES conventions and their annexes.

## **1.5 Identification of Faunistic Biodiversity in the Impact Area of Kuzgun Dam and HEPP Facility**

### **1.5.1 Amphibian**

Amphibian species found in the Project area and likely to be found are listed and critical species are given in the report. There are no endangered and/or endemic amphibian species in the Project area. The river environment after Kuzgun Dam and HEPP seems to be quite suitable for amphibians. *Rana macrocnemis* (Uludağ frog) was observed in abundance during the field study.

No negativity in terms of amphibians and measures to be taken have been observed in the project area. Sufficient water is released into the river bed after energy production.

**Criterion 1:** 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:** Endemic and/or Narrowly Distributed Species. There are no endemic and/or narrowly distributed amphibian species in the Project area.



**Criterion 3:** Species that are migratory and/or concentrated in communities. There are no amphibian species in the Project area that meet this criterion.

**Criterion 4:** Highly Threatened and/or Uniquely Rare Ecosystems. Important habitat for amphibian species in the Project area is 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. In the current situation, it is not possible to say that the river habitat and its immediate surroundings are under a high level of threat.

### **Reptiles**

There are no endemic reptile species in the Project area. According to IUCN lists, the only vulnerable reptile species is **the tortoise (*Testudo graeca*)** and it is listed in the VU category. The tortoise is also listed in the BERN Convention Appendix-II and CITES Appendix-II lists.

Among reptiles, the species likely to be directly affected by the project are *Mauremys caspica*, *Natrix tessellata* and *Natrix natrix*, which are partially or largely water-dependent reptile species. These species may be affected by water retention by the dam and a decrease in water in the river bed due to insufficient water being released into the river bed. However, since water is continuously released from the dam to the river bed for electricity generation, there is no negative impact on these species in the current situation.

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

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

**Criterion 2:** Endemic and/or Narrowly Distributed Species. **There are no** endemic or narrowly distributed reptile species in the Project area.

**Criterion 3:** Species that are migratory and/or concentrated in communities. **There are no** reptile species in the Project area that meet this criterion.

**Criterion 4:** Highly Threatened and/or Uniquely Rare Ecosystems. The important habitat type for reptile species in the Project area is the natural habitats in the region. The Project has been active in the area for many years. Natural habitats in the Project area have not been adversely affected by the Project. Since the Project has been in operation for many years, the negative impacts that occurred during the construction phase seem to have largely normalized. Currently, **there is no** negative impact on the reptile species that are distributed in the region.

### **Mammals**

**Lynx (*Lynx lynx*)** is listed in the EN category according to the IUCN Mediterranean assessment. However, the project area is outside the IUCN Mediterranean assessment area, which generally covers the Aegean, Marmara and Mediterranean regions in Turkey. This species is not listed as endangered in the global assessment. Nevertheless, in this report, this species is considered to be a Critical species and has been assessed here. Although not endangered, an important mammal species for the project area is **the Otter (*Lutra lutra*)**. Plant staff confirmed the presence of Otter in the area. The species has an IUCN criterion of NT and a Bern Convention criterion of Annex II. In other words, it is a fauna species that needs to be strictly protected.

**Criterion 1:** 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:** Endemic and/or Narrowly Distributed Species. **There are no** endemic and/or narrowly distributed mammal species in the Project area.

**Criterion 3:** Species that are migratory and/or concentrated in communities. **There are no** mammal species in the Project area that meet this criterion.

**Criterion 4:** Highly Threatened and/or Uniquely Rare Ecosystems. The important habitat type for mammal species in the Project area is the natural habitats in the region and the river bed. The Project has been active in the area for many years. Natural habitats in the area have not been adversely affected by the Project. Since the Project has been in operation for many years, the negative impacts that occurred during the construction phase seem to have largely normalized. Currently, **there is no** negative impact on mammal species in the region.



**Criterion 5:** Structural features of a region, such as topography, geology, soils, temperature, vegetation and combinations of these factors, can influence the evolutionary processes leading to the territorial patterning of species and ecological features. In some cases, distinctive spatial features have been associated with populations or subpopulations of plant and animal species that are genetically unique. Physical or spatial features have been identified as areal catalysts for evolutionary and ecological processes, and such features are often associated with species diversity. Species (or subpopulations of species) arising from the maintenance of the basic evolutionary processes inherent in an area have become a major focus of biodiversity conservation in recent years, particularly the conservation of genetic diversity. By maintaining species diversity in an area, the processes that drive speciation, as well as genetic diversity within species, provide evolutionary resilience in a system, which is especially important in a rapidly changing climate.

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

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 speciation process and high species and genetic diversity.

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

Connectivity between habitats (e.g. biological corridors) is particularly important in fragmented habitats and in the conservation of metapopulations, enabling species migration and gene flow. This connectivity also includes biological corridors along elevation and climate gradients and "crest to coast".

This includes areas of proven importance for climate change adaptation for both species and ecosystems.

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

Criterion 5 is assessed for Amphibians, Reptiles and Mammals together. Criterion 5 includes an assessment of whether the region in general contains important evolutionary processes. The area where Kuzgun HEPP 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 respect, the area **does not meet** Criterion 5.

### **Ornithology**

As a result of the studies, a total of 47 bird species were identified in the project area and its immediate surroundings. The list of these species, their global Red List status, the status of the species in BERN, CITES and 2022 MAK decisions are given in Table 2 below.

The extinction of 1 of the species around the facility is threatened on a global scale. This species is the Lesser Vulture (*Neophron percnopterus*). The Little Vulture (*Neophron percnopterus*) has been identified as "EN" endangered according to IUCN criteria. Of the bird species found around the facility, 33 are listed in Annex-2 of the BERN Convention, 5 in Annex-3 of the BERN Convention, 1 in CITES Annex-1, 9 in CITES Annex-2 and 1 in CITES Annex-3.

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

### **Criterion 1: Habitats Important for Species Assessed as Critically Endangered (CR) or Endangered (EN)**



The Lesser Vulture (*Neophron percnopterus*) is a globally endangered species with a Red List status of "EN". The species is expected to be seen in the project area during migration and in the spring and summer months corresponding to the breeding period (Kirwan et al., 2008). In order to make a sound assessment of this criterion, very detailed scientific studies are required in the region to make population size estimates (see Biodiversity Action Plan).

### **Criterion 2: Important Habitats for Endemic and Narrowly Distributed Species**

Birds around the facility do not trigger this criterion.

### **Criterion 3: Habitats Hosting Globally Significant Numbers of Migratory and Gathering 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: Highly Threatened and/or Uniquely Rare Ecosystems**

None of the habitats in the vicinity of the facility are listed as high or unique ecosystems on the IUCN Red List of Ecosystems and therefore this criterion is not triggered.

### **Criterion 5: Habitats identified with important evolutionary processes**

The Kuzgun HEPP site is not significantly different from the surrounding area in terms of elevation, moisture gradients, or any other geological, ecological or evolutionary factor indicating that the area is vital for sustaining unique or distinctive evolutionary processes. Therefore, none of the habitats around the facility trigger Criterion 5.

**Table 2 Bird Species Found and Likely to be Found in the Project Area**

Species Scientific Name	Species English Name	Endemism	IUCN (Global)	BERN	MAKK	CITES
<i>Oenanthe oenanthe</i>	Northern Wheatear	Not Endemic	LC	Appx-2	Appx-1	KD
<i>Emberiza hortulana</i>	Ortolan Bunting	Not Endemic	LC	Appx-3	Appx-1	KD
<i>Lullula arborea</i>	Woodlark	Not Endemic	LC	Appx-3	Appx-1	KD
<i>Rhodopechys sanguineus</i>	Crimson-winged Finch	Not Endemic	LC	KD	Appx-1	KD
<i>Sturnus vulgaris</i>	Starling	Not Endemic	LC	KD	Appx-1	KD
<i>Columba livia</i>	Rock Pigeon	Not Endemic	LC	Appx-3	Appx-2	KD
<i>Coturnix coturnix</i>	Quail	Not Endemic	LC	Appx-3	Appx-2	KD
<i>Columba palumbus</i>	Wood Pigeon	Not Endemic	LC	KD	Appx-2	KD
<i>Corvus monedula</i>	Eurasian Jackdaw	Not Endemic	LC	KD	Appx-2	KD
<i>Pica pica</i>	Eurasian Magpie	Not Endemic	LC	KD	Appx-2	KD
<i>Tetraogallus caspius</i>	Caspian Snowcock	Not Endemic	LC	KD	KD	Appx-1
<i>Accipiter brevipes</i>	Levant Sparrowhawk	Not Endemic	LC	Appx-2	KD	Appx-2
<i>Aquila chrysaetos</i>	Golden Eagle	Not Endemic	LC	Appx-2	KD	Appx-2
<i>Buteo rufinus</i>	Long-legged Buzzard	Not Endemic	LC	Appx-2	KD	Appx-2
<i>Ciconia nigra</i>	Black Stork	Not Endemic	LC	Appx-2	KD	Appx-2
<i>Clanga pomarina</i>	Lesser Spotted Eagle	Not Endemic	LC	Appx-2	KD	Appx-2
<i>Hieraaetus pennatus</i>	Booted Eagle	Not Endemic	LC	Appx-2	KD	Appx-2
<i>Milvus migrans</i>	Black Kite	Not Endemic	LC	Appx-2	KD	Appx-2
<i>Neophron percnopterus</i>	Egyptian Vulture	Not Endemic	EN	Appx-2	KD	Appx-2
<i>Gypaetus barbatus</i>	Bearded Vulture	Not Endemic	NT	KD	KD	Appx-2
<i>Carpodacus erythrins</i>	Rosefinch	Not Endemic	LC	Appx-2	KD	Appx-3
<i>Actitis hypoleucos</i>	Sandpiper	Not Endemic	LC	Appx-2	KD	KD
<i>Aegypius monachus</i>	Cinereous Vulture	Not Endemic	LC	Appx-2	KD	KD



Species Scientific Name	Species English Name	Endemism	IUCN (Global)	BERN	MAKK	CITES
<i>Anthus spinoletta</i>	Water Pipit	Not Endemic	LC	Appx-2	KD	KD
<i>Carduelis carduelis</i>	Goldfinch	Not Endemic	LC	Appx-2	KD	KD
<i>Coracias garrulus</i>	European Roller	Not Endemic	LC	Appx-2	KD	KD
<i>Curruca curruca</i>	Lesser Whitethroat	Not Endemic	LC	Appx-2	KD	KD
<i>Cyanistes caeruleus</i>	Blue Tit	Not Endemic	LC	Appx-2	KD	KD
<i>Delichon urbicum</i>	House Martin	Not Endemic	LC	Appx-2	KD	KD
<i>Emberiza cia</i>	Rock Bunting	Not Endemic	LC	Appx-2	KD	KD
<i>Emberiza melanocephala</i>	Black-headed Bunting	Not Endemic	LC	Appx-2	KD	KD
<i>Lanius minor</i>	Lesser Grey Shrike	Not Endemic	LC	Appx-2	KD	KD
<i>Monticola saxatilis</i>	Rufous-Tailed Rock Thrush	Not Endemic	LC	Appx-2	KD	KD
<i>Motacilla alba</i>	White Wagtail	Not Endemic	LC	Appx-2	KD	KD
<i>Motacilla cinerea</i>	Grey Wagtail	Not Endemic	LC	Appx-2	KD	KD
<i>Oenanthe melanoleuca</i>	Black-eared Wheatear	Not Endemic	LC	Appx-2	KD	KD
<i>Oriolus oriolus</i>	Golden Oriole	Not Endemic	LC	Appx-2	KD	KD
<i>Petronia petronia</i>	Rock Sparrow	Not Endemic	LC	Appx-2	KD	KD
<i>Phoenicurus ochruros</i>	Black Redstart	Not Endemic	LC	Appx-2	KD	KD
<i>Ptyonoprogne rupestris</i>	Eurasian Crag Martin	Not Endemic	LC	Appx-2	KD	KD
<i>Pyrrhocorax pyrrhocorax</i>	Red-billed Chough	Not Endemic	LC	Appx-2	KD	KD
<i>Saxicola rubetra</i>	Whinchat	Not Endemic	LC	Appx-2	KD	KD
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Not Endemic	LC	Appx-2	KD	KD
<i>Upupa epops</i>	Hoopoe	Not Endemic	LC	Appx-2	KD	KD
<i>Cuculus canorus</i>	Cuckoo	Not Endemic	LC	Appx-3	KD	KD
<i>Alaudala heinei</i>	Greater Short-toed Lark	Not Endemic	LC	KD	KD	KD
<i>Phylloscopus nitidus</i>	Green Warbler	Not Endemic	LC	KD	KD	KD

The wetlands in the project area have ecologically different characteristics. Bacillariophyceae class was the most dominant class in almost all of the sampled stations. Especially in terms of species diversity, they constitute the most populous class of freshwater. Members of this class have a very important place both qualitatively and quantitatively both in Turkey and in the world freshwaters. Although they show seasonal variations in terms of population densities, they can be dominant organisms under favorable conditions. The most important algal group of Kuzgun dam area aquatic systems were the members of Bacillariophyta. 96 taxa belonging to this class were identified. While members of this class were the most dominant organism in terms of number of species, they were abundant in many months in terms of population densities, especially among attached algae, compared to other classes. Among these species, Naviculaceae stood out as the family with the highest number of genera.

Members of Chlorophyceae constitute the second group after Bacillariophyceae in terms of species diversity. A total of 28 taxa belonging to this class were identified. When the Chlorophyta divisions were evaluated within themselves, they showed significant increases in the summer months, especially during the sampling period at the still water stations.

*Spirogyra* spp., *Oocystis*, *Scenedesmus* taxa from Chlorophyceae were dominant. These taxa were the most important organisms that provided the increase of Chlorophyta in summer compared to other months. Hutchinson (1967) reported that green algae increase in summer and *Scenedesmus*, which also shows a significant increase in these months, are common organisms of eutrophic lakes. Abundance assessments have shown that this species has a significant density in polluted areas. Chlorococcales members are common in polluted areas, but *Oocystis* genus is reported to prefer clean water. (Hutchinson, 1967; Reynolds, 1984).

Desmidiaceae members are also abundant in oligotrophic lakes (Hutchinson, 1967). In addition, Desmidiaceae members were reported to be more abundant in lakes with pH lower than 7. *Cosmarium* and *Closterium* genera, which are prominent in this group, were found in moderate abundance in many stations.



Twenty-six taxa belonging to the class Cyanophyceae were identified and the most dominant groups were the genera *Nostoc*, *Anabaena* and *Oscillatoria*. It is known that blue-green algae blooms in wetlands with high productivity during the summer months when the temperature increases. These include the genera *Microcystis* and *Anabaena*. Both genera have shown the expected increase, especially in stagnant water environments. However, the species *Nostoc commune* has been the dominant species of the epilithic habitat during hot periods but in clear and fast flowing water systems. This species was only sampled from the clear water tributary.

Five taxa belonging to the class Euglenophyceae were identified. *Euglena* and *Phacus* genera show an increase in the number of individuals in the first months of summer. This increase in summer can be explained by the fact that the members of Euglenophyceae have the potential to grow in environments with high temperature and pollution (Round, 1973).

Species belonging to the class Pyrrophyceae are the group represented with the lowest percentage in total phytoplanktonic organisms. Two taxa belonging to this class were identified. Among these taxa, *Peridinium* genus is common in eutrophic lakes according to Hutchinson (1967) and Reynolds (1984). In general, the algae species identified in the study area are cosmopolitan species similar to those found in many lakes of Turkey.

The main factors affecting zooplankton distribution in freshwater systems can be classified as nutrients, competition, mechanical relationships with other organisms, predation and parasitism, as well as physical and chemical properties of water. Temperature-dependent changes in environmental factors affect the distribution of zooplanktonic organisms (Wetzel, 1983, Herzig, 1984). Another important factor affecting zooplankton community structure is predation. Many invertebrates and fishes feed on Rotifera at least for a certain period of their lives (Herzig, 1980). In addition, current is a disadvantage in the distribution of zooplanktonic organisms.

As a result of the identification of invertebrates, a total of 65 taxa were found from three stations. In general, it is noteworthy that Diptera (20 taxa) and Ephemeroptera (11 taxa) members of the Insecta class were dominant in terms of number of species and population densities in all environments. However, Odonata, Coleoptera and Hemiptera were also found in high taxon numbers. Chironomidae of the order Diptera and Heptageniidae of the order

Ephemeroptera were found in high densities in terms of number of species. Chironomidae from the Diptera family was dominant in the sludge analysis of Serçeme Stream and Kuzgun Dam, especially in their stagnant environments. Some species in this family are considered as indicators of eutrophic waters living in polluted waters.

Chironomidae larvae constitute the dominant benthic group in Kuzgun Dam. However, Gammaridae family members, Plecoptera nymphs, Ephemeroptera nymphs and Simuliidae larvae are the dominant benthos members.

One of the most important factors affecting the diversity and distribution of bottom invertebrates in rivers is undoubtedly the chemical and physical properties of the water. These properties are also used as criteria for quality classification of surface waters.

A total of 13 fish taxa were captured and identified as a result of fish sampling in and around the project area. Of these, 11 belong to Cyprinidae, 1 to Salmonidae and 1 to Balitoridae families.

Among the identified specimens, *Barbus plebejus* and its subspecies are listed in Annex III of the international Bern Convention and are among the species that need to be protected. According to the European Red List, 4 species are not evaluated (NE) and all other species are in the low risk (LC) category. No CITES-listed species were observed in the project area.



**Table 3 Algae Species of the Project Area and Environment**

<b>BACILLORIOPHYCEA</b>
<i>Achnanthes flexella</i> var. <i>flexella</i>
<i>Achnanthes hungarica</i>
<i>Achnanthes lanceolata</i>
<i>Achnanthes minutissima</i>
<i>Amphora coffeiformis</i>
<i>Amphora commutata</i>
<i>Amphora normanii</i>
<i>Amphora ovalis</i>
<i>Amphora veneta</i>
<i>Anomoeoneis sphaerophora</i>
<i>Aulacoseira ambigua</i>
<i>Aulacoseira granulata</i>
<i>Bacillaria paradoxa</i>
<i>Caloneis alpestris</i>
<i>Caloneis bacillum</i>
<i>Caloneis permagna</i>
<i>Caloneis schumanniana</i>
<i>Cocconeis pediculus</i>
<i>Cocconeis placentula</i>
<i>Cyclotella comta</i>
<i>Cyclotella kützingiana</i>
<i>Cyclotella meneghiniana</i>
<i>Cyclotella ocellata</i>
<i>Cymatopleura elliptica</i>
<i>Cymatopleura solea</i>
<i>Cymbella affinis</i>
<i>Cymbella caespitosa</i>
<i>Cymbella cistula</i>
<i>Cymbella cymbiformis</i>
<i>Cymbella helvetica</i>
<i>Cymbella lanceolata</i>
<i>Cymbella prostrata</i>
<i>Denticula elegans</i>
<i>Denticula kuetzingii</i>
<i>Diatoma hiemala</i>
<i>Diatoma tenuis</i>
<i>Diatoma vulgaris</i>
<i>Diploneis ovalis</i>
<i>Epithemia argus</i>
<i>Epithemia sorex</i>
<i>Fragilaria capucina</i>
<i>Fragilaria contruens</i>
<i>Fragilaria crotonensis</i>
<i>Fragilaria dilatata</i>
<i>Fragilaria parasitica</i>
<i>Fragilaria pulchella</i>
<i>Fragilaria ulna</i>
<i>Gomphonema acuminatum</i>
<i>Gomphonema angustum</i>

<i>Gomphonema gracile</i>
<i>Gomphonema olivaceum</i>
<i>Gomphonema parvalum</i>
<i>Gomphonema pseudoaugur</i>
<i>Gomphonema truncatum</i>
<i>Gyrosigma acuminatum</i>
<i>Gyrosigma attenuatum</i>
<i>Hantzschia amphioxys</i>
<i>Melosira varians</i>
<i>Meridion circulare</i>
<i>Navicula capitatoradiata</i>
<i>Navicula cincta</i>
<i>Navicula cryptocephala</i>
<i>Navicula cuspidata</i>
<i>Navicula gracilis</i>
<i>Navicula nivalis</i>
<i>Navicula oblonga</i>
<i>Navicula pupula</i>
<i>Navicula pygmaea</i>
<i>Navicula radiosa</i>
<i>Navicula rhyncocephala</i>
<i>Navicula tuscula</i>
<i>Navucila bacillum</i>
<i>Neidium affine</i>
<i>Neidium dubium</i>
<i>Nitzschia amphibia</i>
<i>Nitzschia constricta</i>
<i>Nitzschia dissipata</i>
<i>Nitzschia gracilis</i>
<i>Nitzschia hantschiana</i>
<i>Nitzschia hungarica</i>
<i>Nitzschia linearis</i>
<i>Nitzschia obtusa</i>
<i>Nitzschia palea</i>
<i>Nitzschia sigmoidea</i>
<i>Nitzschia tryblionella</i>
<i>Pinnularia borealis</i>
<i>Pinnularia microstauron</i>
<i>Rhoicosphenia abbreviata</i>
<i>Rhopalodia constricta</i>
<i>Rhopalodia gibba</i>
<i>Stauroneis smithii</i>
<i>Stephanodiscus astrea</i>
<i>Surirella angusta</i>
<i>Surirella brebissonii</i>
<i>brightwelli</i>
<i>Surirella ovalis</i>
<b>CYANOPHYCEA</b>
<i>Anabaena komvophoron</i>
<i>Anabaena spiroides</i>
<i>Calothrix epiphytica</i>
<i>Calothrix fusca</i>



<i>Chroococcus minutus</i>
<i>Chroococcus turgidus</i>
<i>Gloeotrichia echinulata</i>
<i>Lynbya aestuarii</i>
<i>Lynbya hieronymusii</i>
<i>Merismopedia elegans</i>
<i>Merismopedia glauca</i>
<i>Merismopedia punctata</i>
<i>Microcystis aeruginosa</i>
<i>Nostoc commune</i>
<i>Oscillatoria agardhii</i>
<i>Oscillatoria brevis</i>
<i>Oscillatoria formosa</i>
<i>Oscillatoria limnetica</i>
<i>Oscillatoria limosa</i>
<i>Oscillatoria rubescens</i>
<i>Oscillatoria tenuis</i>
<i>Schizothrix natans</i>
<i>Spirulina laxissima</i>
<i>Spirulina major</i>
<i>Spirulina sp.1</i>
<i>Spirulina sp.2</i>
<b>CHLOROPHYCEA</b>
<i>Ankistrodesmus falcatus</i>
<i>Cladophora fracta</i>
<i>Cladophora glomerata</i>
<i>Closterium diana</i>
<i>Closterium lunula</i>
<i>Coelastrum microporum</i>
<i>Cosmarium botrytis</i>
<i>Cosmarium granatum</i>
<i>Gloeocystis sp.</i>
<i>Gonium pectorale</i>
<i>Mougeotia sp.</i>
<i>Oedogonium sociale</i>
<i>Oocystis borgei</i>
<i>Oocystis crassa</i>
<i>Pediastrum boryanum</i>
<i>Pediastrum dublex</i>
<i>Pediastrum simplex</i>
<i>Scenedesmus acuminatus</i>
<i>Scenedesmus ecornis</i>
<i>Spirogyra circumlineata</i>
<i>Spirogyra dubia</i>
<i>Spirogyra sp. 1</i>
<i>Spirogyra sp. 2</i>
<i>Spirogyra sp. 3</i>
<i>Staurodesmus sp.</i>
<i>Tetraedron minimum</i>
<i>Ulothrix subconstricta</i>
<i>Zygnema sp.</i>

<b>EUGLENOPHYCEA</b>
<i>Euglena acus</i>
<i>Euglena oxirus</i>
<i>Phacus curvicauda</i>
<i>Phacus orbicularis</i>
<i>Trachelomonas sp.</i>
<b>PYRROPHYCEAE</b>
<i>Glenodinium sp.</i>
<i>Peridinium sp.</i>

**Table 4 Zooplanktonic Species of the Project Area and Surroundings**

<b>ROTIFERA</b>	
<i>Brachionus patulus</i>	Lindia sp.
<i>Colurella colurus</i>	Polyarthra remata
<i>Colurella uncinata</i>	Proales theodora
<i>Colurella adriatica</i>	Proales fallaciosa
<i>Colurella obtusa</i>	Philodina megalotrocha
<i>Cephalodella gibba</i>	Bedelloid rotifer
<i>Cephalodella catellina</i>	<b>CLADOCERA</b>
<i>Cephalodella tenuior</i>	<i>Moina sp.</i>
<i>Cephalodella sp.</i>	<i>Alona rectangula</i>
<i>Dissotrocha sp.</i>	<i>Daphnia sp.</i>
<i>Euchlanis sp.</i>	<b>COPEPODA</b>
	<i>Cyclops sp.</i>
<i>Keratella tecta</i>	
<i>Lepadella patella</i>	
<i>Lepadella quadricarinata</i>	

**Table 5 Benthic Organisms of the Project Area and Surroundings**

<b>Phylum: ANNELIDA</b>
Class: CLITELLATA
Order: HIRUDINEA
Family: Erpobdellidae
<i>Erpobdella sp.</i>
Class: OLIGOCHAETA
Order: LUMBRICULIDAE
<i>Lumbriculus variegatus</i> (Müller, 1774)
Order: TUBIFICIDA
Family: Tubificidae
<i>Tubifex tubifex</i> (Müller, 1774)
<i>Limnodrilus udekemianus</i> Claparède, 1862
<i>Potamothrix hammoniensis</i> (Michaelsen, 1901)
Family: Naididae
<i>Nais communis</i> Piguet, 1906
<i>Nais variabilis</i> Piguet, 1906
<i>Nais elinguis</i> Müller, 1773
<i>Pristinella jenkiniae</i> (Stephenson, 1931)
<b>Phylum: ARTHROPODA</b>
Class: CRUSTACEA
Order: AMPHIPODA



Family: Gammaridae
Gammarus pulex
Order: DECAPODA
Family: Oniscidae
<i>Potamon sp.</i>
Class: INSECTA
Order: HEMIPTERA
Family: Corixidae (Nimf)
<i>Micronecta sp.</i>
Family:Hydrometridae
<i>Hydrometra sp.</i>
Family:Corixidae
<i>Corixa sp.</i>
Family:Gerridae
<i>Geris sp.</i>
Family:Notonectidae
<i>Notonecta sp.</i>
Order: COLEOPTERA
Family: Hydrophilidae
<i>Hydrobius fuscipes (Linnaeus, 1758)</i>
<i>Laccobius bipunctatus (Fabricius, 1775)</i>
Family: Noteridae
<i>Noterus (Noterus) clavicornis (De Geer, 1774)</i>
Family: Dytiscidae
<i>Hydroporus marginatus (Duftschmid, 1805)</i>
<i>Laccophilus minutus (Linnaeus, 1758)</i>
Order: EPHEMEROPTERA
Family: Baetidae
<i>Baetis muticus (Linnaeus, 1758)</i>
<i>Baetis vernus (Curtis, 1834)</i>
<i>Cloeon dipterum (Linnaeus, 1761)</i>
Family: Oligoneuriidae
<i>Oligoneuriella zanga</i>
Family: Heptageniidae
<i>Rhithrogena caucasica</i>
<i>Iron caucasicus</i>
<i>Heptegenia longicauda (Stephens, 1835)</i>
Family: Ephemerellidae
<i>Ephemera vulgata Linnaeus, 1758</i>
<i>Ephemerella ignita (Poda, 1761)</i>
Family: Potamanthidae
<i>Potamianthus luteus (Linnaeus, 1767)</i>
Family: Caenidae
<i>Caenis macrura</i>
Order: PLECOPTERA
Family: Taeniopterygidae
<i>Taeniopteryx sp.</i>
Family: Perlodidae
<i>Isoperla obscura</i>
<i>Perlodes sp.</i>
Family: Perlidae
<i>Perla marginata</i>

Order: TRICHOPTERA
Family: Hydroptilidae
<i>Hydroptila sp.</i>
Family: Limnophilidae
<i>Limnephilus sp.</i>
Family: Hydropsychidae
<i>Hydropsyche sp.</i>
Family: Leptoceridae
<i>Leptocerus sp.</i>
Order: ODONATA
Family: Aeshnidae
<i>Anax imperator</i>
<i>Aeshna sp.</i>
Family: Cordulegasteridae
<i>Cordulegaster boltonii</i>
Family: Calopterygidae
<i>Calopteryx splendens</i>
Family: Coenagrionidae
<i>Coenagrion sp.</i>
Order: DIPTERA
Blephariceridae
<i>Liponeura cinerascens</i>
Family: Limoniidae
<i>Dicranota bimaclata</i>
Family: Simuliidae
<i>Simulium morsitans</i>
<i>Simulium bezzi</i>
<i>Simulium angustipes</i>
<i>Prosimulium sp.</i>
Family: Empididae
<i>Pterempis sp.</i>
Family: Chironomidae
<i>Procladius (Holotanypus) sp.</i>
<i>Krenopelopia binotata (Wiedemann, 1817)</i>
<i>Brillia modesta (Meigen, 1830)</i>
<i>Cardiocladius capucinus (Zetterstedt, 1850)</i>
<i>Abiskomyia paravirgo Goetghebuer, 1940</i>
<i>Nanocladius rectinervis (Kieffer, 1911)</i>
<i>Halocladius fucicola (Edwards, 1926)</i>
<i>Corynoneura sp.</i>
<i>Thienemanniella sp.</i>
<i>Pentapedilum exsectum (Kieffer, 1916)</i>
<i>Polypedilum pedestre (Meigen, 1830)</i>
<i>Paralauterborniella nigrohalteralis (Malloch, 1915).</i>
<i>Paratanytarsus lauterborni (Kieffer., 1909)</i>

## **Biodiversity Risk Assessment**

### **Flora**

Considering the criteria of IFC PS-6 and Guidance Note 6, there are no plant taxa with CR and EN status under the IUCN convention and no critical habitats or plant taxa under the Bern and CITES conventions in and around the Project area.

During the visit to the facility, it was observed that there is a surface movement of material both at the points where the dam body touches the sloping slopes and in the areas reaching the water mirror from the reservoir sides. Terracing and afforestation to prevent this material mobility in front of and behind the body will both prevent the filling of the dam basin and provide stability on vegetation.

### **Invasive Species**

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

Alien invasive species (IAS) can have 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 change ecosystems, for example by altering soil composition or creating habitats that encourage forest fires. These effects can lead to the local or global extinction of native species and ultimately to ecological devastation.

IAS can also have significant socio-economic impacts. The European Union (EU) has recognized the human health impacts of IAS,

EUR 12 billion worth of losses per year due to the impact on infrastructure damage and agricultural losses.



In Europe, there are more than 12,000 alien species, 15% of which are invasive. IAS is the third most serious threat to European threatened species. According to a report published in 2015, 354 endangered species (229 animals, 124 plants and 1 fungus) are clearly affected by IAS, accounting for 19% of all threatened species in Europe. The newly adopted EU Biodiversity Strategy emphasizes the importance of managing introduced alien invasive species and tackling this threat by proposing to 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 Regulation on IAS, putting forward the issues of prevention of their introduction, early warning/rapid response and effective and coordinated management. IUCN has been providing technical and scientific support to the implementation of the EU IAS Regulation since 2016, through a series of service contracts with the EC and in collaboration with the IUCN Invasive Species Specialist Group (ITUG).





Invasive flora species have been identified in the Project impact area (Table 7). Compliance with the Biodiversity Action Plan is required.

Energy investment sites are areas shaped by human impact. In these areas, construction activities arising from the nature of the investment were tried to be rehabilitated with landscape planning around the roads and buildings. The ability of some plant species used here to survive and spread in the area causes them to be called invasive species. Apart from rehabilitation works, species transported by floods and overflows or faunistic resources may have the same characteristics. For these reasons, in order to protect the existence of natural areas within the energy investment area, the individuals and diaspores (breeding units) of these plants should be cleared from the area.

Timing: Control of invasive plant species should be done before the plant goes to seed. If the plant is recognized by its above-ground parts before flowering, it is removed in spring, if not, it is removed immediately after flowering.

**Table 7: Invasive Species Found and Likely to be Found in the Project Area**

<p><i>Acer negundo</i> (Ash Maple) Areas Open To Andropogenic Effects</p>	
<p><i>Agropyron repens</i> (Couch Grass) Field, Open Area</p>	
<p><i>Ailanthus altissima</i> (The tree of heaven) Areas Open To Andropogenic Effects</p>	
<p><i>Amaranthus retroflexus</i> (Pigweed) Field, Open Area</p>	

<p><i>Boreava orientalis</i> (Waxy Leaved Mustard) Field, Roadside</p>	
<p><i>Chenopodium album</i> (Goosefoot) Flood, Floodplains</p>	
<p><i>Cirsium arvense</i> (Creeping Thistle) Flood, Floodplains</p>	
<p><i>Conyza canadensis</i> (Canadian Horseweed) Areas Open To Andropogenic Effects</p>	



*Conyza bonariensis* (Hairy Fleabane) Areas Open To  
Andropogenic Effects








*Conyza albida* (White Fleabane) Areas Open To  
Andropogenic Effects



*Cuscuta campestris* (Golden Dodder) Meadow-Pasture  
Habitats



<p><i>Lepidium draba</i> (Hoary Cress) Areas Open To Andropogenic Effects</p>	
<p><i>Nasturtium officinale</i> (Watercress) Riverside</p>	
<p><i>Reseda lutea</i> (Wild Mignonette) Field, Roadside</p>	
<p><i>Rumex acetosella</i> (Sheep's Sorrel) Field, Roadside and Wastelands</p>	

<p><i>Senecio vernalis</i> (Eastern Groundsel) Roadside and Areas Shaped By Human Influences</p>	
<p><i>Sicyos angulatus</i> (Star-Cucumber) Humid Areas</p>	
<p><i>Solanum americanum</i> (American Black Nightshade) Waterside and Moist Shady Areas</p>	
<p><i>Portulaca oleracea</i> (Purslane) Field, Open Area</p>	
<p><i>Phytolacca americana</i> (Pokeweed) Stream Beds And Moist Habitats</p>	



*Paspalum distichum* (Knotgrass) In Canals Within Water Communities



*Robinia pseudoacacia* (Black Locust) Roadsides




*Xanthium strumarium* (Cocklebur) Flood, Floodplains



*Xanthium spinosum* (Spiny Cocklebur) Flood, Floodplains



<p><i>Viscum album (European Mistletoe) Parasite on Trees</i></p>	
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## Fauna

Considering the IFC PS-6 and Guidance Note 6 criteria, "critical species" assessment and "critical habitat" assessment have been made in section 5 and there are no Critical species in terms of fauna (Amphibians, Reptiles, Mammals) in the region and accordingly no critical habitat.

**Risk Assessment for Tortoise (*Testudo graeca*):** This species was observed in the vicinity of the site. Its presence in the area was assessed as rare. Since it is not a water-dependent species, it was assessed that the facility does not have a negative impact on this species. However, it would be useful to increase awareness about the species and take some measures to prevent damage to the species, especially in human-mosquito encounters. These issues are detailed in the Biodiversity Action Plan.

**Risk Assessment for Lynx (*Lynx lynx*):** The habitat of the project area and its surroundings seems to be very suitable for this species. It is difficult to be seen by humans as it prefers to stay away from humans and is very well camouflaged. It seems unlikely that the animal will be negatively affected by a HEPP facility due to its lifestyle. However, it would be useful to raise awareness about the species and take some measures to prevent harm to the species, especially in human-lynx encounters. These issues are detailed in the Biodiversity Action Plan.

**Risk Assessment for Otter (*Lutra lutra*)** Its presence in the project area was confirmed by project staff. There is plenty of water left in the river bed after energy production. No direct threat to the species was observed.

## **Ornithology**

Considering the criteria of IFC PS-6 and Guidance Note 6, "critical species" assessment and "critical habitat" assessment were made in section 5 and there is a Critical species in the region in terms of birds. This species is the Lesser Vulture (*Neophron percnopterus*). The actions given in the Biodiversity Action Plan for this species should be considered.

Several other soaring bird species have also been identified in the vicinity of the facility and are at risk of collision with the transmission lines. Some of these species are Red Hawk (*Buteo rufinus*), Bearded Vulture (*Gypaetus barbatus*) and the endangered Lesser Vulture (*Neophron percnopterus*). Other than that, it was assessed that the facility does not pose a serious risk to birds. It was also determined that there are many songbird species in and around the facility site. The very good amount of water released from the facility is a positive situation for species such as Cinclus cinclus (*Cinclus cinclus*) that live in downstream habitats and depend on these river habitats. During the field studies, it was observed that there are many species of cavity-nesting birds and that they nest everywhere, including in holes in light poles. Other than this, the facility has no direct negative impact on bird diversity and populations.

## **Hydrobiology**

There are no intensive fishing activities in the region. Domestic and industrial pollution sources of the settlements in the upper basin of Kuzgun significantly threaten the presence and density of fish species. These species are widespread and abundant in the inland waters of Anatolia.

Rivers are complex and dynamic ecosystems. By altering these areas, lotic species will be significantly affected and decline due to the loss of their breeding grounds with the change of environment. Riverine species normally inhabit and spawn in shallow places and seek such habitats after the formation of a reservoir. When they cannot find them, they face losing competition with other lentic species due to the difference in their ecological niche. In applications such as HEPPs, areas where some species can live after the formation of such areas should also be protected.

Aquatic species form characteristic biocenoses by adapting to the living conditions in a particular river section and shaped by the change of abiotic factors along the river (Vannote et al. 1980). Algae, zooplankton and benthic organisms living in the fluvial



environment can also form new communities within this biocenosis, creating significant changes, especially in the food pyramid. More productive stagnant water environments may constitute important food areas for all aquatic organisms.

No invasive algae, zooplankton, benthic organisms or fish species were found in Kuzgun HEPP and surrounding areas. Social responsibility projects and biodiversity action plans are important at this point.

### **Environmental Risk Analysis**

The possibility that a project may directly or indirectly adversely affect human health or the environment is called Environmental Risk. Estimating the magnitude of risk in all activities and deciding whether the risk can be tolerated is called **Risk Assessment**.

**Environmental Risk Assessment** is a set of studies using appropriate qualitative and / or quantitative methods to identify environmental hazards that exist in the working environment with systematic methods, to reveal risks and to control risks.

To determine the possible environmental impacts that may occur in the periods determined within the scope of the environmental management and monitoring plan and to minimize the impacts of the project by comparing the compliance of the studies carried out by collecting the relevant data in this context with the legislation;

- management of the business,
- waste
- air emissions,
- noise,
- waste water

such effects will be monitored.

It is necessary to prepare a Waste Management Plan for the wastes generated and likely to be generated within the scope of the Project and it is necessary to continue to act in accordance with the issues specified in the waste plan and the legislation in force during all stages of the Project. Waste Management to be implemented within the scope of the Project is given in Table 8.

**Table 8: Waste Management to be Implemented**

PHASE	SUBJECT		PRECAUTION
CONSTRUCTION AND OPERATION PHASE	Noise and Vibration		Noise generation during the operation phase of the project will be caused by vehicles. However, all necessary safety precautions should be taken by the owner of the activity in order to prevent any negative impact of the activity and any complaints or suggestions from the nearby settlements should be taken into consideration and the owner of the activity should do as required.
	Air Emissions	Because of Vehicle	The vehicles used in the project area must comply with the provisions of the "Regulation on Exhaust Gas Emission Control and Gasoline and Diesel Oil Quality Regulation", which entered into force after being published in the Official Gazette dated 11.03.2017 and numbered 30004.
	Waste Management	Domestic Solid Waste	Domestic solid wastes generated within the scope of the project must be collected in closed containers against odor, pests and negative effects.
		Packaging Waste	For the management of domestic solid wastes, the provisions of the "Waste Management Regulation" published in the Official Gazette dated 02.04.2015 and numbered 29314 must be complied with.  Household solid wastes of organic origin that cannot be recycled should be collected in sealed household waste bins and delivered to the relevant Municipality. Recyclable wastes (glass, paper/cardboard, metal, etc.) should be collected separately from other wastes, collected in containers and recycled by companies licensed by the Ministry of Environment, Urbanization and Climate Change. The provisions of the Regulation on the Control of Packaging Wastes, which entered into force after being published in the Official Gazette dated 26.06.2021 and numbered 31523, must be complied with.  The containers in which the wastes are accumulated must be kept closed at all times to prevent gnawing animals and pests.
		Domestic Waste Water	Within the scope of the wastewater generated during the operation phase, the provisions of the "Water Pollution Control Regulation", which entered into force after being published in the Official Gazette dated 31.12.2004 and numbered 25687, must be complied with.  During operation, the provisions of the Regulation on Water Pollution Control and the Regulation on the Protection of Drinking-Utilization Water Basins must be complied with.  In all stages of the project, the provisions of the "Law No. 167 on Groundwater" published in the Official Gazette dated 23.12.1960 and numbered 10688 and the "Regulation on the Protection of Groundwater against Pollution and Degradation" published in the Official Gazette dated 07.04.2012 and numbered 28257 must be complied with.

PHASE	SUBJECT		PRECAUTION
		<b>Waste Batteries and Accumulators</b>	<p>Within the scope of waste batteries and accumulators generated within the scope of the process, in accordance with Article 13- of the Regulation on the Control of Waste Batteries and Accumulators; waste batteries should be collected separately from household waste, waste batteries should be delivered to the collection points to be established by the enterprises that distribute and sell battery products or by municipalities, and the batteries, batteries and / or accumulators used in transformers should not be kept for more than ninety days on a sealed ground in the field until they are delivered to the manufacturer after they become waste. In accordance with the provisions of the "Regulation on the Control of Waste Batteries and Accumulators" published in the Official Gazette dated 31.02004 and numbered 25569, the waste must be disposed of.</p>
		<b>Medical Wastes</b>	<p>For medical waste generated within the scope of the activity; Establishing a system to minimize waste at the source Preparing and complying with the in-unit industrial waste management plan, including separate collection, transportation and temporary storage of wastes and measures to be taken in the event of an accident Collecting medical, hazardous and domestic wastes and packaging wastes separately at the source without mixing with each other, Use the bags and containers whose technical specifications are specified in the Regulation when collecting medical waste and sharp-piercing waste, Transport separately collected medical and domestic waste separately only by vehicles allocated for this purpose In order to temporarily store wastes, temporary waste storage will be built or containers must be available, and the provisions of the Legislation must be complied with.</p>
		<b>Waste Electronic Equipment</b>	<p>Electronic waste generated within the scope of the process is likely to occur. The electronic wastes generated must be collected in the temporary waste storage area and given to the licensed disposal/recovery company. The provisions of the Regulation on the Control of Waste Electrical and Electronic Equipment, which entered into force after being published in the Official Gazette dated 22.05.2012 and numbered 28300, must be complied with.</p>
		<b>Waste Oils</b>	<p>Within the scope of waste oils generated at all stages of the project, the provisions of the "Regulation on Waste Oil Management" published in the Official Gazette dated 21.12.2019 and numbered 30985 and the "Waste Management Regulation" published in the Official Gazette dated 02.04.2015 and numbered 29314 must be complied with.</p>



PHASE	SUBJECT		PRECAUTION
			The waste oils generated should be stored in the Temporary Waste Storage Area and recovered and/or disposed of by companies licensed by the Ministry of Environment, Urbanization and Climate Change.
		<b>Waste Plantal Oils</b>	In case the project generates vegetable waste oil, it is necessary to comply with the relevant provisions of the "Regulation on the Control of Vegetable Waste Oils" published in the Official Gazette dated 06.06.2015 and numbered 29378.
		<b>End-of-Life Tires</b>	In the event that such wastes are generated for any reason, the provisions of the "Regulation on the Control of End-of-Life Tires" dated 25.11.2006 and numbered 26357) must be complied with.
		<b>Hazardous Wastes</b>	In case fluorescent lamps used in lighting, printing toners from printers used in the administrative building, contaminated wastes and other hazardous wastes are generated at any stage of the process, they must be stored in the Temporary Waste Storage Area in accordance with the waste codes and recovered and/or disposed of by companies licensed by the Ministry of Environment, Urbanization and Climate Change.
		<b>Oily Sludge</b>	Oily sludge resulting from any stage of the process or from equipment maintenance work should be sent to licensed companies for disposal.

The relevant applications have been completed within the scope of the Regulation on the Amendment of the Zero Waste Regulation and the facility has a zero waste certificate. The facility has an Industrial Waste Management Plan prepared within the scope of the Waste Management Regulation and it has been determined that it has been approved by the Provincial Directorate of Environment, Urbanization and Climate Change. It has been determined that the packaging wastes generated at the facility are sorted on-site in accordance with their codes and stored regularly in the Temporary Waste Storage Area. The stored wastes are recycled through licensed companies.

It has been determined that waste scrap materials are stored on the soil floor in some areas of the facility, and attention should be paid to the storage of scrap materials on concrete floors.

Domestic wastewater generated within the scope of the project is collected in the cesspool and it has been determined that it is disposed of by taking septic tank service.

However, it has been observed that the project is outside the scope of the Environmental Permit and License Regulation. However, it has been determined that no application for Environmental Permit and License Regulation has been made. For the facility in question, applications must be made urgently within the scope of the Environmental Permit and License Regulation.

## 1.1 Biodiversity Action Plan

Kuzgun Dam and HEPP Biodiversity Action Plan							
Action Code	Habitat Class	Action Subject	Action Region	Action Reason	Action/Implementation Details	Action Period	Action Duration
K1	All Habitats	Critical Protection of Fauna Species	General Area	Research on Endangered Fauna Species, especially the Small Vulture (Neophron Percnopterus) Species should be investigated in and around the Project Area.	Species/Population Level Monitoring by Expert Biologists	During Operation	Months Between March-November for 2 Years
K2	Operation	Protection of Fauna Species	General Area	Placing Nest Boxes Designed by Experts in and Around the Facility Site and Monitoring the Nests.	Species/Population Level Monitoring by Expert Biologists	During Operation	Months Between March-November for 2 Years
K3	Operation	Protection of Fauna Species	Project Area and Surroundings	Training should be provided to facility employees about the Tortoise (Testudo Graeca) species. Caution Signs should be placed at certain points in the Project Area.	Training should be provided by biologists who are experts in the field	During Operation	1 Time in Months April-May 2024
K4	All Habitats	Protection of Fauna Species	Project Area and Surroundings	Sesamuru (Lutra lutra) Species should be researched in and around the Project Area and Training should be provided.	Training should be provided by biologists who are experts in the field	During Operation	1 Time in September 2024
K5	Operation	Protection of Fauna Species	Project Area and Surroundings	Training should be provided to facility employees about the Lynx (Lynx Lynx) species.	Training should be provided by biologists who are experts in the field	During Operation	April-May 2024



Kuzgun Dam and HEPP Biodiversity Action Plan							
Action Code	Habitat Class	Action Subject	Action Region	Action Reason	Action/Implementation Details	Action Period	Action Duration
K6	Operation	Protection of Fauna Species	Project Area and Surroundings	Tesiste Asla Evcil Kedi Bulundurulmamalıdır. Evcil Köpek Bulundurulmaması Önerilmekle Birlikte Bulundurulsa Bile Özellikle Gece Serbest Dolaşmalarına İzin Verilmemelidir	By Company	During Operation	Year 2024 April-May
K7	Operation	Protection of Fauna Species	Project Area and Surroundings	Bölgede Ayı ( <i>Ursus Arctos</i> ) Bulunmaktadır. İnsan-Ayı Karşılaşmaları Bazen Tehlikeli Olabilmektedir. Ayıları Bölgeye Çekmemek İçin Tesiste Açıkta Asla Besin İçeren Çöpler Bırakılmamalıdır. Bir Çöp Yönetim Planı Hazırlanmalı Ve Ayıları Çekebilecek Tardaki Çöpleri Nasıl Depolandığı Ve Uzaklaştırıldığı Hakkındaki Uygulama Raporlanmalıdır.	By Company	During Operation	Sürekli
K8	Operation	Protection of Fauna Species	Project Area and Surroundings	Tosbağalar Ve Diğer Hayvanlar Yolları Geçerken Araçlar Tarafından Ezilmemesi Amacıyla Tesis İçinde Araç Hızlarının 30 Km/Saat İle Sınırlandırılması, Geçiş Önceliğinin Her Zaman Hayvanlara Verilmesi Gerekmemektedir.	By Company	During Operation	Sürekli
K9	Tüm	İstilacı Türlerin	Proje Alanı	Proje Alanı Ve Çevresinde	Konunun Uzmanı	İşletme	1 Yıl Süreyle

Kuzgun Dam and HEPP Biodiversity Action Plan							
Action Code	Habitat Class	Action Subject	Action Region	Action Reason	Action/Implementation Details	Action Period	Action Duration
	Habitats	Inhibition	and Surroundings	The Invasive Species Found and Especially Ailanthus Altissima Should Be Investigated and Monitored in the Project Area and Its Surroundings and a Dismantling Plan Should Be Prepared.	Species/Population Level Monitoring by Biologists	During Operation	July-August
K10	Operation	Protection of Fauna and Flora Species	Barrage Body	Terracing Should Be Done In Sloping Areas.	By the Company in Coordination with Biologists Who are Experts in the Subject	During Operation	Once in a Year Before Rainy Season
K11	Operation	Protection of Fish Species	Project Area	Some of the fish species can migrate long distances and some short distances. It is important to build a fish passage in order to prevent the contraction of the gene diversity of fish.	By the Company in Coordination with Biologists Who are Experts in the Subject	During Operation	2023 May-August
K12	Operation	Prevention of Environmental Pollution	Project Area	Hazardous wastes generated within the enterprise must be delivered to recycling/disposal facilities by licensed companies in accordance with Waste Codes.	By Company	During Operation	Once in 6 months

Kuzgun Dam and HEPP Biodiversity Action Plan							
Action Code	Habitat Class	Action Subject	Action Region	Action Reason	Action/Implementation Details	Action Period	Action Duration
K13	Operation	Prevention of Environmental Pollution	Project Area	Non-hazardous waste generated within the business must be delivered to recycling/disposal facilities by licensed companies in accordance with the waste codes.	By Company	During Operation	Once in a year
K14	Operation	Prevention of Environmental Pollution	Project Area	Vacuuming Domestic Waste water with a Vacuum Truck	By Company	During Operation	When the Septic Tank Reaches 80% Level
K15	Operation	Legislation Compliance	Project Area	Environmental Permit Exemption Must Be Obtained.	By Company	During Operation	2022 December



## PROJECT TEAM

Name-Surname/Title	Department of the Report/Study	Sign
<i>Senior Biologist Tarık BATUHAN</i>	Project and Report Coordination	
<i>Prof Dr. Mustafa SÖZEN</i>	Ecological Assessment Fauna	
<i>Prof. Dr. Tahir ATIICI</i>	Assessment Hydrobiological	
<i>Asst. Prof. Kerim GÜNEY</i>	Assessment Flora and Vegetation Assessment	
<i>Kaan ÖZGENCİL</i>	Ornithological Assessment and GIS	
<i>Biologist Mehmet Ali YÜKSEL</i>	Studies Ecological Studies and Field Coordination	
<i>Expert Bird Watcher Ayhan BATUHAN</i>	Bird Watching	