CEYHAN PROPANE DEHYDROGENATION - POLYPROPYLENE PRODUCTION PROJECT

MARINE AND TERRESTRIAL ECOSYSTEMS WINTER SURVEY (NOVEMBER 2021)

(ANNEX-T)

FEBRUARY 2023

ANKARA

CEYHAN PROPANE DEHYDROGENATİON - POLYPROPYLENE PRODUCTİON PROJECT

MARINE AND TERRESTRIAL ECOSYSTEMS WINTER SURVEY (NOVEMBER 2021)

Version	Revision	Date	Prepared By					Quality Management By	Checked By	Approved By
Draft	A.0	March 2022	Prof. Dr. Salih Levent TURAN	Prof. Dr. Galip AKAYDIN	Prof. Dr. Aydın AKBULUT	Doç. Dr. Onur CANDAN	Dr. Öğr. Üy. Burak Ali Çicek	Esra Okumuşoğlu (2U1K)	Günal Özenirler (2U1K)	D. Emre Kaya (2U1K)
Final Draft	B.0	February 2023	Prof. Dr. Salih Levent TURAN	Prof. Dr. Galip AKAYDIN	Prof. Dr. Aydın AKBULUT	Doç. Dr. Onur CANDAN	Dr. Öğr. Üy. Burak Ali Çicek	Esra Okumuşoğlu (2U1K)	Celal Denizli (2U1K)	D. Emre Kaya (2U1K)

Revision Codes: A: Draft, B: Final Draft, C: Final

Project No: 21/003

FEBRUARY 2023

CLIENT:

Ceyhan Polipropilen Üretim A.Ş
Portakal Çiçeği Sokak No:33 Yukarı Ayrancı
Çankaya - Ankara / Türkiye
☎: +90 (312) 840 10 00
🖷: +90 (312) 442 58 16

2CEYHAN PETROCHEMISTRY INDUSTRIAL ZONE MANAGEMENT INC.

T.R. MINISTRY OF INDUSTRY AND TECHNOLOGY CEYHAN ENERGY SPECIALIZATION INDUSTRIAL REGION RAW MATERIAL SUPPLY, STORAGE AND PORT FACILITY PROJECT (KURTPINAR NEIGHBORHOOD LOCATION-CEYHAN-ADANA)

MARINE AND TERRESTRIAL ECOSYSTEMS
WINTER SURVEY
(NOVEMBER 2021)

FEBRUARY 2022

CEYHAN ENERGY SPECIALIZED INDUSTRY ZONE RAW MATERIAL SUPPLY, STORAGE AND PORT FACILITY PROJECT AREA

(KURTPINAR NEIGHBORHOOD LOCATION -CEYHAN-ADANA)

MARINE AND TERRESTRIAL ECOSYSTEMS
WINTER SURVEY
(NOVEMBER 2021)

PROJECT TEAM

NO	NAME and SURNAME	DUTY	SIGNATURE
1	Prof. Dr. Salih Levent TURAN (Bölüm II.1)	Terrestrial Fauna	
2	Prof. Dr. Galip AKAYDIN (Bölüm II.2)	Terrestrial Flora	
3	Prof. Dr. Aydın AKBULUT (Bölüm II.3)	Marine Ecosystem	
4	Doç. Dr. Onur CANDAN (Bölüm II.4)	Sea Turtles	
5	Dr. Öğr. Üy. Burak Ali Çicek (Bölüm II.5)	Mediterranean Seal	

TABLE OF CONTENTS

INDEX OF TABLES

INDEX OF FIGURES

INDEX OF PHOTOGRAPHS

SECTION I: GENERAL INFORMATION

I.1. PROJECT DESCRIPTION

In the "Medium Term Program (2019-2021)", which entered into force with the President's Decision dated 20.09.2018 and numbered 108, published in the Official Gazette dated 20.09.2018 and numbered 30541 with the 2nd repetition, there is a statement stating that "Petrochemical cluster and Ceyhan Industrial Zone will be implemented". It was decided to specialize in the petrochemical sector of the Ceyhan Energy Specialization Industrial Zone.

Pursuant to Article 4/D and Provisional Article 4 of the Industrial Zones Law No. 4737, as the responsible manager and operator of the Ceyhan Energy Specialized Industrial Zone, the anonymous company “Ceyhan Petrochemistry Industrial Region Management INC” has been appointed the “Manager Company” of the Ceyhan Energy Specialized Industrial Zone. The Managing Company is responsible for the development of petrochemical investments in the industrial zone and all infrastructure investments such as ports and raw material facilities.

Within the scope of the master plan prepared by the Managing Company - Ceyhan Petrochemical Industry Zone Management Inc., in order to meet the infrastructure and raw material needs of petrochemical facilities within the Ceyhan Energy Specialized Industrial Zone, “Raw Material Supply, Storage and Port Facility Project” is planned to be brought to life.

On the sea side of the Ceyhan Energy Specialized Industrial Zone separated by the shoreline; a port area of approximately 199 ha and a liquid cargo reclaim area and storage area of approximately 44.1 ha on the land side were designed (Figures I.1 and I.2).

In order to establish the Petrochemical Industrial Zone and to meet the infrastructure and raw material needs of the facilities to be included in it, “Within the scope of Raw Material Supply, Storage and Port Facility Project” loading and unloading piers, quays and backyard areas will be constructed where liquid chemical product tankers, LPG tankers, dry cargo ships, general cargo ships and container ships can dock. Thus, the raw material needed by the petrochemical facilities located in the Ceyhan Energy Specialized Industrial Zone will be imported, and the industrial outputs produced in the mentioned facilities will be exported.

With the realization of the project, it is aimed to construct a multi-purpose port where various cargo handling and storage activities will be carried out. It is also aimed to create a storage area for ethane, ethylene, LNG, LPG, Naphtha products with a capacity of 1,010,000 m^3 in the back area.

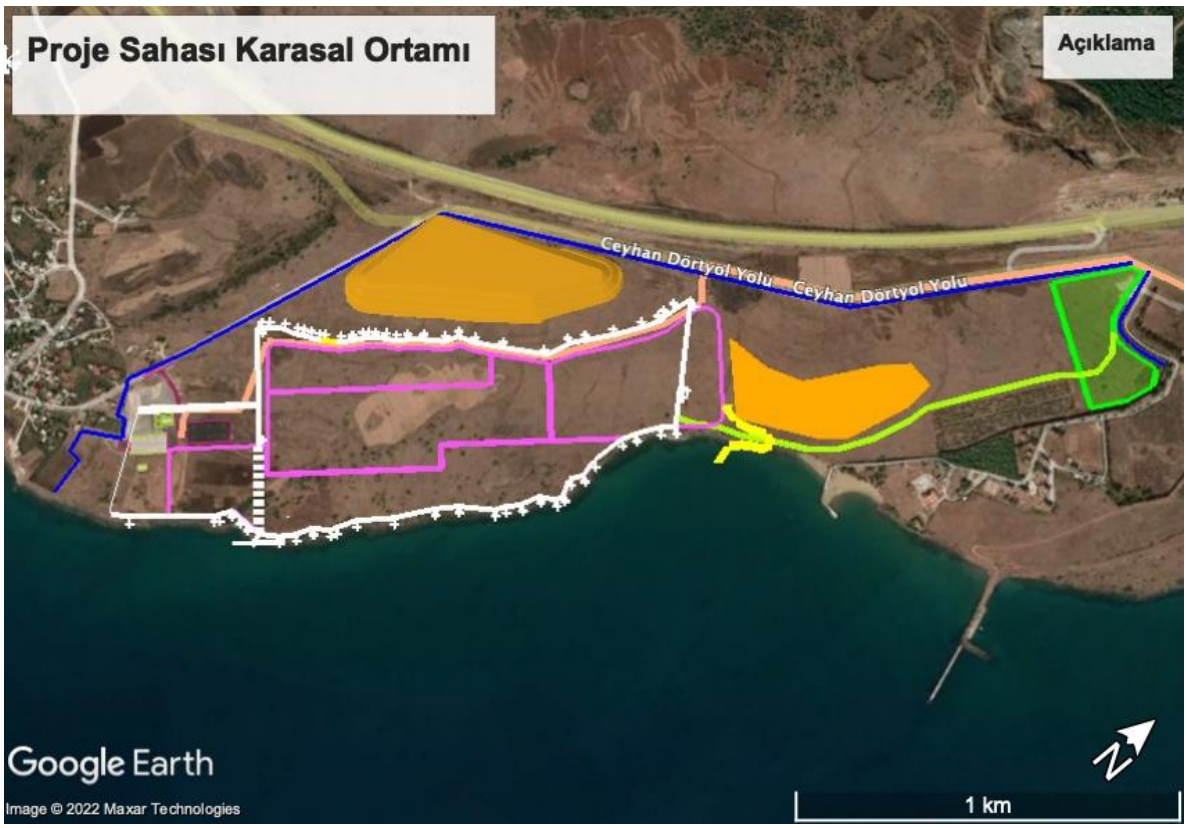


Figure I. 1. Terrestrial Project Environment

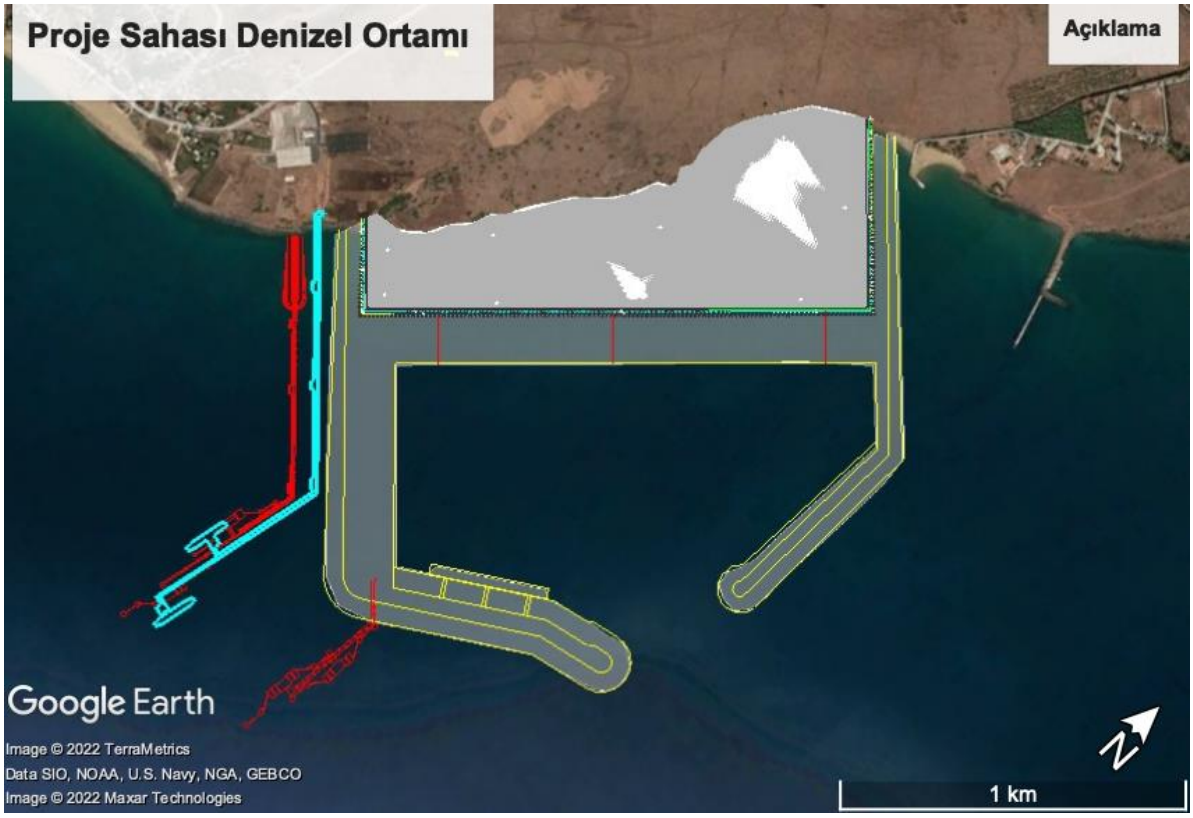


Figure I. 2. Marine Project Environment

The main products planned to be produced in the Ceyhan Energy Specialized Industrial Zone are; polypropylene and polyethylene. The production of these main products will be carried out with a steam cracker facility. Production with mixed raw materials is planned in the region. Due to Turkey's very limited gas and oil resources; Ethane, ethylene, LNG, LPG, naphtha raw materials must be imported by sea and for this purpose, a port facility that can carry bulk cargo and LPG carriers must be built.

Raw material products to be transported to the region by ships will be transferred to the storage facilities located in the back area of the port by using the loading-unloading piers, via pipelines, and the raw materials stored in the tanks will be transmitted to the facilities located in the region. Thus, petrochemical products such as polypropylene, ethylene and polyethylene will be produced by using the raw material by the petrochemical facilities located in the region.

It is aimed to handle a wide variety of different cargoes such as containers, general cargo, vehicles, dry bulk, liquid bulk at the port planned to be built within the scope of the project. The annual cargo handling capacity of the project, which is planned to be invested as a multi-purpose port, is planned to be approximately 50 million tons. The products targeted to be stored in the facility planned to be built within the scope of the project are Ethane, Ethylene, LNG, LPG and Naphtha.

Within the project; workshops, maintenance-repair buildings, transformer, administrative building, load transfer station, semi-open porch, warehouse, truck parking area, vehicle parking area, raw material storage facilities, container loading station, etc. auxiliary facilities are planned.

The structures planned to be built at sea and on land within the scope of the project are explained below:

- A total of 4075 m long breakwater (3015 m main breakwater + 1060 m secondary breakwater) will be built.
- A 350 x 30 m unloading pier will be built on the main breakwater.
- 1210 m long and 10 m wide piled access road for liquid cargo ships and 2 liquid cargo piers (Pier-1 and 2), each 292 m long, will be built on the main breakwater. Pier-1 and 2; It will consist of 8 14 x 12 m connecting dolphins, 8 12 x 20 m recumbent dolphins, a total of 325 m long catwalks and 2 800 m² platforms.

- A 520 m long and 10 m wide piled access road for liquid cargo ships and 2 liquid cargo piers (Port-3 and 4) with a length of 330 m will be built on the Main Breakwater. Pier-3 and 4 will consist of eight 14 x 12 m connecting dolphins, eight 12 x 20 m recumbent dolphins, a total 422 m long catwalk and 2 800 m² platforms.
- A backyard area will be constructed for liquid cargoes in a total area of 85,000 m² (8.5 ha), of which 45000 m² (4.5 ha) on land and 40000 m² (4 ha) on the sea.
- A backyard area will be created for dry cargo ships by filling in an area of 280000 m² (28 ha). It is planned to construct a 250 m, 250 m, 250 m and 250 m berth with a total length of 1000 m and a depth of -16 m, where dry cargo ships can approach.
- By filling in an area of 250000 m² (25 ha), a total of 690000 m² (69 ha) container area will be created, including the back area for container cargo ships and the container expansion area on an area of 440000 m² (44 ha). It is planned to construct a total of 1420 m long -18 m deep berths, 720 m and 700 m, where container ships can dock.
- In addition, it is planned to construct an above-ground pipeline of approximately 1050 m, 1550 m, 1400 m and 1250 m, respectively, for the purpose of loading and unloading from ships planned to berth at Pier 1, 2, 3 and 4 and storing the discharged liquid cargo in tanks.
- Within the scope of the project, a total area of 970000 m² will be scanned. It is planned to scan 130000 m² (13 ha) area to -16 m and 840000 m² (84 ha) area to -18 m. Within the scope of the project, a total area of 970000 m² will be dredged in the sea and approximately 5000000 m³ of dredged material is expected to be formed.
- Within the scope of the project, it is planned to construct 40 storage tanks of 1010000 m³ on a total land area of 39.6 ha. Ehan, ethylene, LNG, LPG, Naphtha products will be stored in the mentioned tanks.

Raw Material Supply, Storage and Port Facility Project annually has been designed to handle 2000000 TEU containers, 15900000 tons of liquid cargo, 11000000 tons of dry cargo, and 1000000 tons of bulk cargo annually. It is planned to create backyard areas in the port area for the handling and storage of the aforementioned cargoes.

Liquid cargo ships between 60000 DWT-125000 DWT will be able to dock at the liquid cargo piers to be built within the scope of the project. 2 60000 DWT, 100000 DWT and

125000 DWT liquid cargo ships belonging to Pier 3 and Pier 4 will be able to dock at Pier 1 and Pier 2 at the same time.

It is designed so that 5 dry cargo ships can dock at the same time on the dry cargo berths planned to be built within the scope of the project, and 4 container or general cargo ships can dock on the container and general cargo berths at the same time.

Within the scope of the project, it is planned to employ 5000 personnel during the construction phase. It is planned to employ 250 personnel at the port during the operation phase. The activity life has been determined as 50 years; maintenance, repair and renewal works will be carried out continuously at the facility, and it will be ensured that it is open to new technologies. During the construction and operation phase of the project, the Environmental Law No. 2872 and all legislative provisions enacted/to be enacted pursuant to this law will be complied with.

I.2. PROJECT AREA

In accordance with the Industrial Zones Law No. 4737; Published in the Official Gazette dated 17/10/2007 and numbered 26673, with the Council of Ministers Decision dated 19/07/2007 and numbered 2007/12632 and the Council of Ministers Decision dated 04/01/2010 and numbered 2010/33, which entered into force by being published in the Official Gazette dated 30/01/2010 and numbered 27478, an area of 1341 hectares located in Adana province Ceyhan district has been declared as "Ceyhan Energy Specialized Industrial Zone". Pursuant to the said law, the Ministry of Industry and Technology has been given the authority to regulate the principles regarding the establishment, management and operation of industrial zones.

The Project Site is located in the southwest-southeast direction, on the southeast skirts of Misis Mountain, which does not reach a height of 1,000 m, and on the coast. The mountains extend to the southeast of the region and reach the Iskenderun Bay with a slight slope. Coastal areas are generally rocky and sandy in small bays. Currently, the Project Site consists of partly agricultural lands and partly vacant land (Photos I.1 and I.2).

Photograph I. 1. Coastal Section of the Project Area

Photograph I. 2. Terrestrial Environment of the Project Area

48 km southwest of the Project Site, Akyatan-Ağyatan in Karatas District and Yumurtalık Lagoon in Yumurtalık District are Natural Protected Areas. In addition, Ayas Ancient City Archaeological Site is located within the boundaries of Yumurtalık District center and 24 km southwest of the Project Site.

The lagoons between the Ceyhan Mouth and Yumurtalık Bay within the boundaries of the Yumurtalık District of Adana Province form a giant wetland system consisting of salt marshes, freshwater marshes, mud flats, reeds, wet meadows, dunes and a pine forest. The closest natural lakes to the Project Site are the Yumurtalık Lagoons in the southwest of the Yumurtalık District.

I.3. PETROCHEMICAL INDUSTRY AND CURRENT SITUATION IN TURKEY

The oil sector has a very important place in the world and Turkish economy. Petroleum and petroleum products, which are used in different areas such as industry and domestic consumption, especially transportation, meet a very important part of the world's energy need and this phenomenon is not expected to change in the next twenty years. Petrochemical Industry is an industry branch that produces plastics, rubber and fiber raw materials and other organic intermediates starting from petroleum refining products and natural gas, and provides input to many sectors such as packaging, electronics, automotive, construction, textile and agriculture. In other words, oil refining and petrochemical industries are indispensable for modern life today.

The petrochemical industry is a large-scale, capital and technology-intensive industry with a wide range of production, producing plastic, rubber, fiber raw materials and other organic intermediates using petroleum products such as Naphtha, LPG, Gas Oil or petroleum gas-based basic inputs.

This industry branch grew rapidly depending on Naphtha and Natural Gas, which started to be produced more and more in the 1950s-1960s, and became the main industry sector in many countries in a short time. Today, the annual production volume of 500 billion dollars of the world Petrochemical Industry emphasizes the power of this sector.

The petrochemical industry represents 25% of the total chemical production in our country, and today Petkim is one of the largest companies in the Turkish chemical industry as the largest petrochemical producer in our countryIt is important that the ratio of petrochemical production to meet demand is high in Turkey. Because the fact that there

is petrochemical production in Turkey plays an important role in determining petrochemical prices in our country.

The Turkish petrochemical industry has not yet reached market saturation and has a great development potential. While the per capita consumption of thermoplastics is between 75-100 kg in developed countries, this rate is around 21 kg in our country. The demand growth rate of thermoplastics in our country is 2-3 times the world average. Although the growth rate in the petrochemical sector in Turkey is nearly twice the growth rate in the Gross Domestic Product (GDP), the Turkish petrochemical sector has not yet reached market saturation. While plastic consumption per capita in the USA, Canada and Western European countries varies between 70-90 kg/year, this rate is 45 kg/year in Turkey.

Ethylene and propylene, which are the most important basic starting materials of the petrochemical industry, are produced in Turkey's Petkim facility called the Ethylene Factory, located in the Petrochemical Complex in Aliağa. Apart from PETKİM, BASIC Petrokimya, which produces Polystyrene, and SASA, which produces Di Methyl Terephthalate, are other petrochemical raw material producers of our country.

I.4. PETROCHEMICAL INDUSTRY AND ENVIRONMENT

The petrochemical industry is a large-scale industry that produces plastic, rubber, fiber raw materials and other organic intermediates using petroleum products such as naphtha, liquefied petroleum gas (LPG), kerosene obtained from petroleum refineries as the main raw material, or gas-based basic inputs. It is a large-scale, capital- and technology-intensive industry. The petrochemical sector produces inputs for many sectors such as automotive, packaging, electronics, construction, textile and agriculture. The petrochemical industry grew rapidly due to naphtha and natural gas, which started to be produced more and more in the 1950s and 1960s, and became the main industry sector in many countries in a short time.

The petrochemical industry is grouped under three main headings based on the products produced. These subgroups are:

- Primary petrochemical industry.
- Secondary petrochemical industry
- Tertiary petrochemical industry.

The primary petrochemical industry produces products for use in the secondary and tertiary petrochemical industry. Products manufactured in the primary petrochemical industry are divided into three main groups:

- Alkanes: those based on methane
- Olefins: Ethylene-based, propylene-based, C4-based
- Aromatics: Benzene-based, toluene-based, xylene-based

The secondary petrochemical industry produces chemicals for use in the tertiary petrochemical industry, using products from the primary petrochemical industry. In the tertiary petrochemical industry, petrochemical products (plastic resin, synthetic fiber, synthetic rubber, etc.) are manufactured using chemicals obtained from the primary and secondary petrochemical industry.

Petrochemical Industry, considering the inputs, products and end products produced from petrochemical products, is an industry branch with multidimensional environmental impacts. Environmental effects of the Petrochemical Industry;

− Environmental impacts during production and

− Environmental impacts in areas where petrochemical products are used

Today, petrochemical products are faced with many climate, air quality and water pollution problems. Petrochemical products provide significant benefits to society, including an increasing number of applications in various sectors, clean technologies that are critical to a sustainable energy system. However, the production, use and disposal of these products raises several sustainability issues that need to be addressed.

Although the chemical industry consumes as much energy as the steel and cement industries combined, it emits less CO_2 than either industry. Still, this equates to about 1.5 $GtCO_2$, which is 18% of all industrial sector CO_2 emissions or 5% of total combustion-related CO2 emissions. This is partly because the chemical industry consumes more oil and gas than other heavy industries. Another contributing factor is that the carbon found in chemical feedstocks is mostly locked into final products (like plastics) and is only released when the products are burned or decomposed.

When evaluated in general, the petrochemical industry causes the formation of pollutants that carry risks compared to many industries in terms of environmental effects (air, water, soil). Minimizing the negative environmental effects that may occur should be regulated

by legal and technological principles. In our country, the rules that all kinds of domestic or industrial activities with environmental effects must comply with are determined by laws. Certain environmental effects on water, air and soil during the production of petrochemical products have been brought under control with the relevant communiqués of the regulations. When the air and wastewater emission values that the petrochemical industry must comply with are compared with the EU standards, it is seen that there is not much difference between them. In our country, too, environmental policy and environmental strategies support the sustainability of the petrochemical industry with a systematic and technological approach within the framework of Environmental Management Systems.

SECTION II. TERRESTRIAL AND MARINE BIODIVERSITY

II.1. TERRESTRIAL FAUNA REPORT

II.1.1. INTRODUCTION

This study has been prepared for terrestrial fauna components and habitats in relation to the Raw Material Supply, Storage and Port Facility project planned to be realized in Adana Province, Ceyhan District, Kurtpınar Mahallesi location by Ceyhan Petrokimya Industry Zone Yönetim A.Ş.

The aim of the study was to determine the components of the terrestrial vertebrate fauna naturally found in the areas that the planned activity will come to life. Simultaneously, habitats used by these components for different purposes were taken into account; parameters such as the types, sizes and durations of the effects that are inevitable on local faunal components and habitats due to activities are emphasized.

In the last part of the study, the actions and measures be taken will be discussed in order to minimize the effects that may shape the living resources and habitats during the implementation and operation of the planned activity.

Within the scope of the planned project, it is planned to build a port in the Ceyhan Energy Specialized Industrial Zone, in addition to the facilities for raw material supply and storage, in the sections defined as the project area. The location of the project site in Turkey is given in Figure II.1.1.

Figure II.1. 1. Location of the Project Site in Turkey.

II.1.2. STUDY AREA AND METHOD

Studies to determine the faunal components that can be seen within the boundaries of the Project Site and in the areas close to the site were carried out in June 2020. The period in which the studies were chosen to be carried out was the period when the vegetation period was continuing for the plants and the reproductive processes were continuing for the animals. The presence of adults carrying food to their nest in their beaks during the studies confirms this situation (Photo II.1.1).

Photograph II.1. 1. A Wheatear Detected While Carrying Food to Its Nest at the Project Site

The studies carried out by us in the project area, both direct observations and indirect determinations of fauna components were made through habitat studies and literature checks.

In addition to the findings obtained in the field study carried out by us regarding the Raw Material Supply, Storage and Port Facility project, in addition to the literature research, we also benefited from the findings obtained in the field studies carried out by us in the region since 2011, including similar projects in similar locations..

The faunal structure of the project site and its immediate surroundings has been revealed by evaluating scientific findings of different origins together. Findings on this subject are given under the title of "Project Site Faunal Structure" of this study. In the next stage,

possible risks and precautions on faunal structure and habitats due to the planned activity were examined.

Studies and evaluations on the project site were carried out by zoologist Dr. S. Levent Turan (Photograph II.1.2.). The CV and works of the expert who carried out the study are given at the end of the study.

Photograph II.1. 2. Zoologist L. Turan During Field Studies

II.1.2.1. Location of the Project and the General Features of this Location

The project is planned to be implemented in Adana Province, Ceyhan District, Kurtpınar Mahallesi location (Figure II.1.2). The project site is located in the marine environment and in the terrestrial part adjacent to the sea. There is a continuous rocky strip where the marine environment meets the land. On the western side of this strip, the rocky part ends and a sandy shoreline begins. A stream bed crossing this beach line in the west is connected to the marine environment. In this section, there is a port established in terrestrial and marine environments for similar purposes, and related structures in the terrestrial environment.

In the project area, a maquis area starts as a layered structure just behind the rocky shoreline and continues until the highway. Some parts are used for agricultural purposes.

Although there are temporary stream beds in the parts of the project site, there is no permanent stream or stagnant water environment.

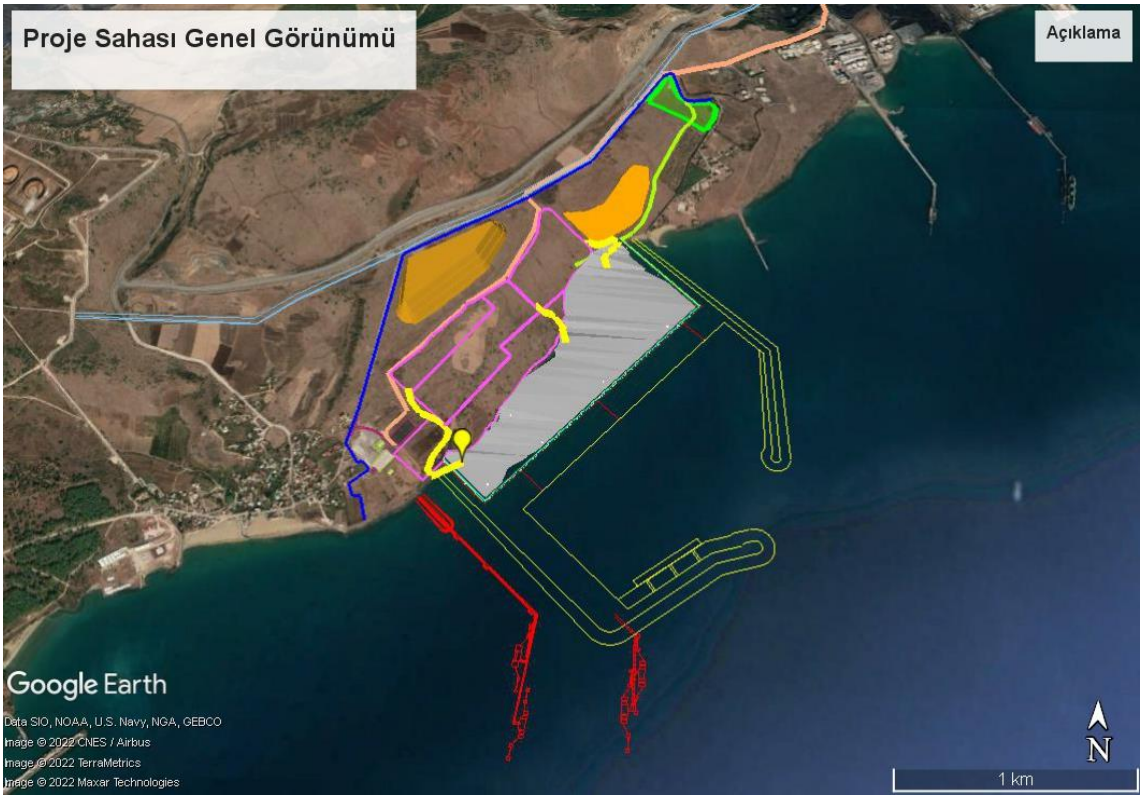


Figure II.1. 2. Google-Earth Image of Sections Where Project Components Will Take Place

There is no habitat type defined as "forest" due to its vegetative formation feagure in the land part of the project site, especially near the coast, in areas where permanent structures will be established. On the other hand, perennial assemblages can be found in places adjacent to the site. Apart from this, there are many habitat types such as agricultural areas, wooded areas and clearings in the region.

There will be many facilities in the project area that will serve the activities in the sea and coastal areas. In this context, the sections where permanent structures will be located do not have a chance to return to their former state. For this reason, although habitat surveys have been carried out in the immediate environment within the scope of the field work carried out by us, more intensive studies, examinations, observations, etc., have been carried out especially on the sections where permanent transformations will take place, where the buildings and facilities related to the project will be located, and its immediate surroundings.

II.1.2.2. Working Method

The methodologies used for each faunal taxon during the fauna studies are summarized in the following sections. The following general methodology was utilized during the faunistic field studies:

- When determining animal species and the existence of habitats suitable for the preferences of faunal components, especially when determining bird and large mammal species, nests, young, vomits-footprints of these species were utilisied. During the determination of the mammal species, various markers such as feces (Photo II.1.3), food residues, nest holes, above-ground mounds, skin, horns and bone fragments were used.

Photograph II.1. 3. Feces Left by the Red Fox Vulpes vulpes on the Field

- During the field studies for the determination of the faunistic components, no hunting-catch-killing operations were carried out for species identification.
- Observations and inanimate material of reptile and small mammal species obtained from nature (especially dead reptile individuals and/or skin, shell fragments found in the field), literature information on fauna elements of these areas; Museum materials previously collected by amateurs, local residents, and stuffed animal specimens by amateur taxidermists were used in the preparation of species lists.
- 1/25.000 scale maps and satellite images were used in the field studies for the fauna. In addition, during the mapping studies, GPS equipment was used to determine altitudes and geographic coordinates.

- Field work started early in the morning and continued until sunset.
- Winter period field studies were carried out for 2 full days.
- Field studies were also carried out at night in order to identify nocturnal active species (especially bats, large mammals and snakes).

II.1.3. TERRESTRIAL FAUNA OF THE PROJECT AREA

Under this heading, there are determinations and evaluations of amphibians, reptiles, birds and mammals that make up the terrestrial backbone fauna in the project area and in the immediate vicinity.

II.1.3.1. Amphibians (Amphibia)

Three-day field studies were carried out by us in June 2020 in order to determine the amphibian (frog and salamander) species and habitat characteristics likely to be found in the project area. In addition, in order to reveal the situation in the winter period and to make an assessment of the findings obtained in the first field study, field studies were carried out at the end of November, 2021, spanning 2 full days. In order to determine the amphibian species in the project area, observations and researches were made in the water ponds, irrigation channels and humid areas as amphibian habitats within the site boundaries and adjacent to the site. This type of habitat is necessary for amphibians to feed, shelter and especially reproduce. Observations were made both in coastal areas and relatively inland, in wet and humid areas suitable for amphibians in terrestrial environments.

During the studies, observations, examinations and researches were carried out on eggs, larvae and adults of amphibians. In this study, the "Patch Sampling" method, which is the method applied in field studies related to reptile species, was used. This method is applicable when searching for specific target species that may be confined to certain microhabitats within a larger habitat (Jaeger, 1943). Studies were carried out in microhabitats, taking into account the habitat preferences of amphibians. The microhabitats in question are shrubs and tree trunks. In order to serve the purpose, the bottoms of plants and stones were checked in habitats suitable for amphibians. Amphibian species were visually identified. Therefore, there is no need to use the capture application. Each patch sampling time was set at approximately 30 minutes.

As in the other groups, field studies were started early in the morning and continued until sunset. The studies were carried out in different localities where different habitat types were in question and other vertebrate classes were also sampled.

In order for this method to be applied in a healthy way, the following requirements must be met;

- No animals should be present in the patch/quadrate prior to observations;
- Patches/quadrats should be randomly determined within the boundaries of the project site;
- Each patch/quadrate is fully defined;

Localities were recorded by being determined by a GPS. Species identified at each sampling point were recorded on field forms. Visual recordings of the species were also taken whenever possible.

The number of amphibian species identified as potentially occurring in the areas defined as the activity area and in the habitats adjacent to these areas is only 2. Both of these species were identified during field observations and habitat surveys in wet habitats close to the project site (Photo II.1.4).

Amphibian species that can be seen in the sections related to the planned activity are given in Table II.1.1.

Photograph II.1. 4. Lowland Frog Pelophylax ridibundus Identified at the Project Site

II.1.3.2. Reptiles (Reptilia)

The total number of reptile species that can be seen in the project site and its vicinity is 12. Among these species, 8 Reptile species were identified by our field observations and investigations and included in the relevant list. Apart from this, the remaining 4 reptile species were included in the relevant list according to the literature and survey findings.

The list of reptile species in the project area and its vicinity is given in Table II.1.2. There are no endemic, rare or endangered reptile species among the detected reptile species.

No endemic, restricted range, endangered or critically endangered species were identified. Among the detected species, the only reptile species with a high conservation status is the tortoise Testudo graeca. This reptile species is in the category of “VU”, that is, “Vulnerable, Vulnerable” (Photo II.1.5- II.1.7).

Photograph II.1. 5. Land Tortoise *Testudo graeca*

Photograph II.1. 6. Broad-toed Lizard *Hemidactylus turcicus*

Fotoğraf II.1. 7. Thorny Lizard *Stellagama stellio*

During the winter period monitoring studies, the striped turtle *Mauremys rivulata* individuals were identified in the small-scale stream connecting to the sea, forming the western border of the project site (Photo II.1.8). Some of the individuals in question were

observed on the banks of the river on the project site side. It is thought that these individuals, who could not be detected in the previous fieldwork, came to these sections after the end of the periodic anthropogenic movements. In addition, it is thought that they may have come to these areas due to the disappearance of the Freshwater environments in the close vicinity in the very dry summer and then in the autumn.

In the population density study we carried out to determine the population density of the aquatic reptile species in question, it was found out that at least 20 individuals were found in a restricted zone.

Photograph II.1. 8. Striped Tortoise *Mauremys rivulata*

Also, during the winter field studies, a Nile tortoise *Trionyx triunguis* population was detected in a still water habitat on Burgaz Beach, located approximately 10 km from the site, in an area that can be defined as the "Area of Influence", although it is not within the boundaries of the project site. Due to the fact that the project site is on the sea coast, the relevant sections have been defined as potential impact areas.

II.1.3.3. Birds (Aves)

The number of bird species that were seen in the first field study within the boundaries of the project site and adjacent to the project site was 48. During the field study carried out by us during the winter period, 2 more bird species were added to this number. With the

addition of these species, the number of bird species that were identified and included in the list during field studies, which was 44 before, increased to 46 and the total number of bird species to 51. Among these species, 5 were added to the list a result of literature review. First species that was observed and added during the winter period fieldwork was Quail *Coturnix coturnix* and the second one was Silver plover *Pluvialis squatarola* (Photo II.1.9)

Photograph II.1. 9. Silver plover *Pluvialis squatarola*

The list of bird species detected in the project area and its vicinity is given in Table II.1.3.

No endemic, rare, endangered or critically endangered bird species could be identified in the project-related areas. The only threatened bird species identified as potentially present is the Dovetail *Streptopelia turtur* (Photo II.1.10). This bird species, which was detected by us within the scope of different projects around the project site in 2017 and 2019, has been listed in the "VU" (Vulnerable) category of IUCN Red List.

Photograph II.1. 10. *Streptopelia turtur* – Turtle dove

No bird species that form large groups in the habitats at the project site and adjacent to the site have been identified. On the other hand, some migratory bird species with "Summer Visitor" status have been identified. These migrant forms are in the status of regular summer migrant for the project site. In other words, the forms that come here every year in the spring, after completing their reproduction, migrate to the south again, to the wintering regions.

Some other species with "Summer Visitor" status are Storks *Ciconia* spp. and some members of the diurnal predator family Accipitridae. However, these migrant forms do not use the project site collectively or regularly for purposes such as feeding or resting.

Some of the bird species observed in the area can be seen on Photograph II.1.11.

	
Redstart *Phoenicurus phoenicurus*	Kestrel *Falco tinnunculus*
	
Red-backed shrike *Lanius collurio*	Goldfinch *Carduelis carduelis*
	
Eurasian skylark *Alauda arvensis*	Little owl *Athene noctua*

Photograph II.1. 11. Some of the bird species that were observed within area.

	
White wagtail *Motacilla alba*	Wheatear *Motacilla alba*
	
Crested lark *Galerida cristata*	Kingfisher *Alcedo atthis*
	
White-spectacled bulbul *Pycnonotus xanthopygos*	Kentish plover *Charadrius alexandrinus*

Photograph II.1. 12. Some of the bird species that were observed within area (continued).

II.1.3.4. Mammals (Mammalia)

The number of mammal species determined within the boundaries of the project site and in the areas adjacent to the site is 12. Among these species, 4 mammal species were identified during field studies. The remaining mammal species were added onto the species list after literature checks and surveys with local residents.

The list of terrestrial mammals that can be seen in the project area and its vicinity is given in Table II.1.4.

II.1.4. EFFECTS OF THE PLANNED ACTIVITY ON MEMBERS OF THE FAUNA AND HABITATS AND PLANNED MEASURES

Regardless of the habitat type, it is inevitable that all kinds of activities planned to be carried out in natural environments, especially construction activities where permanent structures will be established, will have some effects on the local living components and the habitats used by these living components for different purposes. The most innocent effect of the activity may be at least disturbing the faunal components that are present in the relevant sections throughout the year or that visit these areas for limited periods. The extent and duration of the disturbance may remove some fauna components from the study area, even for a short time.

Depending on the type of the project, some activities may be in the form of more time-consuming activities in which more comprehensive studies will be carried out. The inconveniences caused by such activities may also be of relatively large scale and duration. In this case, the responsibility of the owner of the activity and the organizers of the process should be to try to eliminate or minimize the risks by predicting the disturbances and risks that may be shaped on the faunal components due to the planned activity.

II.1.4.1. Precautions to be Taken in Studies to be Carried out in Terrestrial Environment

Within the scope of the project, there will be many permanent structures with different characteristics to be established in the terrestrial environment. In the field investigations carried out by us, it has been observed that there is no significant tree presence in the project area, in the sections where the relevant structures will be established. There are sections of individual trees, shrubs and small groups of trees throughout the site. These rough sections, where permanent structures will be located, will need to be prepared for construction prior to the mentioned construction works. For this purpose, the ground will

be leveled and perennial forms will be removed, even if they are rare. First of all, bushes and trees will be cleared. In this process, bushes and trees will be visually inspected prior to removal. It will be checked whether there is any animal sheltering in the bushes, in the hollows of the trees, between the roots and on the branches. In case the construction works hit between March and May, which is the breeding period, it will be checked whether there are active bird nests on the trees to be removed. If no active nests are found, they will be removed from the areas where permanent structures will be located, after making sure that there are no animals in the tree's cavities or roots.

This will also apply to shrubs. As it is known, most of the turtles and reptiles prefer to spend the winter under dense bushes, in burrows they dig or find in the soil. In addition, shrubs can be preferred by small-bodied bird species for nesting purposes. Therefore, if a bush remains on the construction site and needs to be removed, it will first be visually carefully checked, if any animals are encountered, they will either be allowed to escape on their own; In the case of very slow-moving forms such as turtles, or forms that are stressed, they will be helped to move away. The animals, which will handled sensitively by wearing suitable gloves, will be carefully placed in cloth bags, taken to a habitat similar to the environment in which the species lives, in areas that will not be affected by the construction work, and will be carefully released. In order to serve this purpose, a member of staff with experience in this field may be employed or service may be procured for this subject.

If an active nest area is found in the visually inspected section, the work in that section will be suspended for a while; that section will be marked with tapes and a warning sign will be placed on the works in this section, and the construction works will be shifted from this point to another section for a period of time that will not last long, until the breeding activity is over. After making sure that the breeding activity has been completed, the work in this section will continue from where it left off.

After there is no problem with the vegetative formation that needs to be removed, it will be time to work on the soil that needs to be prepared for the work to be done. Excavation, filling, leveling and disposal works will be carried out in order to prepare the sections where large-scale facilities such as storage and processing will be located, roads will be opened and other small-scale buildings will be located. As it is known, some of the terrestrial forms live all or part of their lives in cavities, cracks and pits in the soil; some of them live in the burrows they dig themselves. For example, a significant number of

reptiles, as well as foxes, use the burrows they can find underground or dig themselves for this purpose. For this reason, a careful review will be carried out before the studies are carried out in these sections. In this process, maximum sensitivity will be shown on those that are thought to be active among all the cavities and cracks in the floor. Animals that use such habitats leave markings such as footprints or droppings at or near burrow entrances. Considering these, if active nest entrances or cavities are detected in the sections where the works will be carried out, risk-preventing practices will be brought to the agenda in these sections. Before the studies, these areas will be carefully monitored, and animals that may be found in them or under the soil surface will be allowed to move away. Increasing human activities in these areas, the arrival of vehicles and construction equipment in these areas will prevent animals from feeling safe. In this case, local wild forms will prefer to get away from themselves first. If there are forms that do not go away on their own, it will be possible for them to be unintentionally exposed during excavations etc. In this case, a corridor will be left for animals that were sheltered under the ground during the works and were unintentionally exposed during the excavation work, to get away from themselves; if there are forms that cannot go away on their own due to stress or any other reason, a similar application of catch-carry-release will be used by a knowledgeable and experienced personnel or team. In the event that there is no suitable personnel in the working team, this practice will be achieved through service procurement. In case the works continue for more than one day in any part, visual checks will be repeated the next day before the works start, considering that there may be those who try to return to their old habitats after the night works are stopped. After it is determined that the sections to be studied are clean in terms of fauna elements, the studies will continue.

Excavations to be carried out in the incisions where the structures to be established in the terrestrial environment will be located during the realization of the planned activity; Some points will also be taken into account during the short or long-term storage of the excess material that will be released during construction works such as correction, filling, or the material to be transported from other sections to be needed in the works. First of all, the sections where the material will be stored or disposed of will be carefully determined. Care will be taken not to select these sections from any stream or lake bed, even if there is no water. Similarly, it will be ensured that the sections to be stored are not used frequently, regularly and intensively by wild forms for purposes such as feeding, resting, overnight and even reproduction, and then related work will be started. For this purpose,

the sections to be processed will be marked with bands before the work, and the work will not be allowed to go beyond these bands.

Within the scope of the project, there will be a port construction in the marine environment. For this purpose, the material to be used in the filling process will have to be taken from the terrestrial environment and transported to the sea shore with the help of carrier vehicles. For this purpose, there will be an intensive transport application for a certain period of time. In order to serve this purpose, a suitable route will need to be established within the site. During the preparation of this route, the above-mentioned procedure will be applied in the same way to eliminate possible risks. Since it will be inevitable that a heavy traffic will be formed after the road construction, even for a certain period of time, the risks that may be shaped in this process and the measures to be taken will be determined before the work. Namely,

- Care will be taken to ensure that vehicles carrying materials to or from the site comply with the low speed limits to be determined, especially within the boundaries of the project site, and the process will be supervised;
- With this application, it will be possible for wild forms that are likely to be encountered in the field while vehicle mobility is experienced, to be able to move away without being adversely affected. In addition, it will be aimed to raise awareness of the drivers by explaining why these measures are taken;
- Similarly, the carrier vehicles will not loaded above the load limit; by covering the transported crates, it will be possible to prevent the damage to the local fauna components of the material that may fall from the vehicles during transportation, as well as to prevent the material that may fall from the vehicles from damaging possible nest entrances or nests, possible offspring and adults.
- Efforts to prevent dust emissions will be another issue to be taken care of simultaneously with vehicles complying with speed limits. The intense dust exposure of the vegetation near the road route where there will be intense use, even for a short time, may cause the plants to be adversely affected by closing their respiratory openings. A similar situation will also be valid for fauna components, nests and hatchlings that may be found near the road route. It will be possible to prevent this undesirable situation with a few simple precautions; first of all, applications such as the drivers complying with the speed limits, not overloading the crates and covering them tightly during material transportation, as well as

increasing the quality of the road, covering it with a material that will not cause dust, or finally, by applying irrigation at regular intervals, will prevent dust emissions in the field and its scattering;

- Considering the other risks that may arise from the vehicles to be utilized during the construction phase and other motor vehicles, the first headings that come to mind are the possible risks arising from exhaust gases, tires and vehicle oils. In the works, care will be taken not to use old, poorly maintained vehicles and other vehicles whose periodic maintenance has not been done on time, whose oil, filter, pad or other related parts have not been replaced on time with the originals. Attention will be paid to this issue at the stage of contracts before the works begin and inspections will be made by the relevant personnel of the project regarding this issue. Thus, during the construction phase where intensive works will be carried out, besides the air quality, the habitats and living components around the parts that vehicles will frequently use will be prevented from being exposed to pollutants that may originate from the vehicles.

Monitoring Studies

It is thought that some measures should be taken in order to minimize the possible risks in the upcoming periods regarding some species and their habitats identified during the winter period field studies carried out by us for the project area. These measures are mentioned below on the basis of species/systematic category.

1) Striped Water Turtle *Mauremys rivulata*

In the last field study, approximately 20 individuals were identified in the western border of the section defined as the Project Site, on the small-scale stream bed forming this border, and on both the east and west coasts of the stream bed. The points to be considered in order to prevent these individuals from being adversely affected by the operational processes that will be in question during and after the construction are mentioned below;

a) Conservation of Habitat

In this section, there is no stream habitat with a similar ecological structure that individuals of this species can benefit from, at least in the immediate vicinity. In addition, the aforementioned Freshwater habitat is a habitat that is also used by some fish and waterfowl. Although the intense effect of terrestrial pollutants is observed, it is thought that it is important to ensure the continuity of the wetland habitat in question at least in its current state state. In addition, it is important to pay attention to the calendar issue in case it is necessary to carry out a study in the areas adjacent to this habitat. For example, due

to the hot and dry season in the summer of 2021, it is thought that individuals belonging to this species have to prefer these sections because of the fact that there is a river bed on the seaside, some of which have salty water. It is thought that it would be beneficial to schedule the studies at least in the Spring period or by making use of reliable meteorological data.

b) Transport Applications

In the most challenging situations, as an alternative, individuals who can be caught with simple scoops will be left in portable fresh water pools for a while and then get released back to the stream bed. The last option is to find another stream or a permanent stagnant water environment in the immediate vicinity that does not stop flowing, so that the individuals can be transported there. This transport may be short or long term depending on the situation.

2) The Situation of Shore Birds

As can be seen in the last field study, the shoreline of the project site can be used by some water birds for feeding or resting. It was thought that the individuals in question visited these areas while traveling between the wetlands in the region. Although it is thought that not all parts of the rocky habitat on the coastline is suitable for nesting, the fact that the eastern part rises above the sea may suggest such options. Considering all these possibilities, visually checking the relevant sections before the works are carried out; it is thought that it is important to carry out the studies especially in the period between April and June, which is the breeding period, for the purpose of eliminating the possible risks.

3) Status of Subterranean Rodents

During the last field study, plenty of rodent mounds were detected on the soil surface, especially in the areas where interventions were made on the vegetation in the project area. The fact that all the mounds were fresh suggests that the mole rats living under the ground are also active. As it is known, members of this taxon are held in the "DD" (Data Deficient) category by IUCN. In other words, although their protection status is not high, they are not yet at the "LC" level. In addition, since it will not be possible not to interfere with the ground in the works to be carried out in the field, the habitats of these underground rodents and the loss of individuals may be inevitable if care is not taken. For this reason, it is required to be extra careful, especially in areas with old or new bumps. It is thought that the individuals who may be exposed during the excavation process can either go away on their own or, when necessary, can be accompanied by an experienced or trained personnel

who can perform the appropriate capture-carry-release application, and eliminate the possible dangers.

4) Situation with Migratory Birds

As it is known, the Project site is on the sea coast. During the winter period monitoring studies, Quail, *Coturnix coturnix*, which is a migratory species and also a bird species whose hunting is allowed, were identified in the field. Individuals of this species come from northern latitudes during the Autumn migration period, continuing their southward journey by crossing the Mediterranean directly over the sea or by crossing the Island of Cyprus. Due to their small wings, they rest and feed, especially before crossing large water surfaces. This situation continues to be exhibited in the opposite direction in the Spring season. Although the fieldwork coincided with a date at the end of the migration period, the detection of immigrant individuals in the field revealed the possibility that the relevant sections were used for this purpose both in the Spring and Autumn periods. As it is known, the contracts to which we are a part of stipulate the protection of migratory birds during their migration journeys. In this case, against possible risks, in the case of the starting of the construction works in the spring in the period between April and June and September-December period in the autumn, it would be beneficial to carry out the visual inspections especially in the locations that would be interefed with during the migration period. In addition, it is thought that it is important to ensure that precautions are taken to ensure that the forms in question are not hunted, especially in the project area and adjacent areas, especially by the project employees, even if they are in the status of game animals.

II.1.4.2. Studies that will be carried out in the marine environment

Compared to the studies to be carried out in terrestrial environments, the studies to be carried out in the marine environment will be less but more important. At the end of the filling process to be made in the marine environment, a pier to which the ships will be moored will be established. Terrestrial vertebrate fauna components are not expected to be adversely affected during the establishment of the pier. On the other hand, in the marine environment, the section where the pier will sit will lose its natural state. In this process, evaluations regarding the fixed forms living on the sea floor and other organisms where the pier will sit made in detail in the part of the study related to aquatic fauna.

With the start of the works, the aquatic forms visiting these sections will have to move away from these sections for a certain period of time. After a while, the sea environment will return to its former stability and sea water will regain its former quality. Considering

that there will be no uncontrolled discharge into the marine environment in terms of waste, etc., it can be said that the operation process will also contribute positively to the water quality.

After the pier is built, both the filling for the pier and the sections between the pier will provide areas where many water birds will feel safe, feed, shelter and expand. They will even be able to find nest alternatives for themselves on and between the filling material to be brought here for the pier filling. The pier structure to be established in the marine environment will also act as a kind of breakwater. Thus, the section left behind will serve as a shelter for many birds in adverse weather conditions. This can be considered as an unplanned contribution in terms of local fauna.

II.1.4.3. Precautions to be Taken Regarding Forms with Conservation Status

As can be seen from the species inventory lists, among the faunal components that can be seen in the areas related to the planned activity and in the living areas in its immediate vicinity, there are species included in the additional lists of internationally valid Conventions such as the Bern Convention to which our country is a party. In addition, the European Red List of Threatened Species prepared and constantly updated by the IUCN is also taken as a reference by the official authorities. For this reason, there are some responsibilities arising from the said contracts regarding the sections that will be the subject of the planned activity and the faunal components that can be seen in its vicinity. Within the scope of this study, an evaluation has also been made regarding the species included in the national or international protection lists, and it is given below;

Points to be Considered and Measures to be Taken Regarding the Species Included in the Annexes of the Bern Convention

As can be seen from the fauna inventory tables (Table-II.1.1-II.1.4) prepared for the project and given in this study, in the sections where permanent structures related to the planned activity are planned to be established and in the habitats adjacent to these sections, there are some species included in the supplementary lists of the Bern Convention (Annex-II and Annex-III). In the second part of the Bern Convention, it is emphasized that all the signatory countries have to give special importance to the areas that are important for the migratory species included in Annex-II and Annex-III. In the visual controls carried out by us regarding this issue, it has been determined that individuals from migratory species can be seen in the areas where the activities related to the activity are planned and in the

immediate vicinity. Although migratory forms were encountered in the field studies carried out during the spring bird migration period, it was not possible to evaluate whether the parts to be the subject of the project were used collectively or regularly by migratory forms for purposes such as feeding or resting or overnighting during the migration periods. Even if almost all of the observed forms continued to fly towards the northwest, it will be possible to reveal the results in a healthy way after observations, examinations and determinations on this subject especially after following the monitoring practices that can be carried out in the next period, especially during the construction phase, and during the spring and autumn migration periods.

In Article 6 of the Bern Convention and in the application named "Species Under Absolute Protection" in Annex-II, there are clauses that state wild fauna components, including birds, should never be caught, imprisoned or killed. In addition, it is emphasized that the resting and breeding areas of these species should not be disturbed or destroyed, wild fauna species should not be disturbed especially during breeding, feeding and wintering periods and the eggs of especially the bird species should not be damaged and these eggs should not be collected even if they are empty..

Similarly, the regulations of the Convention regarding the wild fauna components that are under protection included in Annex-III, are specified in Article 7. Accordingly, all parties are obliged to take the necessary legal and administrative measures to ensure the protection and continuity of the wild fauna species included in Annex-III. These measures stipulate that all kinds of business activities related to the species in Annex-III should be arranged in a way that does not endanger the populations of wild animal species. All of the commitments highlighted within the scope of this study for not adversely affecting the wildlife components that may be encountered during both the construction phase and the operation phase in all sections related to the activity are related to the content of this article. All employees will be informed about these issues, and the person/team in charge of the process will take care to show the necessary sensitivity to this issue. All measures will be taken to ensure that the birds and other fauna components encountered during the studies and the habitats they prefer regularly or intensively are not adversely affected, and maximum attention will be paid to this issue.

In the light of all these, attention will be paid to the above-mentioned points in all areas where permanent structures related to storage, supply and port are planned to be established, in any application to be carried out due to the project, especially regarding the

species included in the Annexes of the Bern Convention (Annex-II and Annex-III'). The measures stated to be taken will be strictly followed, and the points to be considered will be taken into account.

Points to Consider Regarding the Species Included in the Lists of the Central Hunting Commission

In line with the lists and decisions updated by the Central Hunting Commission of the General Directorate of Nature Conservation and National Parks for the period 2020-2021, for the bird and mammal species that are not allowed to be hunted by this commission and that can be seen in the project area and its immediate vicinity, the protection measures defined in this commission's decisions will be strictly adhered to.

The species that were previously determined to be existing in the areas where the activity is planned to be carried out, all of the species, except the birds and mammals that are allowed to be hunted, are under protection by the Ministry of Agriculture and Forestry in accordance with the first paragraph of Article 4 of the Land Hunting Law No. 4915. All adverse interference with the species on this list, including hunting, possession of dead or alive, and even transport, is prohibited. When it comes to the starting phase of the project, informative studies will be conducted for all employees both before the activity and during the works on how to behave towards the winged forms as well as not causing them any harm and to the habitats that they use that may be encountered during the whole of the activities.

Points to Consider and Measures to be Taken Regarding the Species Included in the European Red List (ERL)

The European Red List (ERL), which has been prepared and constantly updated by the IUCN, namely the International Union for Conservation of Nature and Natural Habitats, covers almost all of the wildlife components recorded in our country. There are many species included in the European Red List among the faunal components that have been seen within the boundaries of the Project Site and its close parts. A significant number of these species are in the category of "LC" (=Least Concern), that is, "Least Threatened" in the European Red List. The points to be considered and the measures to be taken regarding these species in the process related to the activity are almost similar to the precautions and measures for protection emphasized in the Bern Convention and MAK decisions. In other

words, apart from those highlighted above, there will be no need for very special conservation practices for individuals from species belonging into this category.

On the other hand, among the species that are among the fauna components naturally found within the boundaries of the activity area and in the immediate vicinity, there are also species that fall under the category of "VU", that is, “Vulnerable" in the European Red List. For the fauna species in this conservation category, the definition of "species facing extinction in the medium-term future" is made in these lists. especially during the construction phase, there will be conservation priorities regarding the species that belong into this category and the habitats preferred by these species. If species in this (“VU”) category are encountered, great care will be taken to make sure that they are not adversely affected; any interference with nests or parts they regularly use will be avoided; support from the relevant scientific and official authority will be obtained, when necessary, action plans will be prepared, the relevant parties will be avoided until this support and cooperation is provided, and the project authorities will be informed.

II.1.5. EVALUATION FOR THE PROJECT SITE AND BIRD MIGRATION ROUTES

As it is known, our country is located in a geography called the Western Palearctic Region within the scope of biogeography. In this area, there are bird migration routes stretching between northern and southern latitudes. These bird migration routes continue from the southern tip of Africa to the northern tip of Europe. Every year, in the spring and autumn seasons, millions of individuals from many bird species use this route to make regular journeys between the areas where they will spend the winter or spend the summer as well as performing their breeding activities. The most important bird migration routes passing through our country are seen on a map prepared by us (Figure II.1.3). As can be seen from the figure, a branch of the bird migration route that comes from the south and enters our borders during the spring migration period in this region heads to the west and then to the north. Similarly, migrant forms entering the borders of our country through Trakya during the autumn migration period head south, and continue their journey towards Hatay by flying parallel to the coast in the parts of the project site. Sometimes migratory forms can use the same routes in both spring and autumn. Sometimes there may be differences between the spring and autumn bird migration routes.

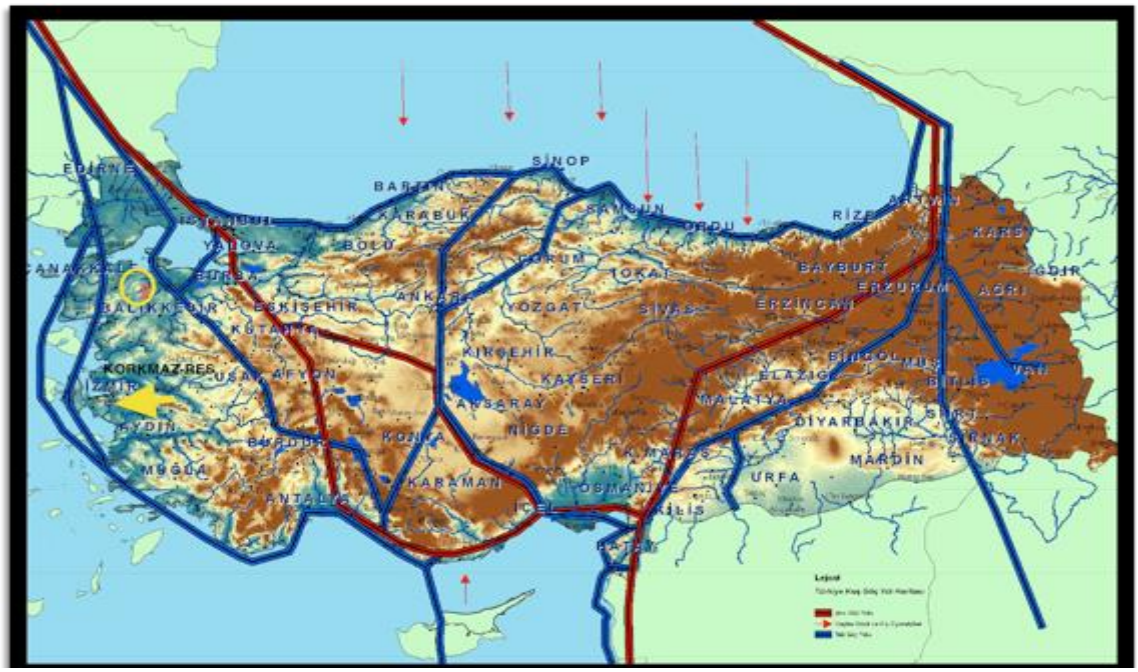


Figure II.1. 3. Bird Migration Routes Passing Over Turkey

The fact that a bird migration route passes over or near any project site does not mean that migratory forms using this route may be adversely affected. This situation is directly related to the type of activity to be carried out. Although it is important which migrant forms pass through the sections where the project site is located, and what heights they prefer when passing through, the most important is the type of activity. For example, wind energy projects with turbine heights higher than one hundred meters, or high voltage lines, as well as skyscrapers or towers, where birds can collide and be adversely affected during their migration journeys, may be installed on bird migration routes, which can bring important risks to the agenda. Today, the beginning of such projects can be allowed after sound scientific studies, and they are followed up with process monitoring studies during the construction and operation phases for precautionary purposes. If there are significant risks, depending on the type of the activity, effective measures are then brought to the agenda.

Within the scope of this project, there are no tall buildings (which can be classified as "mania" by the migratory forms) among the permanent structures planned to be established both on land and in the sea environment. This means that, no significant "risks" are present in terms of the bird activity within the region.

II.1.6. FINAL ASSESSMENT ON TERRESTRIAL FAUNA

Within the scope of this project, within the borders of Adana, Ceyhan, it is planned to establish a port on the relatively rugged part of the project area which also has a coastline. On the shoreline, permanent a facility that will include permanent facilities for raw material supply and storage is planned to be established.

As a result of field and office studies to determine the faunal structure of the project site and its immediate surroundings, predominantly common fauna components and populations of these components that do not have significant densities have been identified in the areas that will be the subject of the activity.

The project site is a relatively rugged area involving meadows, open spaces and agricultural sites with no significant tree and bush presence.

On a large scale, there is no aquatic environment with permanent fresh water characteristics within the boundaries of the project site. This means the absence of one of the important habitat types that shape the number of species and individuals. On the other hand, the fact that a part of the project site is in a marine environment does not make a significant contribution to the faunal richness. On the contrary, saline environments are always limiting environments and shape a unique fauna. While the number of species found in the aquatic parts of the project and the duration of their stay in the aquatic parts of the project are quite limited, the port structure to be established in the marine environment will attract many species that will have the chance to roost, shelter, feed, perhaps nest in these parts, and will allow them to stay in these parts for much longer periods compared to the past.

As a result of the evaluation regarding whether there is a bird migration route passing through the project site and its vicinity, it has been determined that the bird migration routes used in both spring and autumn periods pass over the project site and its vicinity. On the other hand, the planned activity is not in the position of a project that will pose risks during the flights of immigrant forms, such as a WPP project. It was also not possible to verify that the migrant forms, which made their way through the region, especially during the migration periods, used the project site or the parts adjacent to the site collectively and regularly for purposes such as feeding, resting, overnight or wintering..

The precautions to be taken and the points to be considered in order to prevent the vertebrate fauna components determined to be seen in the sections related to the planned

activity from being adversely affected by the process during the construction and operation phases are mentioned in this report. Although significant risks are not expected to be shaped on local faunal components due to the operation process, at least the measures to be taken during the construction phase will either completely eliminate the possible risks to occur on fauna components and habitats, or reduce them to a minimum if this is not possible.

In the light of all these findings, implementation of the risk-specific measures highlighted in this assessment for the faunal components and habitats determined to be found throughout the year or for certain periods in the sections related to the Project, paying attention to the issues expressed to be considered, especially during the construction phase; respecting all legal and conscientious obligations, including international conventions to which it is a party; its realization poses significant risks to living components and habitats used by these components for different purposes, provided that sensitivities are not overlooked that not only those with conservation status but also any wild fauna components are adversely affected by this process; It is not expected that all species or populations will be lost in the project site and its immediate vicinity due to the project.

Table II.1. 1. Amphibian Species in the Project Area and Its Nearby Surroundings (Amphibia)

	Taxon	**Description**	**LOCATION**			**CONSERVATION STATUS**				
Category	**SCIENTIFIC NAME**	**COMMON NAME**	**Project Area**	**Nearby Vicinity**	**IUCN**	**END**	**BERN**	**CITES**	**END**	**MAK 2020-2021**
ANURA	*Bufotes variabilis*	Eurasian green toad	✕	✓	LC	--	Annex-II	--	--	--
	Pelophylax ridibundus	Swamp toad	✕	✓	LC	--	Annex-III	--	--	--

Table II.1. 2. Species of Reptiles in the Project Area and Its Surroundings (Reptilia)

	TAXON	**DESCRIPTION**	**RECORDING**	**LOCATION**	**CONSERVATION STATUS**				
CATEGORY	Scientific name	Common name	Project Area	Nearby Vicinity	IUCN	END	BERN	CITES	MAK 2020-2021
CHELONIA	***Testudo graeca***	**The Greek turtle**	✔	✔	**VU**	--	**Annex-II**	✖	✖
	Mauremys rivulata	Balkan pond turtle	✖	✔	LC	--	**Annex** -II	✖	✖
	Trionyx triunguis	**Nile tortoise**	✖	✔	**CR**	--	**Annex -II**	**App-II**	✖
SQUAMATA	*Hemidactylus turcicus*	Mediterranean house gecko	✖	✔	LC	--	**Annex** -III	✖	✖
	Stellagama stellio	Starred agama	✔	✔	LC	--	**Annex** -II	✖	✖
	Eumeces schneideri	Berber skink	✖	✔	LC	--	**Annex** -III	✖	✖
	Heremites vittatus	Bridled skink	✖	✔	LC	--	**Annex** -III	✖	✖
	Lacerta media	Eastern green lizard	✔	✔	LC	--	**Annex** -III	✖	✖
	Apathya cappadocica	Capadocian lizard	✖	✔	LC	--	**Annex** -III	✖	✖
	Anatololacerta danfordi	Danford's lizard	✔	✔	LC	--	**Annex** -III	✖	✖
	Ophisops elegans	Snake-eyed lizard	✔	✔	LC	--	**Annex** -II	✖	✖
SERPENTES (=OPHIDIA)	*Dolichopis caspius*	Caspian whipsnake	✔	✔	LC	--	**Annex** -III	✖	✖
	Dolichopis jugularis	Black whipsnake	✔	✔	LC	--	**Annex** -II	✖	✖
	Eirenis modestus	Dwarf snake	✖	✔	LC	--	**Annex** -III	✖	✖

Table II.1. 3. Species of Avians in the Project Area and Its Surroundings (Aves)

	TAXON	DESCRIPTION	LOCATION		CONSERVATION STATUS					
CATEGORY	**SCIENTIFIC NAME**	**COMMON NAME**	**P.A**	**N.V**	**RDB**	**IUCN**	**END**	**BERN**	**CITES**	**MAK (2020-2021)**
GALLIFORMES	*Coturnix coturnix*	Common quail	✔	✔	A.3	LC	--	Annex-III	--	Annex -II
SULIFORMES	*Phalacrocorax carbo*	Great cormorant	✔	✗	A.4	LC	--	Annex -III	--	Annex -II
CICONIIFORMES	*Ciconia ciconia*	White stork	✗	✔	A.2	LC	--	Annex -II	--	--
ACCIPITRIFORMES	***Neophron percnopterus***	**Egyptioan vulture**	✔	✔	**A.3**	**VU**		Annex **-II**	--	--
	Circaetus gallicus	Short-toed snake eagle	✗	✔	A.3	LC	--	Annex -II	--	--
	Circus aeruginosus	Marsh harrier	✔	✗	A.3	LC	--	Annex -II	--	--
	Buteo rufinus	Long-legged buzzard	✔	✔	A.2	LC	--	Annex -II	--	--
	Buteo buteo	Common buzzard	✗	✔	A.3	LC	--	Annex -II	--	--
	Clanga pomarina	Lesser spotted eagle	✔	✔	A.2	LC	--	Annex -II	--	--
FALCONIFORMES	*Falco tinnunculus*	Kestrel	✔	✔	A.2	LC	--	Annex -II	--	--
CHARADRIIFORMES	*Pluvialis squatarola*	Grey plover	✔	✔	A.3	LC	--	Annex -III	--	--
	Charadrius dubius	Little ringed plover	✔	✗	A.3	LC	--	Annex -II	--	--
	Charadrius alexandrinus	Kentish plover	✔	✗	A.4	LC	--	Annex -II	--	--
	Larus michahellis	Yellow-legged gull	✔	✗	A.4	LC	--	Annex -II	--	Annex -I
COLUMBIFORMES	*Columba livia*	Rock dove	✔	✗	A.5	LC	--	Annex -III	--	Annex -II
	Streptopelia turtur	**Turtle dove**	✗	✔	**A.2**	**VU**	--	Annex **-III**	--	Annex **-II**
	Spilopelia senegalensis	Laughing dove	✔	✔	A.4	LC	--	Annex -III	--	Annex -I
STRIGIFORMES	*Athene noctua*	Little owl	✗	✔	A.3	LC	--	Annex -II	--	--
APODIFORMES	*Apus apus*	Common swift	✗	✔	A.4	LC	--	Annex -III	--	--
CORACIIFORMES	*Merops apiaster*	Bee-eater	✔	✔	A.4	LC	--	Annex -II	--	--
	Alcedo atthis	Kingfisher	✔	✗	A.2	LC	--	Annex -II	--	--

	TAXON	DESCRIPTION	LOCATION		CONSERVATION STATUS					
CATEGORY	**SCIENTIFIC NAME**	**COMMON NAME**	**P.A**	**N.V**	**RDB**	**IUCN**	**END**	**BERN**	**CITES**	**MAK (2020-2021)**
	Halcyon smyrnensis	White-throated kingfisher	✔	✗	A.1.2	LC	--	Annex -II	--	--
	Upupa epops	Eurasian hoopoe	✔	✔	A.2	LC	--	Annex -II	--	--
	Dendrocopus syriacus	Syrian woodpecker	✗	✔	A.3	LC	--	Annex -II	--	--
PASSERIFORMES	*Galerida cristata*	Crested lark	✔	✔	A.3	LC	--	Annex -III	--	Annex -I
	Alauda arvensis	Eurasian skylark	✔	✔	A.3	LC	--	Annex -III	--	Annex -I
	Hirundo rustica	Barn swallow	✔	✔	A.5	LC	--	Annex -II	--	--
	Delichon urbicum	Common house martin	✗	✔	A.4	LC	--	Annex -II	--	--
	Motacilla alba	White wagtail	✔	✔	A.4	LC	--	Annex -II	--	--
	Pycnonotus xanthopygos	White-spectacled bulbul	✔	✔	A.2	LC	--	Annex -III		
	Luscinia megarynchos	Common nightingale	✔	✔	A.3	LC	--	Annex -II	--	--
	Pkoenicurus phoenicurus	Common redstart	✔	✔	A.3	LC	--	Annex -II	--	--
	Saxicola torquatus	African stonechat	✗	✔	A.3	LC	--	Annex -II	--	--
	Oenanthe oenanthe	Northern wheatear	✔	✔	A.3	LC	--	Annex -II	--	Annex -I
	Oenanthe hispanica	Western black-eared wheatear	✔	✔	A.2	LC	--	Annex -III	--	--
	Turdus merula	Common blackbird	✗	✔	A.3	LC	--	Annex -III	--	Annex -II
	Sylvia atricapilla	Eurasian blackcap	✗	✔	A.2	LC	--	Annex -II	--	--
	Phylloscopus collybita	Common chiffchaff	✔	✔	A.2	LC	--	Annex -II	--	--
	Muscicapa striata	Spotted flycatcher	✔	✔	A.3	LC	--	Annex -II	--	--
	Lanius collurio	Red-backed shrike	✔	✔	A.3	LC	--	Annex -II	--	Annex -I
	Garrulus glandarius	Eurasian jay	✗	✔	A.3.1	LC	--	--	--	Annex -II
	Pica pica	Magpie	✔	✔	A.5	LC	--	--	--	Annex -II

	TAXON	DESCRIPTION	LOCATION		CONSERVATION STATUS					
CATEGORY	**SCIENTIFIC NAME**	**COMMON NAME**	**P.A**	**N.V**	**RDB**	**IUCN**	**END**	**BERN**	**CITES**	**MAK (2020-2021)**
	Corvus corone	Carrion crow	✔	✔	A.5	LC	--	--	--	Annex -II
	Passer domesticus	House sparrow	✔	✔	A.5	LC	--	--	--	Annex -II
	Passer montanus	Eurasian tree sparrow	✔	✔	A.3	LC	--	Annex -III	--	Annex -I
	Chloris chloris	European greenfinch	✗	✔	A.3	LC	--	Annex -II	--	--
	Carduelis carduelis	Goldfinch	✔	✔	A.3.1	LC	--	Annex -II	--	--
	Linaria cannabina	Common linnet	✔	✔	A.3	LC	--	Annex -II	--	--
	Emberiza hortulana	Ortolan bunting	✗	✔	A.2	LC	--	Annex -III	--	Annex -I
	Emberiza melanocephala	Black-headed bunting	✔	✔	A.4	LC	--	Annex -II	--	--
	Emberiza calandra	Corn bunting	✔	✔	A.6	LC	--	Annex -III	--	Annex -I

Tablo II.1. 4. Species of Mammals in the Project Area and Its Surroundings (Mammalia)

	TAXON	DESCRIPTION	KAYIT YERİ		CONSERVATION STATUS				
SCIENTIFIC CATEGORY	**SCIENTIFIC NAME**	**COMMON NAME**	**P.A**	**N.V**	**IUCN**	**END**	**BERN**	**MAK 2020-2021**	**CITES**
INSECTIVORA	*Erinaceus concolor*	Hedgehog	✗	✔	LC	--	Annex -III	Annex -I	--
CHIROPTERA	*Rhinolophus mehelyi*	Mehely's horseshoe bat	✔	✔	VU	--	Annex -II	--	--
	Myotis capaccinii	Long-fingered bat	✔	✔	VU	--	Annex -II	--	--
	Rhinolophus ferrumequinum	Great horseshoe bat	✗	✔	LC	--	Annex -II	--	--
	Pipistrellus kuhlii	Kuhl's pipistrelle	✗	✔	LC	--	Annex -II	--	--
LAGOMORPHA	*Lepus capensis*	Cape hare	✗	✔	LC	--	Annex -III	Annex -II	--
RODENTIA	*Sciurus anomalus*	Squireel	✔	✗	LC	--	Annex -II	Annex -I	--
	Nannopalax ehrenbergi	Middle east blind mole-rat	✔	✔	DD	--	--	--	--
CARNIVORA	*Vulpes vulpes*	Red fox	✗	✔	LC	--	--	Annex -II	--
	Mustela nivalis	Least weasel	✗	✔	LC	--	Annex -III	Annex -I	--
	Vormela peregusna	Marbled polecat	✔	✔	VU	--	Annex -II	--	--
ARTIODACTYLA	*Sus scrofa scrofa*	Wild boar	✗	✔	LC	--	--	Annex-II	--

II.1.7. REFERENCES

Baran, İ. 2005: Türkiye Amfibi ve Sürüngenleri. Tübitak Popüler Bilim Kitapları, Ankara, 165 s.

Bezzel, E. 2000: Vögel. Sonderteil: Seltene Arten, Jungvögel, Nester, Eier.6. Aufl. BLV-Verlag, München, Wien, Zürich.

Council of Europe, 1999: Appendices to the Convention on the Conservation of European Wildlife and Natural Habitats. Secretariat Memorandum prepared by the Directorate of Environment and Local Authorities. Strasbourg, 26 pp.

Diesener, G., Reichholf, J., 1986: Lurche und Kriechtiere. Mosaik Verlag GmbH, München, 287 pp.

Felten, H., Spitzenberger, F. & Storch, G., 1971: Zur Kleinsäugerfauna West Anatoliens. Teil I, Senckenbergiana biol., 52 (6): 393-424.

Felten, H., Spitzenberger, F. & Storch, G., 1973: Zur Kleinsäugerfauna West-Anatoliens. Teil II, Senckenbergiana biol., 54 (4-6): 227-290.

Felten, H., Spitzenberger, F. und Storch, G., 1977: Zur Kleinsäugerfauna West-Anatoliens. Teil III a, Senckenbergiana, Biol., 58: 1-44.

Kiziroğlu, İ., 1989: Türkiye Kuşları. OGM yayınları, Ankara, 314 s.

Kiziroğlu, İ., 2008: The Birds of Türkiye. (Species List in Red Data Book). Ankara.

Krystufek, B. & Vohralik, V., 2001, Mammals of Turkey and Cyprus. Introduction, Checklist, Insectivora. Zgodovinsko drustvo za juzno Primorsko Znanstveno-raziskovalno sredisce Republike Slovenije Koper. 140 pp.

Krystufek, B. & Vohralik, V., 2005, Mammals of Turkey and Cyprus. Rodentia I: Scuidae, Dipodidae, Gliridae, Arvicolinae. Zgodovinsko drustvo za juzno Primorsko Znanstveno-raziskovalno sredisce Republike Slovenije Koper. 292 pp.

Sterry, P. 2004: Die Vögel am Mittelmeer. Frankch. Kosmos Verlags-GmbH. Stuttgart, 192 pp.

Turan, L. 2007: Biyolojik Çeşitlilik ve Türkiye. Tübitak-H.Ü. Ankara, 196 s.

IUCN, 2020: IUCN Red List of Threatened Species. Version 2020-1.

IUCN Kırmızı Liste Sınıfları ve Ölçütleri (Ver. 3.1) IUCN (International Union for Conservation of Nature). http://www.iucnredlist.org/technicaldocuments/categories-and-criteria.

Tarım ve Orman Bakanlığı, 2019: 2019-2020 Av Dönemi Merkez Av Komisyonu Kararı. Resmi Gazete, Sayı: 30808. Resmigazete.gov.tr.

Adamerosherptil, Türkiye'nin Amfibi ve Sürüngenleri. 2019. http://www.turkherptil.org.

Tramem, Türkiyenin Anonim Memelileri, 2019. http://www.tramem.org.

II.2. FLORA REPORT

II.2. 1. INTRODUCTION

Changes in natural areas, climate change, pollution and excessive unsustainable use of natural resources seriously affect biodiversity and threaten the life of the living things in natural environments. Biodiversity is an indicator of the viability of ecosystems and a healthy environment, including the structure and function of the habitats in which the species live.

Before artificial activities are carried out in the natural areas, the biological diversity in the project area must be revealed and how the ecosystem in the area will be affected during and after these activities must be revealed by the subject experts. These studies are especially important in terms of flora and vegetation. Unlike animals, plants do not possess the ability to move and therefore will be more affected by such activities due to the fact that they cannot move away from the environment.

Turkey is among the countries with the richest biological diversity in the Europe and the Middle East due to its location at the crossroads of the Asian and European continents, being surrounded by seas on three sides, the mountain range being both parallel and perpendicular to the seas, and its climate diversity. Our country has a very rich plant diversity with approximately 11,000 taxa, of which approximately 3700 are endemic (only grown in our country). To make our plant richness more easily comprehendable, it will be useful to provide the fact that the number of known species in the European continent today is approximately 12000. Having different and quite rich habitats such as steppes, maquis, forests, rocks, wetlands, beaches are other factors that contribute to our rich biodiversity.

One of the most important factors providing the plant and biological richness of Turkey is that 3 of the 37 plant geography (phytogeography) regions defined in the world intersect in our country (Figure II.2.1). The number of countries where three different phytogeographic regions intersect is very few. Especially the Euro-Siberian phytogeographic region in Northern Anatolia, the Mediterranean phytogeographical region in the West and South, and the Irano-Turan or Turan-Anatolian phytogeographic region in Central, Eastern and Southeastern Anatolia (Figure II.2.2). Besides the species richness, the flora of our country is very important due to the fact that it contains natural ancestors of many grains, legumes and various fruits used as food products.

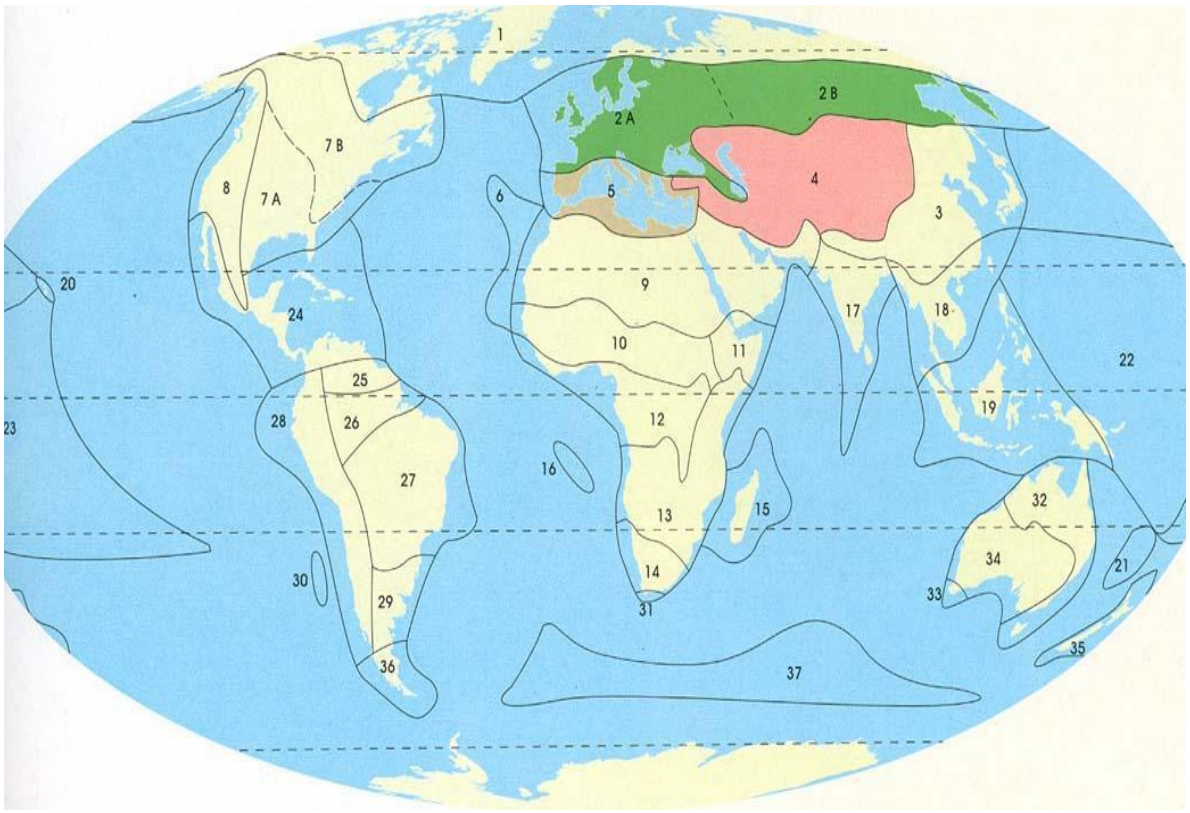


Figure II.2.1. Phytogeographic regions defined in the world.

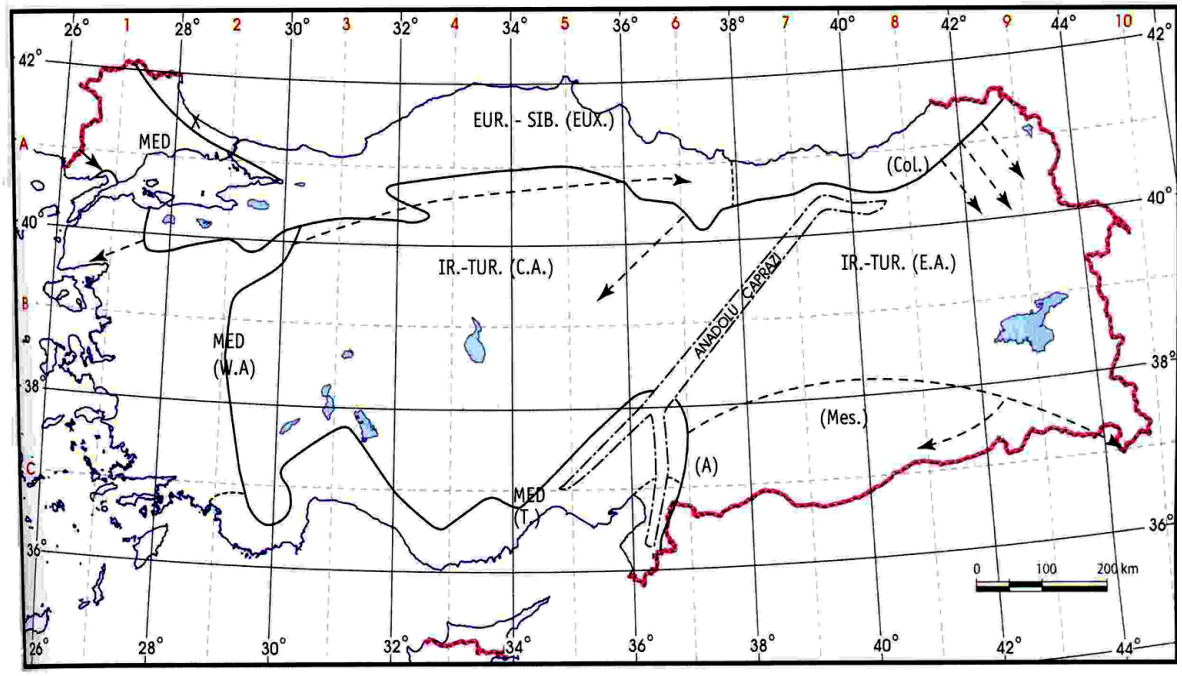


Figure II.2.2. Grid mapping system used in Flora of Turkey and Phytogeographic regions.

In order to protect and ensure the continuity of this plant and biological wealth of our country, it is crucial that the project sites planned in natural areas should be studied in terms of floristics by an expert botanist and that the recommendations suggested should be followed very strictly in order to minimize the negative effects of the project activities.

The aim of this study is to reveal how the vegetation and flora in the project area and its surroundings will be affected from the activities related to the "Raw Material Supply, Storage and Port Facility" project planned to be established by the Ceyhan Petrochemical Industrial Zone Administration in the Kurtpınar District of Adana province, Ceyhan district, and to determine conservation measures for regional and/or local endemic species and rare plants if they are present..

II.2.2. MATERIALS AND METHODS

The project area is located in the C5 square according to the grid mapping system used in Flora of Turkey (see Figure II.2.2). Initially, literature review ("Flora of Turkey And East Aegean Islands") was made in order to determine the vegetation cover of the area and its immediate surroundings, the natural plants growing in the area and the risks that may arise from the project activities related to these plants, and their conservation status. Then, the fieldwork process was started in June 2020 within the project site. Autumn period field studies at the project site were carried out in November 2021 (Photo II.2.2).

Photograph II.2.1. Field studies that were in the project area (June 2020)

Photograph II.2. 2 Second field studies in the project area (November 2021)

The most important factor in the floristic field study is to determine the vegetation period and to plan the field studies accordingly. Flower and fruit periods of plants occur at different times from each other. The vegetation period in our country varies depending on the latitude and altitude. As it is known, the vegetation period is the time between the temperature that starts the growth in plants and the temperatures where the growth stops. In order to reveal the floristic structure of the research area, the recognized plants were noted in the field studies. However, some plant specimens were collected, some photographs were taken, and observational records of some specimens were taken. During the field studies, a few samples of the plants that could not be recognized at the species level were collected and the collected plant samples were dried with appropriate methods. The study named "Flora of Turkey and East Aegean Islands" was used to identify the dried plant samples. The list of the identified plants is given under the title of “Floristic Table”. Floristic Table has been prepared according to the evolutionary order of Ferns (Pteridophyta), Gymnosperms (Gymnospermae), Angiosperms (Angiospermae), Dicots (Dicotyledones) and Monocots (Monocotyledones) in the Flora of Turkey. However, the genus, species and subspecies taxa within the families are listed alphabetically, with the thought of being easy to use. Family was given in the first, name in the second (genus species and subspecies if any), Turkish name of the plant in the third , phytogeographical region (Euro-

Siberia, Iran-Turan and Mediterranean phytogeographic regions) in the fourth, endemism status in the fifth (regional, common), the threatcategory of the taxon according to IUCN criteria in the sixth, the status of the BERN contract Supplementary list 1 in the seventh, the habitat code of the plant in the eighth (1,2,3 and 4) and the periods (June-November) in which the taxon was observed was given in the ninth and last column. Taxa that are grown or likely to grow in the area and determined from the literature are indicated by putting an * sign in front of them. In determining the Turkish names of plants, the names of "Great Plants Guide" (Akalın, 1952), "Turkish Plant Names" (Baytop, 1997), "Plants in Anatolian Culture" (Akaydın et al., 2014) and "Our Natural Plants" (Akaydın, 2008) were used. The threat categories of the plants were given in accordance with the criteria determined by the IUCN, according to the "Red Book of Plants of Turkey".

Abbreviations and explanations used in determining the threat categories of plant species:

EX - EXTINCT IN THE WILD

Species that are proven to be extinct with undoubted evidence. This taxon is in category EX if there is no doubt that the last individual has died. Some taxa, which are mentioned to be grown in our country in the Flora of Turkey, but could not be found even though they were specifically searched, have been placed in this category.

EW - EXTINCT IN THE WILD

Species that have become extinct in the wild but exist in other areas (for breeding or display). If the plant could not be found in detailed researches carried out at different times of the year and in environments where it can be found, that is, if it is lost in nature and continues to live only in culture, it is placed in this group.

CR - CRITICALLY ENDANGERED

Species that are in danger of extinction in the wild. If a taxon is at risk of extinction in the very near future, it is placed in this group. In the floristic studies, the plants whose populations are thought to be damaged in the future have been put in this category.

EN - ENDANGERED

Species in danger of extinction in the wild. If a taxon is at very high risk and in danger of extinction in the near future, but not yet in the CR group, it is placed in the EN group.

VU - VULNERABLE

Species in danger of extinction in the wild. Taxa that cannot be placed in CR and EN groups, but which are highly threatened in the medium-term future in nature are placed in this group.

Some species that are thought to be under threat in the medium term in our country and that are known from more than one locality, and some species that are not endangered for now, were put in this category in order to ensure their protection in the future.

NT - NEAR THREATENED

Species that are not currently endangered but are candidates for VU, EN, or CR in the near future (candidates that cannot be placed in the previous group but are close to being placed in the VU category).

LC - LEAST CONCERN

Common species. Those who do not require any protection and are not threatened.

DD - DATA DEFICIENT

Species for which there is not enough information. If the information about the distribution and abundance of a taxon is insufficient, it is placed in this group. Although the biology of a taxon in this category is well known, information about its distribution and abundance is lacking. For this reason, placing a taxon in the DD category indicates the necessity of collecting more information about it rather than being threatened. Once information is available, it should be placed in another category appropriate to its situation.

NE - NOT EVALUETED

Species not evaluated for compliance with the above criteria so far.

Habitat Codes:

1- Agricultural areas and road sides

2- Maquis

3- Rocky areas

4- Sandy areas

Endemism:

R- Regional endemic

W- Widespread endemic

II.2. 3. FLORISTIC ANALYSIS

A total of 179 taxa belonging to 46 families were identified in the area as a result of the floristic examination carried out in relation to the "Raw Material Supply, Storage and Port Facility" project planned to be established by the Ceyhan Petrochemical Industrial Zone Administration Inc. in the Kurtpınar District of Adana province, Ceyhan district, located in the Mediterranean Phytogeographic region (Table II. 2.1).

As a result of the field studies carried out in June 2020 and November 2021, 189 taxa belonging to 49 families, all belonging to the Angiospermae group, were identified in the project area. Among these taxa, 153 taxa belonging to 42 families are from Dicotyledones (Dicotyledones), and 36 taxa belonging to 7 families are from Monocotyledones class. The first 5 families with the most taxa in the area and the number of taxa they contain are as follows; Asteraceae 26, Fabaceae 25, Poaceae 17, Lamiaceae 10 and Brassicaceae 8 taxa. These families are among the first 5 families that contain the most taxa in the Flora of Turkey. The remaining 101 taxa belong to other small families. (Figure II.2.3).

As a result of the second field studies carried out in November 2021, the distribution of plants determined to grow in the area according to phytogeographic regions is as follows; Mediterranean elements 53 (28.4%) and Iranian-Turanian elements 4 (2%). The remaining 131 (69%) taxa are widely distributed or cosmopolitan species with unknown phytogeographic region or more than one phytogeographic region element (Figure II.2.4).

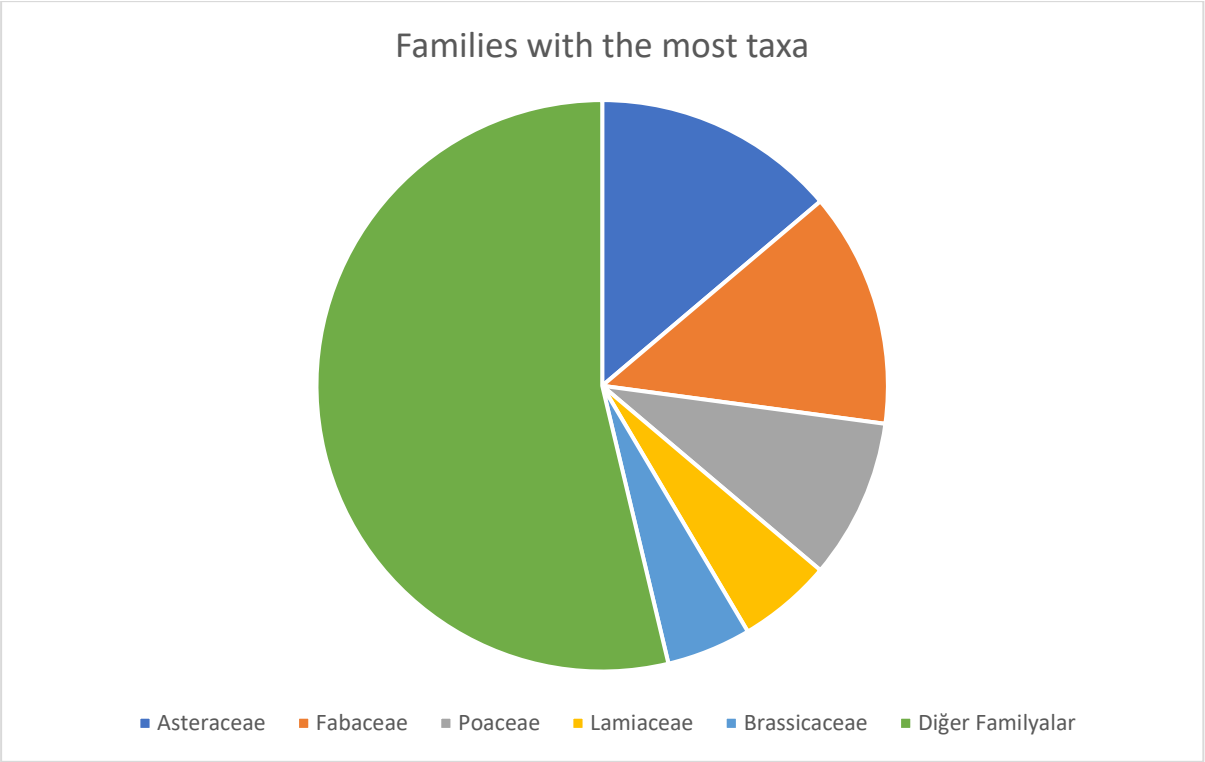


Figure II.2. 3. The richest 5 families to which the plants identified in the project area belong

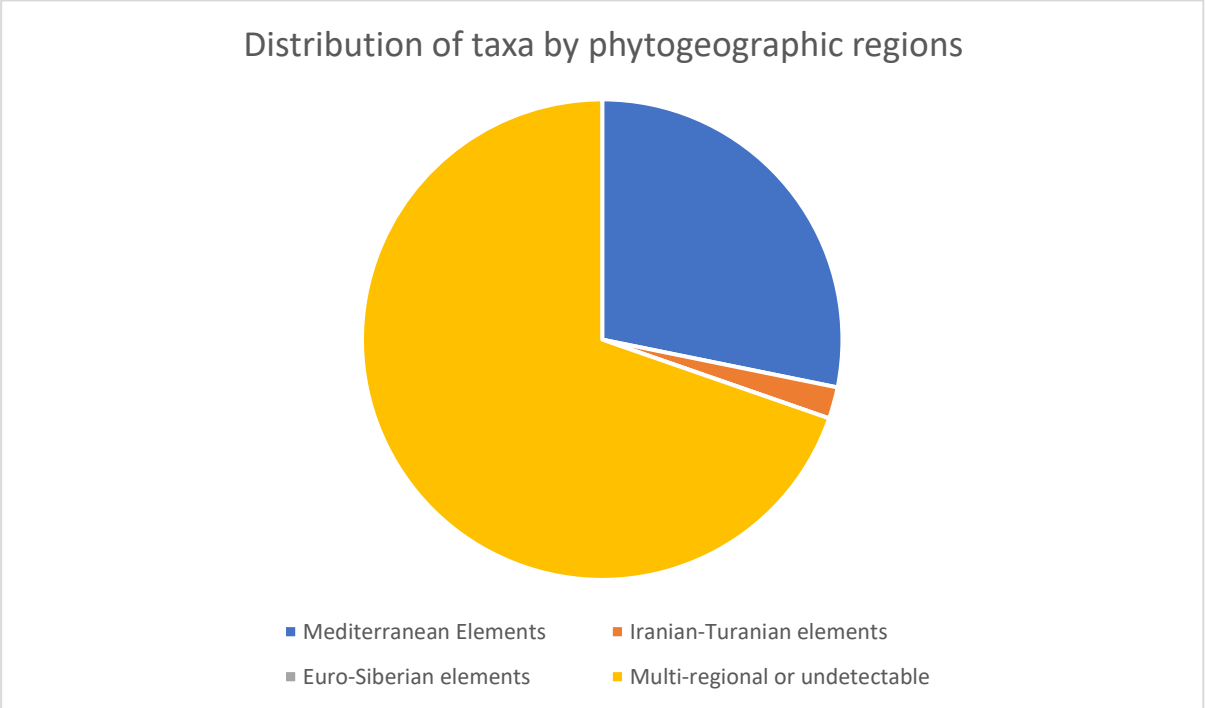


Figure II.2. 4. Distribution of plants detected in the project area to phytogeographic regions

The fact that the elements of the Mediterranean phytogeographic region are more than 28% in the area can be explained by the fact that the project site is located in this phytogeographic region. The high proportion of widely distributed or cosmopolitan species whose

phytogeographic region is unknown or more than one phytogeographic region element indicates that the area is close to agricultural areas and settlements.

Among the plants detected in the study area, there is 1 taxon (*Pacratium maritimum* L.) in the EN category in the rare (Rare) plants group, although it is not endemic.

Other distribution areas and population status of this plant in our country are given under the title of protection measure.

Table II.2. 1. Floristic Table of the Project Site

FAMILY	SCIENTIFIC NAME	COMMON NAME	P.G.R	ENDEMISM		IUCN	BERN	HABITAT				OBSERVATION PERIOD	
				L	W		ANNEX . 1	1	2	3	4	JUNE 2020	NOVEMBER 2021
	DİCOTYLEDONES	**DICOTS**											
RANUNCULACEAE	**Adonis aestivalis* L. ssp. *aestivalis*	Summer pheasant's eye	-			LC							
	Ranunculus arvensis L.	Butter cup	Med.			LC		X				X	
	**Ranunculus muricatus* L.	Butter cup	-			LC							
	Ranunculus repens L.	Butter cup	-			LC		X				X	
PAPAVERACEAE	**Hypecoum procumbens* L.	-	Med.			LC							
	Papaver gracile Boiss.	-	-			LC		X				X	
	Papaver rhoeas L.	-	-			LC			X			X	
CRUCIFERAE	*Alyssum dasycarpum* Steph. ex Willd.	-	-			LC		X	X			X	
	Cakile maritima Scop.	Sea rocket	-			LC					X	X	X
	Capsella bursa-pastoris (L.) Medik.	Shepherd's purse	-			LC		X	X			X	
	Descurainia sophia (L.)	Fixweed	-			LC		X				X	
	Eruca sativa Miller	Rocket	-			LC		X				X	
	Hierschfeldia incana (L.) Lag.-Foss.	-	-			LC		X				X	
	Raphanus raphanistrum L.	Wild mustard	-			LC		X				X	
	Thlaspi perfoliatum L.	-	-			LC		X	X			X	
CAPPARACEAE	*Capparis spinosa* L. var. *spinosa*	Capari	-			LC		X		X		X	X
CISTACEAE	*Cistus creticus* L.	Pink rock-rose	Akd.			LC			X			X	X
	**Helianthemum stipulatum* (Forssk.) C.Chr.	Slender shrublet	Akd.			LC							

FAMILY	SCIENTIFIC NAME	COMMON NAME	P.G.R	ENDEMISM		IUCN	BERN	HABITAT				OBSERVATION PERIOD	
				L	W		ANNEX . 1	1	2	3	4	JUNE 2020	NOVEMBER 2021
CARYOPHYLLACEAE	*Minuartia hybrida* (Vill.) Schischk. ssp. *hybrida*	Fine-leaved sandwort	-			LC			X			X	
	**Polycarpon tetraphyllum* (L.) L.	-	-			LC							
	Stellaria media (L.) Vill. subsp. *media*	Chickweed	-			LC		X	X			X	
	Silene kotschyii Boiss. var. maritima Boiss.	-	-			LC			X			X	
	Silene colorata Poiret	-	-			LC		X	X			X	
	*Silene vulgaris (*Moenc) Garcke var. *vulgaris*	-	-			LC		X				X	
	Silene alba (Miller) Krause subsp. *alba*	-	-			LC		X				X	
	**Spergularia marina* (L.) Griseb.	-	-			LC							
ILLECEBRACEAE	*Herniaria incana* Lam.	Gray rupturewort	-			LC		X	X			X	
POLYGONACEAE	*Polygonum maritimum* L.	Knotgrasses	-			LC					X	X	
	Polygonum equisetiforme ibth.&Sm..	Horsetail knotweed	-			LC					X	X	X
	Rumex conglomeratus Murray	Clustered dock	-			LC		X				X	
CHENOPODIACEAE	**Arthrocnemum fruticosum* (L.) Moq.	-	-			LC							
	Chenopodium botrys L.	Sticky goosefoot	-			LC		X				X	X
	**Halimione portulacoides*(L)Aellen	-	-			LC							
	**Salicornia europaea* L.	-	-			LC							
	Salsola ruthenica Iljin	Russian tumbleweed	-			LC		X			X	X	X

FAMILY	SCIENTIFIC NAME	COMMON NAME	P.G.R	ENDEMISM		IUCN	BERN	HABITAT				OBSERVATION PERIOD	
				L	W		ANNEX . 1	1	2	3	4	JUNE 2020	NOVEMBER 2021
	Suaeda splendens (Pourr.) Gren. & Godr.		-			LC					X	X	
HYPERICACEAE	*Hypericum triquetrifolium* Turra	St. John's wort	-			LC			X			X	
MALVACEAE	*Malva niceensis* All.	Bull mallow	-			LC		X	X			X	
	Malva sylvestris L.	Bull mallow	-			LC		X				X	
LINACEAE	*Linum strictum* L. var. *spicatum* Pers.	Rigid flax	-			LC			X			X	
	Linum trigynum L.	Upright flax	-			LC			X			X	
GERANIACEAE	*Erodium cicutarium* (L.) L. Herit subsp. *cicutarium*	Redstem filaree	-			LC		X	X			X	
	Erodium gruinum (L.) L'Herit	Redstem filaree				LC		X	X			X	
	Geranium molle L. subsp. *molle*	Crane's bill	-			LC		X				X	
	**Geranium purpureum* Vill.	Crane's bill	-			LC							
ZYGOPHYLLACEAE	*Tribulus terrestris* L.	Puncture vine	-			LC		X			X	X	X
RHAMNACEAE	*Paliurus spina-christi* Miller	Garland thorn	-			LC			X				X
ANACARDIACEAE	*Pistacia terebinthus* L. Subsp. *palaestina* (Boiss.) Engler	Terenbith	Med.			LC			X			X	
LEGUMINOSAE	*Alhagi pseudolhagi* (M.Bieb.) Desv.	-	Ir.-Tur.			LC		X				X	
	Anthyllis tetraphylla L.	-	-			LC		X	X			X	
	Calicotome villosa (Poir.) Link	Spiny broom	Med.			LC			X			X	X
	Coronilla cretica L.	-	Med.			LC							
	Dorycnium hirsutum (L.) Ser.	Lotus hirsutus	-			LC			X			X	

FAMILY	SCIENTIFIC NAME	COMMON NAME	P.G.R	ENDEMISM		IUCN	BERN	HABITAT				OBSERVATION PERIOD	
				L	W		ANNEX . 1	1	2	3	4	JUNE 2020	NOVEMBER 2021
	Glycyrrhiza glabra L. var. *glandulifera* (Waldst. & Kit Tan) Boiss.	Liquorice	-			LC		X				X	
	Hymenocarpus circinnatus (L.) Savi	-	Med.			LC			X			X	
	Lotus corniculatus L. var. *corniculatus*	Lotus	-			LC			X			X	
	Medicago coronata (L.) Bartal.	Crown medick	-			LC			X			X	
	Medicago marina L.	“	Med.			LC					X	X	
	Medicago orbicularis (L.) Bartal.	“	-			LC			X			X	
	Medicago turbinata (L.) All. var. *turbinata*	“	-			LC			X			X	
	Melilotus alba Desr.	-	-			LC		X	X			X	
	Melilotus officinalis (L.) Desr.	-	-			LC		X				X	
	Onobrychis caput-galli (L.) Lam.		Med.			LC			X			X	
	Ononis ornithopidioides L.	Bird restharrow	-			LC		X	X			X	
	Ononis pusilla L.	“	-			LC		X	X			X	
	Psoralea bituminosa L.	Arabian pea	Med.			LC		X	X			X	
	Spartium junceum L	Spartium	Med.			LC			X			X	X
	Trifolium angustifolium L.	Narrow-leaf clover	-			LC		X	X			X	
	Trifolium campestre Schreb.	“	-			LC			X			X	
	Trigonella monspeliaca L.	Hairy trigonella	-			LC			X			X	
	Trigonella spicata Sibth. & Sm.	“	Med.			LC			X			X	

FAMILY	SCIENTIFIC NAME	COMMON NAME	P.G.R	ENDEMISM		IUCN	BERN	HABITAT				OBSERVATION PERIOD	
				L	W		ANNEX . 1	1	2	3	4	JUNE 2020	NOVEMBER 2021
	Vicia cracca L. ssp. *stenophylla* Velen.	Tuffed vetch	-			LC			X			X	
	Vicia sativa L. ssp. *nigra* (L.) Ehrh.	"	-			LC		X	X			X	
ROSACEAE	*Potentilla recta* L.	Sulphur cinquefoil	-			LC		X	X			X	
	**Potentilla reptans* L.	"	-			LC							
	Rubus sanctus Schreber	Holy bramble	-			LC		X	X			X	X
	Sanguisorba minor Scop. subsp. *muricata* (Spach)Brig	Garden burnet	-			LC			X			X	
	Sarcopoterium spinosum (L.) Spach	Thorny burnet	Med.			LC			X	X		X	X
MYRTACEAE	*Eucalyptus camaldulensis* Dehnh.	Eucalyptus	-			LC						X	X
	Myrtus communis L. subsp.*communis*	Common myrtle	-			LC		X				X	X
LYTHRACEAE	**Lythrum hyssopifolia* L.	Hyssop loosestrife	-			LC							
CACTACEAE	*Opuntia ficus-indica* (L.) Miller	Indian fig	-			LC		X				X	X
UMBELLIFERAE	*Caucalis platycarpos* L.	-	-			LC		X				X	
	Crithmum maritimum L.	Rock samphire	-			LC				X			X
	Daucus carota L.	Carrot	-			LC		X				X	
	Echinophora tenuifolia L. ssp. *sibthorpiana* (Guss.) Tutin	-	-			LC		X	X			X	
	Eryngium campestre L. var. *campestre*	Field eryngo	-			LC		X	X			X	X
	**Eryngium falcatum* D.Delaroche	"	-			LC							
	**Pastinaca sativa* L. Subsp. *urens* (Req. Ex Godron) Celak	-	-			LC							

FAMILY	SCIENTIFIC NAME	COMMON NAME	P.G.R	ENDEMISM		IUCN	BERN	HABITAT				OBSERVATION PERIOD	
				L	W		ANNEX . 1	1	2	3	4	JUNE 2020	NOVEMBER 2021
	**Tordylium syriacum* L.	-	Med.			LC							
DIPSACACEAE	*Scabiosa columbaria* L. subsp. *columbaria* var. *columbaria*	Small scabious	-			LC		X	X			X	
COMPOSITAE	*Anthemis cretica* L. subsp. *cretica*	White mat chamomile	-			LC			X			X	
	Bellis sylvestris Cyr.	Southern daisy	Med.			LC			X			X	X
	**Bidens tripartita* L.	-	-			LC							
	Cardopatium corymbosum (L.) Pers.	-	Med.			LC			X			X	X
	Carduus nutans L. *sensu lato*	Musk thistle	-			LC		X	X			X	X
	Centaurea iberica Trev. Ex Sprengel	Iberian knapweed	-			LC		X				X	
	Chondrilla juncea L . var. *juncea*	-	-			LC		X	X			X	
	Chrysanthemum coronarium L.	Crown daisy	Med.			LC			X			X	
	**Cirsium alatum* (J.F.Gmel.) Bobrov ssp. *alatum*	-	-			LC							
	Conyza bonariensis (L.) Cronquist	-	-			LC		X	X			X	
	Crepis sancta (L.) Babcock	Crepis	-			LC		X	X			X	
	Echinops viscosus DC. ssp. *bithynicus* (Boiss.) Rech. fil.	Great globe-thistle	-			LC		X	X			X	
	Inula viscosa (L.) Aiton	Inula	Med.			LC		X	X			X	X
	Lactuca serriola L.	Prickly lettuce	-			LC		X	X			X	
	Lapsana communis L.	-	-			LC		X	X			X	
	Pallenis spinosa (L.) Cass.	Spiny starwort	Med.			LC		X	X			X	
	Pulicaria dysenterica (L.) Bernh.	Fleabane	-			LC			X			X	
	Reichardia picroides (L.) Roth	-	Med.			LC			X			X	

FAMILY	SCIENTIFIC NAME	COMMON NAME	P.G.R	ENDEMISM		IUCN	BERN	HABITAT				OBSERVATION PERIOD	
				L	W		ANNEX . 1	1	2	3	4	JUNE 2020	NOVEMBER 2021
	**Senecio vulgaris* L.	Groundsel	-			LC							
	Silybum marianum (L.) Gaertn.	Milk thistle	Med.			LC			X			X	
	Sonchus asper (L.) Hill subsp. *glaucescens* Jordon) Ball	-	-			LC		X				X	
	Taraxacum hellnicum Dahlst.	Dandelion	Med.			LC			X			X	
	**Urospermum picroides* (L.) F.W.Schmidt	-	Med.			LC							
	Xanthium strumarium L. ssp. *cavanillesii* (Schouw) D.L. & Dans.	Rough cocklebur	-			LC		X				X	X
	Xanthium spinosum L.	Thorny cocklebur	-			LC		X				X	X
CAMPANULACEAE	*Legousia speculum-veneris* (L.) Chaix.	Looking glass	Med.			LC			X			X	
PRIMULACEAE	**Cyclamen persicum* Miller	Persian cyclamen	Med.			LC			X				
OLEACEAE	*Olea europea* L.	Olive	Med.			LC		X				X	X
APOCYNACEAE	*Nerium oleander* L.	Nerium oleander	-			LC		X				X	X
ASCLEPIADACEAE	**Cionura erecta* (L.) Griseb	-	Med.			LC							
	**Cynanchum acutum* L. ssp. *acutum*	-	-			LC							
GENTIANACEAE	*Blackstonia perfoliatum* (L.) Huds. ssp. *perfoliatum*	-	-			LC			X			X	
	Centaurium pulchellum (Sw.) Druce	Lesser centaury	-			LC			X	X		X	
CONVOLVULACEAE	**Convolvulus lanatus* Vahl	-	-			LC							

FAMILY	SCIENTIFIC NAME	COMMON NAME	P.G.R	ENDEMISM		IUCN	BERN	HABITAT				OBSERVATION PERIOD	
				L	W		ANNEX . 1	1	2	3	4	JUNE 2020	NOVEMBER 2021
	Ipomea stolonifera (Cyr.) J.F.Gmel.	Beach morning-glory	-			LC					X	X	X
BORAGINACEAE	*Buglossoides arvensis* (L.) Johnston	-	Med.			LC		X	X			X	
	Echium angustifolium Miller	Narrow-leaved bugloss	-			LC		X			X	X	X
SOLANACEAE	*Datura stramonium* L.	Thorn apple	-			LC		X			X		X
SCROPHULARIACEAE	**Kickxia elatine* (L.) Dumort. ssp. *crinita* (Mabille) Greuter	-	-			LC							
	Verbascum sinuatum L. var. *sinuatum*	Scallop leaved mullein	-			LC		X	X			X	X
VERBENACEAE	*Vitex agnus-castus* L.	Vitex	-			LC		X	X			X	X
LABIATAE	*Acinos rotundifolius* Pers	-	-			LC			X			X	
	Ajuga salicifolia (L.) Schreber	Ajuga	-			LC			X			X	
	Lamium amplexicaule L.	Common henbit	-			LC		X	X			X	
	**Mentha longifolia* (L.) Hudson var. *longifolia*	Mint	-			LC							
	**Prasium majus* L.	-	Med.			LC							
	**Salvia aethiopis* L.	Sage	-			LC							
	**Salvia verbenaca* L.	“	Med.			LC			X				
	**Salvia viridis* L.	“	Med.			LC			X				
	**Sideritis montana* L. ssp. *remota* (d’Urv.) P.W. Ball ex Heywood	Mountain ironwort	Med.			LC			X				
	**Ziziphora capitata* L.	-	Ir.-Tur.			LC							
PLUMBAGINACEAE	**Limonium virgatum* (Willd.) Fourr.	Violet sea lavender	Med.			LC							

FAMILY	SCIENTIFIC NAME	COMMON NAME	P.G.R	ENDEMISM		IUCN	BERN	HABITAT				OBSERVATION PERIOD	
				L	W		ANNEX . 1	1	2	3	4	JUNE 2020	NOVEMBER 2021
	Plumbago europeae L.	Common leadwort	-			LC		X	X				X
SANTALACEAE	*Osyris alba* L.	Osyris	Med.			LC			X			X	
PLANTAGINACEAE	**Plantago afra* L.	-	-			LC							
	Plantago coronopus L.ssp.*coronopus*	-	-			LC					X		X
EUPHORBIACEAE	**Euphorbia apios* L.	-	Med.			LC							
	Euphorbia paralias L.	-				LC					X	X	X
	Euphorbia peplis L.	-	Med.			LC					X		X
FAGACEAE	*Quercus coccifera* L.	Kermes oak	-			LC		X	X			X	X
RUBIACEAE	**Galium cassium* Boiss.	-	Med.			LC							
	**Galium fissurense* Ehrend.& Schönb.	"	Med.			LC				X			
	Valantia hispida L.	-	Med.			LC			X	X		X	
	MONOCOTYLEDONES	**MONOCHROME**											
ARACEAE	*Arisarum vulgare* Trag. – Tozz.	Friar's cowl	Med.			LC			X				X
	Arum italicum Boiss.	Italian arum							X			X	
	Dracunculus vulgaris Schott	Common dracunculus	Med.			LC			X			X	
LILIACEAE	**Allium ampeloprasum* L.	Wild leek	Med.			LC			X				
	**Allium scorodoprasum* L. subsp. *rotundum* (L.) Stearn	"	Med.			LC			X				
	Asparagus acutifolius L.	Asparagus	Med.			LC			X			X	X
	Asphodelus aestivus Brot.	Summer asphodel	Med.			LC			X			X	

FAMILY	SCIENTIFIC NAME	COMMON NAME	P.G.R	ENDEMISM		IUCN	BERN	HABITAT				OBSERVATION PERIOD	
				L	W		ANNEX . 1	1	2	3	4	JUNE 2020	NOVEMBER 2021
	**Ornithogalum narbonense* L.	Narbonne star-of-Bethlehem	Med.			LC			X				
	Scilla automnalis L.	Autumn squill	-			LC			X				X
	Smilax aspera L.	Common smillax				LC			X				X
	Urginea maritima (L.) Baker	Sea onion	Med.			LC			X	X			X
AMARYLLIDACEAE	***Pancratium maritimum* L.**	**Sea daffodil**	Med.			**EN**					**X**	**X**	**X**
	Sternbergia lutea	Winter daffodil	Med.			LC			X				X
IRIDACEAE	**Gladiolus italicus* Mill.	Gladiol	-			LC							
JUNCACEAE	**Juncus acutus* L	Spiny rush	-			LC			X				
	**Juncus littoralis* C.A.Mey.	"	-			LC			X				
CYPERACEAE	**Carex diluta* M.Bieb.	-	Ir. – Tur.			LC							
	Carex distachya Desf. var. *distachya*	-	Med.			LC					X	X	
	**Cyperus capitatus* Vand.	-	-			LC							
GRAMINEAE	*Aegilops triuncialis* L. ssp. *triuncialis*	Barbed goatgrass	-			LC		X	X			X	
	**Aeluropus litoralis* (Gouan) Parl.	-	-			LC							
	Avena barbata Pott. ex Link ssp. *barbata*	Slender wild oat	Med.			LC		X				X	
	Briza media L.	Pine grass	-			LC			X			X	
	Bromus tectorum L.	Brom grass	-			LC		X				X	
	Cynodon dactylon (L.) Pers. var. *dactylon*	Bermuda grass	-			LC		X			X	X	X

FAMILY	SCIENTIFIC NAME	COMMON NAME	P.G.R	ENDEMISM		IUCN	BERN	HABITAT				OBSERVATION PERIOD	
				L	W		ANNEX . 1	1	2	3	4	JUNE 2020	NOVEMBER 2021
	Dactylis glomerata L. subsp. *hispanica* (Roth) Nyman	Orchard grass	Med.			LC		X	X			X	X
	Elymus elongatus (Host) Runemark	Tall wheatgrass	-			LC			X			X	
	Hordeum bulbosum L.	Bulbous barley	-			LC		X	X			X	
	Hordeum murinum L.	Bulbous barley	-			LC		X	X			X	
	Lagurus ovatus L.	-	Med.			LC			X			X	
	Lolium perenne L.	-	-			LC			X			X	
	**Lolium rigidum* Gaudin	-	-			LC							
	Poa bulbosa L.	Meadow grass	-			LC		X	X			X	
	**Polypogon monspeliensis* (L.) Desf.	-	-			LC							
	**Rostraria berthea* (Boiss. & Bal) Holub	-	-			LC							
	Trachynia distachya (L.) Link	-	-			LC		X	X			X	

II.2. 4. VEGETATION

According to the grid mapping system used in the Flora of Turkey, the project area, located in the C5 square, is located in the Mediterranean Phytogeographic region. According to the field studies and observations, mainly 4 different vegetation types were determined in the license area (Figure II.2.5).

- Areas left by the deterioration of maquis and agricultural areas,
- Maquius areas in a narrow strip between agricultural fields and the sea,
- Rocky areas stretching in a narrow strip, especially by the sea,
- Sea side beaches.

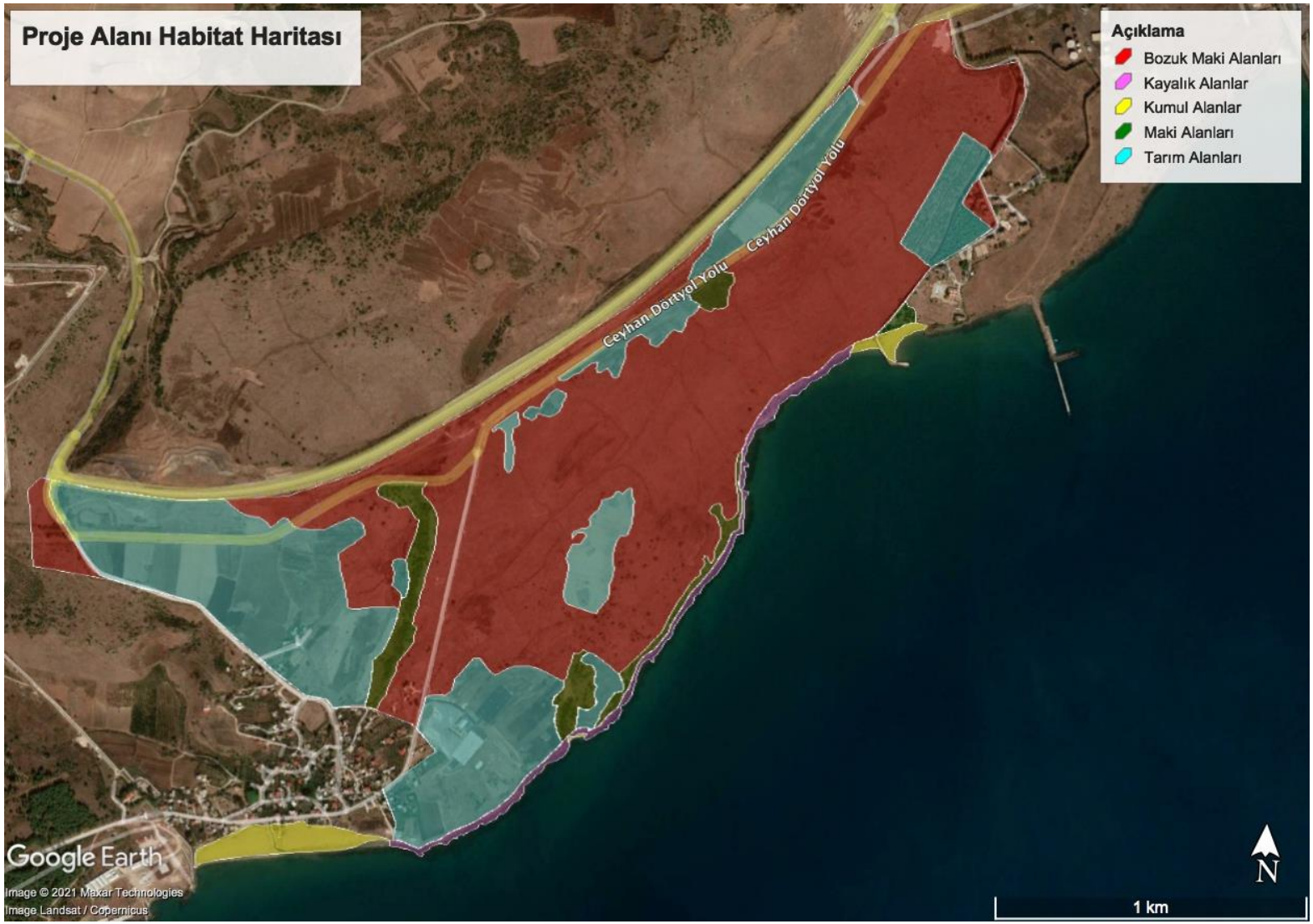


Figure II.2. 5. Project area terrestrial habitat map

Agricultural areas; Generally, cereal fields (Photo II.2.3) and olive groves (Photo II.2.4) were identified in the agricultural areas observed in the project site. Since the agricultural areas have been acquired by the deterioration of the maquis, which are the natural vegetation of the area, plants peculiar to the maquis can naturally grow, albeit in small clusters, on the borders between these areas. Among these plants are; *Spartium junceum, Asparagus acutifolius, Paliurus spina-christi, Myrtus communis subsp. communis, Vitex agnus-castus, Osyris alba* and *Capparis spinosa*. (Photo II.2.5), *Arum italicum* (Photo II.2.6), *Echinops viscosus ssp. bithynicus* (Photo II.2.7) and *Cardopatium corymbosum* (Photo II.2.8).

Photograph II.2. 3. Grain fields

Photograph II.2. 4. Olive groves

Photograph II.2. 5. *Capparis spinosa*

Photograph II.2. 6. *Arum italicum*

Photograph II.2. 7. *Echinops viscosus* ssp. *bithynicus*

Photograph II.2. 8. *Cardopatium corymbosum*

Sea side beaches; In these areas, *Hordeum murinum*, *Cakile maritima* (Photo II.2.9), *Salsola ruthenica, Xanthium strumarum ssp. cavanillesii, Euphorbia paralias* (Photo II.2.10), *Pancratium maritimum* (Photo II.2.11), *Convolvulus lanatus*, *Ipomoea stolonifera* (Photo II.2.12) and *Inula viscosa* are among the most observed plants.

Photograph II.2. 9. *Cakile maritima*

Photograph II.2. 10. *Euphorbia paralias*

Photograph II.2. 11. *Pancratium maritimum*

Photograph II.2. 12. *Ipomoea stolonifera*

Apart from *Sarcopoterium spinosum* (Photo II.2.13), which is actually a scrub member, no other plant associations were observed on the metamorphic rocks at the seaside. However, *Crithmum maritimum* (Photo II.2.14) has been encountered infrequently.

Photograph II.2. 13. *Sarcopoterium spinosum*

Photograph II.2. 14. *Crithmum maritimum*

During the second field studies carried out in the project area in November 2021, beaches and dune plants growing in these areas were also found in the newly added areas to the project area. Among the most observed were, *Euphorbia peplis* (Photo II.2.15), *Echium angustifolium* (Photo II.2.16), *Pancratium maritimum* (Photo II.2.17) and *Ipomea stolonifera* (Photo II.2.18).

Photograph II.2. 15. *Euphorbia peplis*

Photograph II.2. 16. *Echium angustifolium*

Photograph II.2. 17. *Pancratium maritimum*

Photograph II.2. 18. *Ipomea stolonifera*

Maquis: Among the dominant plants observed in this vegetation type, which is observed in a narrow strip between agricultural areas and rocks were *Quercus coccifera* (Photo II.2.19), *Sarcopoterium spinosum*, *Asparagus acutifolius* (Photo II.2.20), *Calicotome villosa* (Photo II.2.21), *Inula viscosa* (Photo II.2.22), *Myrtus communis* (Photo II.2.23), *Paliurus spina -christi* (Photo II.2.24), *Scilla autumnalis* (Photo II.2.25), *Sternbergia lutea* (Photo II.2.26), *Urginea maritima* (Photo II.2.27), *Smilax aspera* (Photo II.2.28), *Bellis perennis* (Photo II.2) .2.29) and *Arisarum vulgare* (Photo II.2.30).

Photograph II.2. 19. *Quercus coccifera*

Photograph II.2. 20. *Asparagus acutifolius*

Photograph II.2. 21. *Calicotome villosa*

Photograph II.2. 22. *Inula viscosa*

Photograph II.2. 23. *Myrtus communis*

Photograph II.2. 24. *Paliurus spina-christi*

Photograph II.2. 25. *Scilla autumnalis*

Photograph II.2. 26. *Sternbergia lutea*

Photograph II.2. 27. *Urginea maritima*

Photograph II.2. 28. *Smilax aspera*

Photograph II.2. 29. *Bellis perennis*

Photograph II.2. 30. *Arisarum vulgare*

II.2.5. PROTECTION MEASURES

According to the field studies and literature reviews, as a result of the floristic examination carried out in relation to the "Raw Material Supply, Storage and Port Facility" project planned to be established by the Ceyhan Petrochemical Industrial Zone Administration in the Kurtpınar District of Adana province, Ceyhan district, narrowly distributed locally endemic species, national and rare species that should be protected in international status were not found in the project area. However, in the regions very close to the border of the field, there are 2 taxa *Pancratium maritimum* and *Cyclamen persicum*, which are in the EN category in the rare (Rare) plants group.

EN - ENDANGERED; Species that are in great danger of extinction in the wild. If a taxon is at very high risk and in danger of extinction in the near future, but is not yet in the CR group, it is placed in the EN group.

Pancratium maritimum species grows on the Mediterranean, Marmara and Black Sea coasts in Kırklareli, Istanbul, Bolu, Sinop, Samsun, Giresun, Trabzon, Antalya and Adana (Figure II.2.6.).

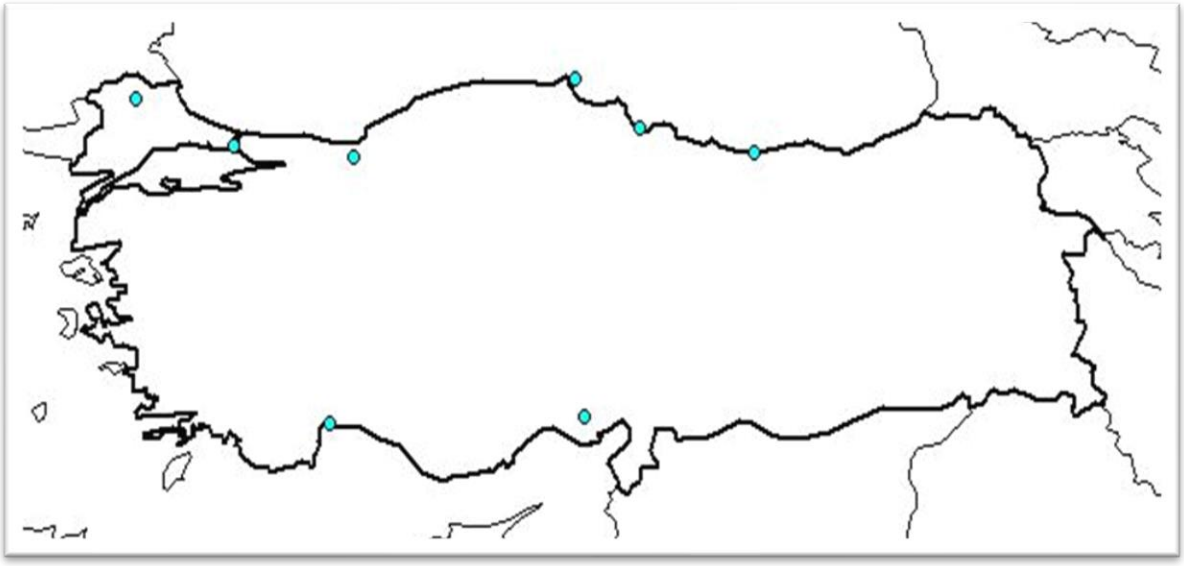
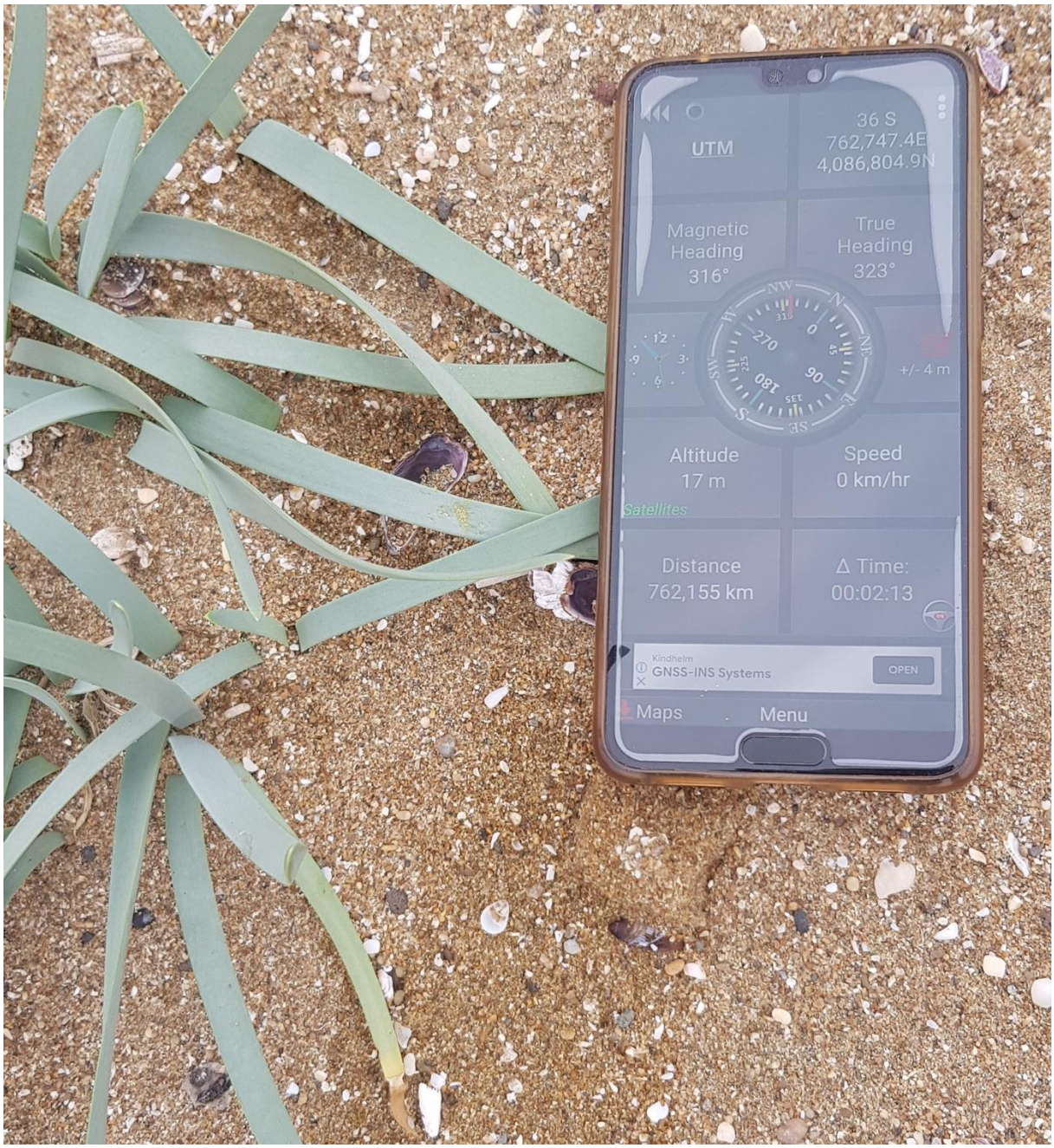


Figure II.2. 6 Distribution of *Pancratium maritimum* in Turkey.

This species, which grows on beach dunes in different regions, has been evaluated in the EN category because it grows rarely and is negatively affected by other activities such as tourism. This taxon, which was thought to be affected by the project activities due to its proximity to the project area during the field studies carried out in June, and which reproduces with its underground vegetative reproductive organ bulbs, was proposed to be preserved as IN-SITU. It was also found in the sand dunes remaining in the area (Photo II.2.31).



Photograph II.2. 31. *Pancratium maritimum*, which was found to be grown in the project area

Before the project activities begin, the tubers must be collected by an expert botanist in accordance with the rules from the areas that will be affected by the activity. The necessary work and observations must be made for two years in order to transport them to the dunes in the areas that will not be affected by the activities and to grow them there. In this way, it will be possible to minimize the loss that may arise for this species and in terms of floristics.

Cyclamen persicum: This plant is a perennial herbaceous geophyte with 15 cm diameter tubers. This plant, which blooms between February and April, grows in evergreen oak maquis,

red pine forests, on open and limestone slopes, up to 800 m above sea level. Apart from Adana, it also spreads in Çeşme, Kuşadası, Alanya and Hatay in Turkey (Figure II.2.7).

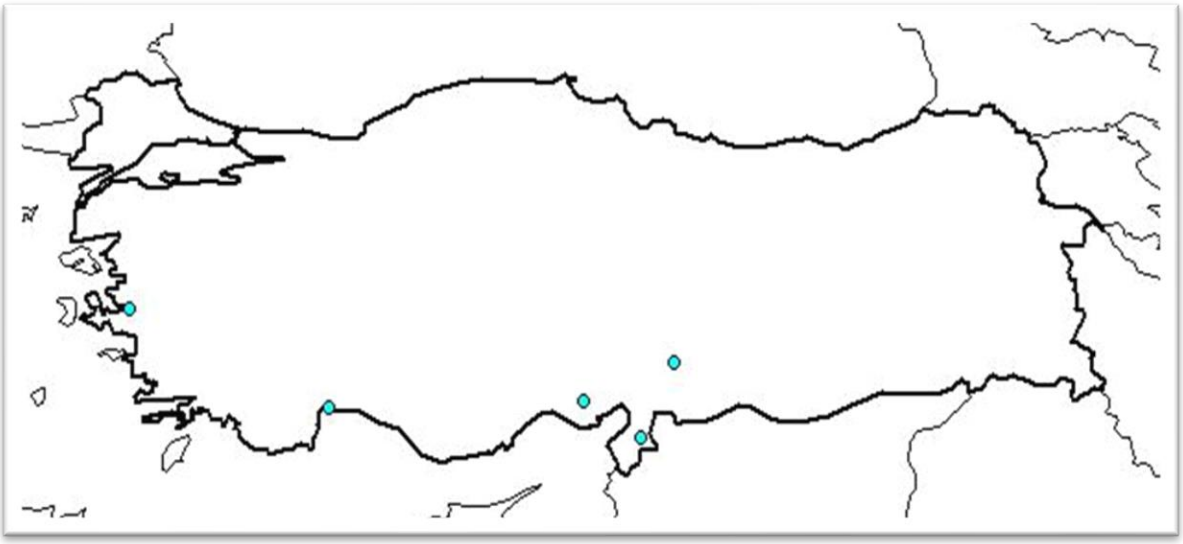


Figure II.2. 7. The areas where *Cyclamen persicum* is distributed in our country

This taxon, was determined to be grown in the project area according to the literature information and the presence record that was previously taken in Adana. It has a very high probability of growing in terms of habitat and altitude. For this reason, the tubers should be collected and transported to areas that will not be affected by the project activities before the activities begin with the field studies to be carried out in February. The leaves and flowers of *Cyclamen persicum* could not be observed since the two different sampling periods we conducted in the area were in June and November. This does not mean that *Cyclamen persicum* is absent in the area. The habitat of this species coincides with the project area in terms of locality, habitat and altitude. Therefore, the conservation studies for this taxon should be evaluated within the scope of the planned monitoring and transportation studies.

II.2.6. EVALUATION OF THE SITE IN TERMS OF STATUS AREAS

a) Within the project area, there is no "National Parks", "Nature Parks", "Nature Monuments" and "Nature Conservation" areas defined in article 2 and 3 of the National Parks Law dated 09/08/1983 and numbered 2873.

b) There are no "Wildlife Protection Areas and Wild Animal Settlement Areas" determined in accordance with the Land Hunting Law No. 4915 dated 01/07/2003 in the project area and project impact area.

c) There are no areas determined and declared as "Special Environmental Protection Areas" by the Council of Ministers in accordance with Article 9 of the Environment Law No. 2872 dated 09/08/1983 in the project area and the project impact area.

d) There are no protected areas in the project area and project impact area according to the Bosphorus Law No. 2960 dated 18/11/1983.

e) In the project area and the project impact area, there are places that are considered as forest areas in accordance with the Forest Law No. 6831 dated 31/08/1956. For the forested areas to be used within the scope of the project, all necessary permits will be obtained by applying to the Regional Forestry Directorate in accordance with Article 17/3 of the Forest Law No. 6831 as amended by Law No. 5192.

f) There are no wetlands in the project area and project impact area as specified in the Wetlands Protection Regulation, which was published in the Official Gazette dated 17/05/2005 and numbered 25818.

II.2.7. EVALUATION OF THE PROJECT SITE IN ACCORDANCE WITH INTERNATIONAL CONTRACTS

When the floristic lists of the project area are evaluated; Regarding the Cyclamen species, which are under protection and prohibited to trade in accordance with CITES (Convention on International Trade in Endangered Animal and Plant Species), signed in Washington on March 3, 1978, Cyclamen persicum has been determined according to the literature information. In addition, plant species that are under protection in accordance with the European Convention on the Conservation of Wildlife and Habitats (BERN), which Turkey officially ratified on 09.01.1984, are not in the project area.

II.2.8. RESULT EVALUATION IN FLORISTIC PERSPECTIVE

Within the area of "Raw Material Supply, Storage and Port Facility" planned to be established by the Ceyhan Petrochemical Industry Zone Management in Adana province, Ceyhan district, Kurtpınar Neighborhood, via the floristic studies, first of all, plants growing in these habitats were determined by general habitat observations and examinations. The literature reviews and the two field studies which were conducted twice in June 2020 and November 2021 also contributed significantly to these studies which were aimed at the determination of the plants growing in the project area.

- During the field works carried out in this process, comprehensive observations,

examinations and necessary evaluations were made regarding the vegetation in the areas where the project will be established and the sections where road works will be carried out. The reason why the works are carried out especially on these areas is that the vegetation will be destroyed in these areas during the construction of the project units. In other words, trees and bushes in these areas will be cut, and herbaceous plants will be trimmed and removed from these areas.

- In the studies carried out for the areas where the projects are planned to be established, it has been determined that most of the construction and road works are planned on agricultural areas. Therefore, it is not foreseen that the natural vegetation arising from the activity in these areas will change. Since the seeds of plants that grow naturally in construction and road areas and reproduce by seeds can spread to other areas by themselves, it is thought that these plants will not cause a significant loss in terms of floristics.
- However, instead of seeds, plants that reproduce by bulbs, rhizomes, tubers, tuber or other vegetative organs, which are usually underground stem metamorphoses, and the tubers of plants that reproduce with bulbs such as Pancratium maritimum, which is one of the rare plants and which are in EN category, or tubers such as Cyclamen persicum, should be handled by a specialist. It is necessary to carry out the necessary studies and observations in order to be collected by the botanist from the areas that will be affected by the activity in accordance with the rules, to be transported to the areas that will not be affected by the activities and to be grown there. In this way, it will be possible to minimize the loss that may arise for these species and in terms of floristics.
- In this context, it is recommended that a botanist should be present in the area as an observer during the related vegetation periods, making the final determinations in the field, and taking or having the necessary measures according to the pre-construction situation during the project studies.
- Considering the precautions and suggestions explained above; the project will not cause a significant change or deterioration on the floristic structure in the project site, or the loss or serious deterioration of its floristic richness.
- If the recommendations are taken into account (especially regarding transportation) and implemented seriously, the project works will not cause measurable, negative impacts on the biodiversity values of critical habitats and the ecological processes that support

these values, and the reduction or extinction of Critical or Endangered species on the basis of our country and region.

- Due to the activities to be carried out in line with the suggestions within the scope of the project, it is thought that the negative effects that may arise in terms of floristics will be at a sustainable level, considering the contributions that the project will make to the country as a whole.

II.2.9. REFERENCES

Akalın, Ş., “Büyük Bitkiler Kılavuzu”, Ankara (1952).

Akaydın, G., Torlak, H. Ve Akbaş, F., “Anadolu Kültüründe Bitkiler”, Hacettepe Üniversitesi Yayınları, Ankara, (2014).

Akaydın, G., “Doğal Bitkilerimiz”, Hacettepe Üniversitesi Yayınları, Ankara, (2014).

Altınözlü, H. (2004). “Flora of the Natural Conservation Area in Adana-Yumurtalık Lagoon (Turkey)”, Turk J Bot., (28) 491-506.

Bakis, Y., Babac, M. T., & Uslu, E. (2011) "Updates and improvements of Turkish Plants Data Service (TÜBİVES)" In Health Informatics and Bioinformatics (HIBIT), (2011).

BERN, Avrupa Yaban Hayatı ve Yaşama Ortamlarını Koruma Sözleşmesi (1984).

Ekim, T., Koyuncu, M., Vural, M., Duman, H., Aytaç, Z., Adıgüzel, N., “Türkiye Bitkileri Kırmızı Kitabı”, Türkiye Tabiatını Koruma Derneği Yayın No: 18, Ankara (2000).

Davis, P.H., “Flora of Turkey And The East Aegean Islands”, Vol.1-10, Edinburg (1965 - 1988).

Baytop, T., “Türkçe Bitki Adları Sözlüğü”, Ankara (1997).

Ekim T., Koyuncu M., Erik S., İlarslan R., “Türkiye’nin Tehlike Altındaki Nadir ve Endemik Bitki Türleri” (1989).

Davis PH & Tan K, Mill RR (eds) (1988). “Flora of Turkey and the East Aegean Islands, Vol. 10”. Edinburgh: Edinb. Univ. Press.

Donner J (1990). “Verbreitungs karten zu P.H. Davis “Flora of Turkey,1-10”. Linzer Biol Beitr 22: 381-515.

Güner A, Özhatay N, Ekim T & Bafler KHC (eds) (2000). “Flora of Turkey and the East Aegean Islands. Vol. 11”. Edinburgh: Edinb. Univ. Press.

IUCN (2001). Red List Categories: Version 3.1. Prepared by the IUCN Species Survival Commission. Gland, Switzerland, and Cambridge, UK: IUCN.

II.3. MARINE ECOSYSTEM (ALGAE, ZOOPLANKTONIC ORGANISMS, BENTHIC LIFE AND FISH)

II.3.1. INTRODUCTION

The project area is 55 km by bird flight from Adana city center and 18 km from Ceyhan district center. Furthermore, Kurtpınar District is 4 km north, Gölovası District is 5.5 km west, Kurtkulağı District is 7 km northwest, Sarımazı District is 6.5 km northeast, Hamzalı District is 8 km northwest of the project area. In order to establish the Petrochemical Industrial Zone and to meet the infrastructure and raw material needs of the facilities to be included in it, within the scope of "Raw Material SUpply, Storage and Port Facility Project", loading and unloading piers, quays and backyard areas will be constructed where liquid chemical product tankers, LPG tankers, dry cargo ships, general cargo ships and container ships will be able to dock. Thus, it is planned to import the raw materials needed by the petrochemical facilities located in the Ceyhan Energy Specialized Industrial Zone and to export the industrial outputs produced in the mentioned facilities.

In the envisaged project, initially, the construction of a pier and then of a port so is planned so that the raw materials to be brought from different oil fields of the world can be taken to the facility. For this purpose, some construction works will be carried out at sea. For this purpose, a series of excavation, filling and construction works will be carried out in the marine environment during the construction of the pier and the pipeline connected to it (Figure II.3.1).

Within the scope of Adana Ceyhan Raw Material Supply, Storage and Port Facility Project, sampling was made from three biologically evaluated stations in the field studies carried out in June 2020 and November 2021 regarding the marine life of the region.

Figure II.3. 1. Port Project

II.3.2. GENERAL STRUCTURE AND ECOLOGICAL FEATURES OF THE MEDITERRANEAN

The Mediterranean Sea is connected to the Atlantic Ocean in the west by the Strait of Gibraltar and to the Sea of Marmara and the Black Sea in the northeast by the Dardanelles Strait. In the southeast, the Suez Canal connects the Mediterranean Sea with the Red Sea and the Indian Ocean. In the Strait of Sicily, a shallow ridge 400 m deep separates the island of Sicily from the Tunisian coast and divides the sea into two main subregions: western (area = 0.85 million km2) and eastern (area = 1.65 million km2) (Coll et al., 2010).

The Mediterranean is a concentration basin: evaporation is higher in the eastern half, causing the water level to drop and salinity to increase from west to east. The resulting pressure gradient pushes relatively cold, low-salt water from the Atlantic through the Mediterranean basin. This water keeps warming up as it travels towards the east where it becomes milder and then sinks in the Levantine Sea before circulating west and exiting the Strait of Gibraltar. The climate in the region is characterized by hot and dry summers and cool, humid winters. The mean annual sea surface temperature shows a high seasonality and significant degrees from west to east and from north to south. The basin is generally oligotrophic, but regional features include changing

wind conditions, temporary thermoclines, streams and river discharges, and organic material loadings into coastal areas by municipal sewage. The basin is characterized by strong environmental gradients, with the eastern end being more oligotrophic than the western. Biological production decreases from north to south and west to east and is inversely proportional to the increase in temperature and salinity (Coll et al. 2010).

The Mediterranean has narrow continental shelves and a large open sea area. Therefore, much of the Mediterranean basin can be classified as deep-sea and contains some unusual features: (1) high homothermia between 300 and 500 m of the bottom in the western basin where temperatures range from 12.8 °C to 13.5 °C, 13.5 °C to 15.5 °C in the east, and (2) 37.5-39.5 psu high salinity. Unlike the Atlantic Ocean, where the temperature drops with depth, there is no thermal limit in the deep sea of the Mediterranean. Shallow waters represent 20% of the total Mediterranean waters compared to 7.6% of the world's oceans and therefore play a significantly larger role than in the world's oceans. The shallow waters in the south are mostly narrow and steep (for example, the coasts of Morocco, Algeria and Libya, except for the Gulf of Gabés), while those in the north are wider (for example, the northern and central Adriatic Sea, the Aegean Sea and the Bay of Lions). These features affect morphology and restrict connections to the Atlantic, Red Sea, and Indian Ocean (Coll et al., 2010).

The closed Mediterranean Basin has a diverse geological history, including being isolated from the world's oceans during the Messinian crisis (5.96 million years ago), which nearly dried out and caused drastic changes in climate, sea level and salinity. Geological history, biogeography, ecology and human history have contributed to the high cultural and biological diversity of the Mediterranean.

The last marine biota in the Mediterranean originated mainly from the Atlantic Ocean, but a wide variety of climate and hydrology contributed to the co-creation and survival of temperate and subtropical organisms. Most of the Mediterranean marine species are endemic. This sea has its own symbolic protection, such as sea turtles, several Cetaceans and the seriously endangered Mediterranean monk seal (*Monachus monachus*). It is the main spawning ground of the eastern Atlantic bluefin tuna (*Thunnus thynnus*). There are many unique and endangered habitats, including endemic *Posidonia oceanica* (seagrass meadows), endemic gastropod *Dendropoma petraeum*, coral reefs, unique species and deep-sea and pelagic habitats that support ecosystems. There are also many sensitive habitats in coastal ecosystems. There are

150 wetlands and 5,000 islands and islets of international importance for marine and migratory birds.

The Mediterranean is a hotspot for marine biodiversity. There are about 17,000 marine species living in the Mediterranean. However, the marine diversity is not yet fully completed. Diversity for microorganisms has not been adequately studied and deep-sea regions and parts of the southern and eastern region are still poorly known. In addition, the invasion of alien species is a crucial factor that will continue to change the biodiversity of the Mediterranean, especially in the eastern basin, which can spread rapidly north and west due to the warming of the Mediterranean. Domestic and industrial settlements are causing a general decline in biodiversity from the northwest to southeast regions. Biodiversity is also higher in coastal areas and continental shelves and decreases with depth. Over time, overfishing and habitat loss have resulted in significant changes in biodiversity as a result of human activities. Currently, habitat loss and degradation, followed by the effects of overfishing, pollution, climate change, eutrophication and alien species invasion are the most important threats and affect the taxonomic groups the most. All these impacts are expected to become important in the future, especially in the context of climate change and habitat degradation.

II.3.3. SCOPE OF PROJECT AREA MARINE ECOSYSTEM STUDIES

Within the scope of the studies in the port area to be built in the sea part of the "Raw Material Supply, Storage and Port Facility Project" license area by the Ceyhan Petrochemical Industrial Zone Management in the Kurtpınar District of Adana Ceyhan district, the marine habitat that may be affected and the algae, zooplanktonic organisms, benthic organisms and fish that make up the food chain in the seas are sampled and the findings are given.

In the study area, the samples described above were taken from 2 different sampling points on 28-29 06 2020 and from 3 different sampling points on 27-28 November 2021, and their identification and examination were carried out.

The following studies were carried out in order to evaluate the effects of the planned filling, dredging and port areas on the marine ecosystem;

- Physical analysis parameters such as the temperature, salinity, electrical conductivity, pH and dissolved oxygen measurements of the marine ecosystem at the designated work stations,

- Detection of sea creatures (macro and microalgae, zoplanktonic organisms, benthic organisms and fish) belonging to the areas to be filled and dredged and identification of the habitats where these creatures are found,
- Identification of rare, sensitive, endemic, protected species/species and their conservation status in the study area,
- To determine the extent to which the marine ecosystem and biodiversity will be affected by the activity.

Biodiversity studies (phytoplankton, zooplankton and benthic organisms) in the marine impact area of the planned works are given in Figure II.3.2..

A total of three different sampling points were selected in the project area and the bottom structure of the selected areas in the open section consists of sand and mud, while the areas near the coast are rocky (Table II.3.1.).

Figure II.3. 2. Marine Sampling Sites

Table II.3. 1. Sampling Stations

Station	Coordinates (Sampling point of fields)	Description
Marine Sampling _1	763492.64 E 4087139.27 N	Rocky areas in the coastal region
Marine Sampling _2	764730.49 E 4087115.34 N	Sampling area approximately 900 m from the shore
Marine Sampling _3	762847.62 E 4085970.01 N	The work station selected as a control point outside the project site

II.3.4. METHODS and FINDINGS

II.3.4.1. Planktonic Organisms

II.3.4.1.1. Materials and Method

In the studies carried out in June 2020 regarding the marine ecosystem planktonic organisms of the port area in the marine part of the project, samples were taken from two stations that were evaluated biologically.

A plankton scoop with 33 µm pore opening, 30 cm diameter and 1 m length was used to detect phytoplanktonic and zooplanktonic organisms from each station determined in the study area (Photos II.3.1 and II.3.2). The plankton scoop was collected by towing a boat 200 m horizontally (for 6 minutes) from the shore and then taken into 250 cc plastic jars. Planktonic samples were fixed by buffering with 4% formaldehyde.

Photograph II.3. 1. Collection of planktonic samples from shore station (June 2020)

Photograph II.3. 2. Collection of planktonic samples (November 2021)

Temporary preparations of algae other than diatoms were prepared from the samples brought to the laboratory, and their diagnosis was made under a Leica microscope and their photographs were taken. Temporary preparations were made by covering the samples taken on the slide with a coverslip and examining them under a microscope.

Permanent preparations are prepared only for the diagnosis of diatom species. Accordingly, acid boiling method was used in order to clearly see the structures such as raphe and citria used in the diagnosis of diatoms (Round, 1973).

For the recognition of zooplanktonic organisms, two types of preparations, temporary and permanent, have been prepared. Temporary preparations were obtained by covering the coverslip on the samples taken on the slide during the study or by directly examining them.

The sources used for the algae and zooplanktonic organisms identified during the studies are given below;

Aysel and ark (2000); Basson (1979); Bold and Wynne (1978); Demirhindi (1972); Dickman (1996); Dumond and Pensaert (1983); Dumont (1981); Dumont and Ridder (1987); Dural and ark. (1989); Dural et al. (1992); Elliot et al. (1982); Emir (1990); Flössner and Krebstieve (1974); Fritsch (1965); Güner et al. (1985); Holme and Mcintyre (1984); Kocataş and Bilecik

(1992); Zeybek and ark (1993); Öztürk (1992); Phyllis et al (1991); Round (1973); Setchhell and Gardner (1967); Songül (1991); South (1976); Tekoğlu (1991); Tsekos and Haritonidis (1977); Ünal et al. (2000); Wetzel (1983)

II.3.4.1.2. Findings Related to Planktonic Organisms

II.3.4.1.2.1. Project Area Phytoplanktonic Organisms and Macro Algae

Algae, which convert carbon dioxide and water into carbohydrates with the effect of light, are primary producers in the aquatic environment, thanks to the pigments in their structure. Thus, it is ensured that the nutritional value and dissolved oxygen ratio in the aquatic environment increase. As a result, they form the first link of the food chain by ensuring their own development. In this way, they are important in terms of their contribution to production and their relations with living things in the upper parts of the chain.

Micro and macro algae species detected in the project area and its immediate surroundings are given in Table II.3.2.

Table II.3. 2. Algae of the Marine Site of the Project Area

BACILLARIOPHYCEAE
Asterolampra marylandica
Bacteriastrum hyalinum
Campylodiscus sp.
Cerataulina pelagica
Chaetoceros affinis
Chaetoceros anastomosans
Chaetoceros constrictum
Chaetoceros costatum
Chaetoceros debile
Chaetoceros didymum
Chaetoceros diversum
Chaetoceros gracile
Chaetoceros lorenzianum
Chaetoceros rostratum
Chaetoceros tetrastichon
Coscinodiscus perforatus
Coscinodiscus radiatus
Cylindrotheca closterium
Dactyliosolen mediterraneus
Ditylum brightwellii
Eucampia zoodiacus
Grammatophorasp.

Guinardia flaccida
Gyrosigma spenceri
Gyrosigma sp.
Gyrosigma tenuissumum
Hemiaulus hauckii
Lauderia borealis
Leptocylindricus danicus
Leptocylindricus minimus
Licmophora abbreviata
Lithodesmium undulatum
Melosira sulcata
Nitzschia longissima
Nitzschia paradoxa
Nitzschia sigma
Odontella mobiliensis
Pleurosigma elongatum
Pleurosigma sp.
Pseudonitzschia pungens
Rhabdonema adriaticum
Rhizosolenia alata f.gracillima
Rhizosolenia calcar-avis
Rhizosolenia imbricata var. shrubsolei
Rhizosolenia robusta
Rhizosolenia setigera
Rhizosolenia sytliformis
Skeletonema costatum
Striatella unipunctata
Surirella fastuosa
Synedra ulna
Thalassionema nitzschioides
Thalassiothrix mediterranea
DINOPHYCEAE
Ceratium biceps
Ceratium breve
Ceratium concilians
Ceratium contortum
Ceratium euarcuatum
Ceratium furca var. furca
Ceratium horridum
Ceratium longirostrum
Ceratium macroceros
Ceratium pentagonum
Ceratium trichoceros
Ceratocorys armata

Ceratocorys gourreti
Ceratocorys horrida
Dinophysis caudata
Dinophysis mitra
Diplopsalis lenticula
Gonyaulax birostris
Gonyaulax diegensis
Gonyaulax polygramma
Gonyaulax turbynei
Heteraulacus sphaericus
Kofoidinium velelloides
Ornithocercus quadratus
Podolampas bipes
Prorocentrum compressum
Prorocentrum micans
Protoperidinium brochi
Protoperidinium depressum
Protoperidinium divergens
Protoperidinium steini
Pyrocystis fusiformis
Pyrophacus horologium
Spiraulax jollifei
CHLOROPHYTA
Anadyomena stellata
Caulerpa prolifera
Cladophora sp.
Chaetomorpha linum
Dasycladus vermicularis
Enteromorpha compressa
Enteromorpha linza
Halimeda tuna
PHAEOPHYTA
Cystoseria barbata
Cystoseria corniculata
Cystoseria foeniculacea
Dictyota dichotoma
Dictyota linearis
Padina pavonia
Sargassum acinarum
Sargassum vulgare
Sphaceleria funcigera
Taonia atomaria
RHODOPHYTA
Acanthophora nayadiformis

Cladostephus spongiosus
Cladostepus verticillatus
Corallina elongata
Dasya corymbifera
Dasya ocellata
Diegena simplex
Halymenia latifolia
Hypneia musciformis
Jania rubens
Laurencia papillosa
Spyridia filamentosa
PRYMNESIOPHYCEAE
Halosphaeria viridis
DICTYOCHOPHYCEAE
Dictyocha fibula

*** Species listed in Annex II of the Barcelona Convention.**

A total of 120 taxa records belonging to 8 different algae divisions were given in the research area. According to the data we have obtained as a result of the sampling, it is seen that phytoplanktonic organisms are more dominant in terms of species diversity than the bound forms. Especially Bacillariophyceae group algae has been the richest class in terms of diversity. 53 taxa belonging to this class, 34 from Dinophyceae, 1 from Chlorophyceae, 10 from Phaeophyceae, 12 from Rhodophyceae, 1 from Prymnesiophyceae and 1 from Dictyochophyceae were found. Some of the species given in the relevant table are supported by literature information.

Only one of the algae species (*Sargassum acinarum*) is included in the Appendix II list (Endangered and Threatened Species List) within the scope of the Barcelona Convention on the Protection of the Mediterranean against Pollution (Protocol on Special Protected Areas and Biological Diversity in the Mediterranean). Accordingly, the parties signing this contract are obliged to prepare and implement action plans for their conservation or recovery by prohibiting the destruction and damage to the habitats of these species.

There are some factors that play a role in the development and distribution of algae in the research area. These are sea water temperature, light transmittance, pH, salinity and dissolved oxygen.

From a large area to the smallest unit area, each region has certain types of algae specific to its temperature. Although the seasonal temperature differences of large areas are much less, the

temperatures of coastal areas change more rapidly. It is possible to see all seasonal as well as annual and perennial plants together in spring and summer, when the rate of photosynthesis is higher than the rate of respiration depending on the temperature.

Algae need light for photosynthesis and show distribution depending on the distribution of light in water. Particles suspended in water prevent light from reaching the lower layers, which negatively affects algae growth. The light transmittance was found to be quite suitable at the sampling date. However, excessive wave movements mix the bottom parts, causing the dunes to mix with the water body. Although this situation poses a temporary problem for the development of algae, it does not create significant problems in terms of biological cycle.

Seawater pH is generally alkaline. This situation also has an effect in the distribution of algae. The groups most affected by pH changes are mostly Brown and Red Algae. There is not a very serious pH increase in the study area and there is no serious input that can affect the pH in sea water.

Considering the dominance values among the divisions, Bacillariophyta was the dominant organism group in the entire study area. Then Pyrrophyta was following Bacillariophyta in terms of numbers. While the density values of Rhodophyta and Chlorophyta were closer to each other, the Phaeophyta division has the lowest density.

It has been determined that the micro and macroalgae species in the stations examined within the scope of the marine ecosystem studies of the project area show a systematic and ecologically healthy development. It is thought that there will not be any negative development for algae species as a result of an impact caused by the port works planned to be carried out in the area.

II.3.4.1.2.2. Zooplanktonic Organisms

Cladocera and Copepoda, which form an important group of zooplanktonic organisms, are groups of very small, mostly microscopic animals. Most of the species belonging to the order Cladocera are distributed in fresh waters. Species such as Podon, Euadne and Penilia are marine.

The results of the zooplanktonic sampling carried out in the marine area of the Project are given in Table II.3.3.

Table II.3. 3. Zooplanktonic Organisms of the Marine Area of the Work Site

COPEPODA
Acartia clausi
Acartia discaudata
Acartia grani
Acartia negligens
Calocalanus pavo
Calocalanus pavoninus
Calonopia elliptica
Calanus gracilis
Calanus tenuicornis
Candacia armata
Centropages furcatus
Centropages kroyeri
Coryceaus spp.
Corycaeus clausi
Clausocalanus arcuicornis
Clausocalanus furcatus
Euterpina acutifrons
Labidocera pavo
Mecynocera clausi
Paracalanus parvus
Temora stylifera
Oithona helgolandica
Oithona nana
Oithona plumifera
Oithona spinirostris
Pontella mediterranea
Oncea media
Oncea mediterranea
Clytemnestra scutellata
CLADOCERA
Evadne spinifera
Evadne tergestina
Penilia avirostris
Podon polyphemoides
OTHER HOLOPLANKTON
Amphipoda
Radiolaria
Appendicularia
Chaetognatha
Doliolida
Foraminifera

Heteropoda
Pterepoda
Siphonophora
MEROPLANKTON
Fish larvae
Bivalvia
Cirripedia
Decapoda
Echinodermata
Gastropoda
Polychaeta

In the marine food chain, carbohydrates, fats and proteins are first synthesized by phytoplanktonic algae groups and pass from there to higher nutrient levels. This vegetable protein first transforms into animal protein in the Crustacea group of zooplankton. Copepods are the most important group of zooplankton in most of the seas and oceans. Copepods are the dominant zooplankton forms throughout warm oceans. Copepods have a very important link in the food chain for creatures that need animal protein in the marine environment, as they convert vegetable protein to animal protein.

Copepoda is the most dominant group among zooplanktonic organisms and is represented by 29 species. *Temora stylifera, Acartia clausi, Oithona nana, Paracalanus parvus* taxa belonging to Copepoda class are dominant organisms. *Evadne spinifera* are also the most dominant taxa in Cladocera. These are true planktonic organisms and are called Holoplankton. Apart from this, there are creatures that spend only one period of their life in a water body and continue their other periods in different environments, and these are called Meroplankton.

Among all zooplanktonic groups, Copepods have a significant dominance at all stations in terms of both species number and density. Cladocera comes next, and the number and density of species belonging to other groups is quite low.

The zooplanktonic organisms examined in the marine ecosystem of the project area consist of common and abundant species observed in the Mediterranean. Species numbers and densities of zooplankton organisms will not be adversely affected by port construction and operation.

II.3.4.2. Benthic Organisms

II.3.4.2.1. Materials and Methods

Ceyhan Energy Specialization Industrial Zone Raw Material Supply, Storage and Port Facility project sampling was carried out to determine the existing zoobenthic organisms that live buried in the sediment in the marine area of the port, and to determine their qualitative and quantitative status in Van Veen Grap and the coastal area from the selected stations (Photo. II.3.3- II.3.6).

The benthic material taken was washed with sea water in the field and sieved, and the living things remaining on the sieve were placed in plastic bags containing 5% formaldehyde and then stored in 5-liter plastic containers. The samples brought to the laboratory were first washed in a sieve with fresh water. Then, the organisms were examined under a binocular stereomicroscope, and the obtained organisms were divided into systematic groups to which they belonged and placed in tubes containing 70% alcohol. After the determination of the species, the table containing the species lists was prepared.

Photograph II.3. 3. Benthic Bucket Sampling (June 2020)

Photograph II.3. 4. Straining Samples through Sieves (June 2020)

Photograph II.3. 5. Benthic Bucket Sampling (November 2021)

Photograph II.3. 6. Straining Samples through Sieves (November 2021)

II.3.4.2.2. Findings Concerning Benthic Organisms

In order to determine the results of any human or other sourced impact on a natural marine environment, it is necessary to know the current diversity of the living life in that region. In particular, most of the benthic invertebrates are widely used to monitor possible changes in the marine environment. Because these invertebrates are in direct contact with the water column and most species live by fixing themselves in one place, they immediately react to any impact that may occur in the environment. In marine environments, depending on various activities, weakening of oxygen in the bottom water, increase in the amount of total sulfide in the sediment, temporary faunal deterioration, remarkable changes in benthic fauna, and significant decreases in the biomass of benthic communities and the number of species can be observed (Tsutsumi et al., 1991). In order to understand the deterioration of fauna in the region, benthic creatures are the creatures that best reflect the degree of this effect.

The benthic species identified by us in the area are given in Table II.3.4.

Tablo II.3. 4. Benthic Creatures Detected

CNIDARIA
Cerianthus sp.
Aiptasia diaphana
Parazoanthus axinellae
Caryophyllia smithii
Caryophyllia sp.
Balanophyllia sp.
Apolemia uvaria
Gymnangium sp.
Eudendrium sp.
Tubularia sp.
Aurelia aurita
NEMERTINI
Nemertini sp.
ECHIURA
Bonellia viridis
ANNELIDA
POLYCHAETA
Aonides oxycephala
Aricidea sp.
Capitellidae (sp.)
Cirratulus sp.
Cossura sp.
Gleycera cf rouxi
Glycea tridactyla
Harmohoe impar
Harmothoe sp.
Hteromastus filiformis
Lumbrinerides cf amoureuxi
Lumbrineris sp.
Magelona papillicornis
Malaccoceros sp.
Monticellina heterochaeta
Nephths caeca
Nephthys sp.
Neridines sp.
Nerine cf cirratulus
Notomastus latericeus
Paradoneis lyra
Ploynoidae (sp.)
Pomatoceros trigueter
Prinospio cf. Cirrifera
Prinospio fallax
Prinospio sp.
Sigalion cf. Mathildae
Sigambra parva

Spio filicornis
Spio sp.
Spiochaepterus costarum
Spionidae sp.
Spiophanes bombyx
Pomatoceros trigueter
ARTHROPODA
Alpheus glaber
Ampelisca brevicornis
Anomura sp.
Apseudes latreillei
Bathyporeia lindstromi
Chthamalus stellatus
Erugosquilla massavensis
Leucothoe richiardii
Macrophthalmus graeffei
Macropthalmus graeffei
Macropthalmus graeffei
Penaeus semisulcatus
Portunus latipes
Portunus segnis
Upogebia pusilla
Urothoe grimaldii
MOLLUSCA
GASTROPODA
Abra prismaica
Acteon tornatilis
Anachis savignyi
Brachidontes pharaonis
Bittium reticulatum
Bittium reticulatum
Brittium submamillatum
Gibbula adansonii
Caecum trachea
Littorina sp.
Loripes lacteus
Macoma cumana
Myrtea spinifera
Nassarius gibbosulus
Nassarius sp.
Patella caerulea
Patella rustica
Patella ulyssiponensis
Smaragdia viridis
Diodora graeca
Haliotis tuberculata
Trochus erythreus

Calliosoma granulatum
Gibbula divaricata
Gibbula umbrilicaris
Monodonta articulata
Monodonta turbinata
Tricolia pallus
Cerithium rupestre
Cerithium vulgatum
Rhinoclavis kochi
Finella pupoides
Pirenella conica
Turritella communis
Littorina neritoides
Littorina punctata
Rissoina bruguiri
Rissoina bertholleti
Strombus decorus
Aporrhais pespelecani
Vermetus rugulosus
Vermetus triquetrus
Petalonochus glomeratus
Serpulorbis arenaria
*Erosaria spurca**
Neverita josephinia
*Tonna galea**
Galeodae echinophora
Phalium granulatim
Janthina nitens
Bolinus brandaris
Hexaplex trunculus
Ocenebra edwardsii
Pisania striata
Pollia dorbignyi
Fusinus rostratus
Nassarius mutabilis
Thais lacera
Columbella rustica
Conus mediterraneus
Bela brachystoma
OPISTOBRANCHIA
Bulla striata
Elysia viridis
Umbraculum umbraculum
PULMONATA
Auriculinella erosa
Ovatella firminii
Ovatella myosotis

Tellina sp.
BIVALVIA
Arca noae
Barbatia barbata
Scapharca natalensis
Striarca lactea
Glycymeris bimaculata
Glycymeris glycymeris
Mytilus galloprovincialis
Brachidontes pharaoneis
*Lithophağa lithophaga**
Amygdalum agglutinans
Pteria hirundo
Pinctada radiata
Malleus regulus
Pecten jacobeus
Chlamys varia
Anomia ephippium
Lima lima
Ostrea edulis
Loripes lacteus
Chama gryphoides
Glans trapezia
Glans aculeata
Venericardia antiquata
Acanthocardia aculeata
Mactra stultorum
Solen marginatus
Ensis ensis
Tellina tenius
Tellina planata
Donax semistriatus
Donax trunculus
Pharus legumen
Timoclea ovata
Chamemea gallina
Pitar rudis
Tapes decussatus
Venerupis senegalensis
*Pholas dactylus**
Dentalium dentalis
Dentalium vulgare
CEPHALOPODA
Sepia elegans
Sepia officinalis
Sepiola rondeleti
Loligo vulgaris

Octopus macropus
Octopus vulgaris
Eledone moschata
Argonauta argo
Striarca lactea
Modiolus adriaticus
Tellina pulchella
Donax venustus
Abra alba
Venus verrucosa
Dosinia lupinus
Paphia lucens
BRYOZOA
Reptadeonella violacea
Aetea truncata
Schizomavella sp.
Bugula sp.
Crisia sp.
Plagioecia sarniensis
Disporella hispida
Reteporella aporosa
Rynchozoon sp.
Savignyella lafontii
Frondipora verrucosa
ECHINODERMATA
OPHIUROIDEA
Amphiopholis squamata
ECHINOIDEA
Echinocardium cordatum
CHORDATA
Saccoglossus sp.

*** Species included in Annex II List of the Barcelona Convention.**

Mollusca species, which are represented in almost all biotopes in marine ecosystems and include the most characteristic species of soft soils, are also the indicator group of communities that are polluted or under stress as a result of anthropogenic effects. However, it is seen that this area is clean according to the results of the water chemistry parameters and there is no organic pollution. Therefore, the abundance of Mollusca species diversity in the environment is entirely due to the composition of the bottom structure of sand, sand-gravel and rock.

In general, the identified benthic invertebrates appear to have a wide distribution in the Aegean and Mediterranean Seas, and they are all distinct species of a clean marine environments.

According to the sampling and literature information in the study area, 200 benthic invertebrate species belonging to 9 branches were identified. Of these, 11 belong to the Cnidaria, 1 Echiura, 124 Mollusca, 16 Arthropoda, 34 Annelida and 11 Bryozoa, 2 Echinodermata and 1 Chordata groups. As can be seen, the most identified group was the Mollusca phylum. Since a significant part of the species belonging to the Mollusca phylum are crustacean individuals, they have been easily accessed and identified, especially in coastal areas. In terms of the number of species, the other dominant group was the Arthropoda (see Table II.3.4).

Four of these Molluska species are included in the Annex II list (Endangered and Threatened Species List) under the Barcelona Convention on the Protection of the Mediterranean Sea from Pollution (Protocol on Special Protected Areas and Biological Diversity in the Mediterranean). Accordingly, the parties signing this contract are obliged to prepare and implement action plans for their conservation or recovery by prohibiting the destruction and damage to the habitats of these species.

According to all sampling results for benthic organisms, Mollusca was represented with the highest number of individuals in sandy and macroalgae-dominated environments. Polychaeta were represented with more individuals in areas with muddy bottom, Crustacea in areas with sandy and macroalgae.

It has been observed that the sampling areas closer to the shore are richer in terms of species diversity and density compared to the deeper regions. This situation can be attributed to the intense inter-species relationship in the littoral region. Littoral regions, which have sufficient conditions in terms of abiotic factors such as temperature, light, nutrients and dissolved oxygen, are also suitable areas for benthic organisms.

Portunus segnis, Erugosquilla massavensis and *Sepia officinalis* are the most common benthic species caught in fishing nets in the study area (Photos II.3.7 and II.3.9) .

Photograph II.3. 7. *Portunus segnis*

Photograph II.3. 8. *Erugosquilla massavensis*

Photograph II.3. 9. *Sepia officinalis*

When the study area is evaluated in terms of benthic creatures; It is possible to describe the region as an environment that is not under any pollution pressure and has an undisturbed ecosystem. Although there will be negative effects on benthic organisms in the construction works of the planned port, the environment will be restored in a short time and no negative effects will be observed during the operation period..

II.3.4.3. Marine Vertebrates

II.3.4.3.1. Materials and Methods

Fish samplings were carried out by laying 5000 m net throughout the marine project area. Accordingly, after the fishing nets with various pore diameters were laid along the line given in Figure II.3.3, they were kept for one day and the fish in the nets were collected and identified the next day. While deploying the fish nets, a route was used to go from the coast to the open areas and to pass through the project site.

Images of the boat used for the nets and their laying are given in Photograph II.3.10-II.3.13.

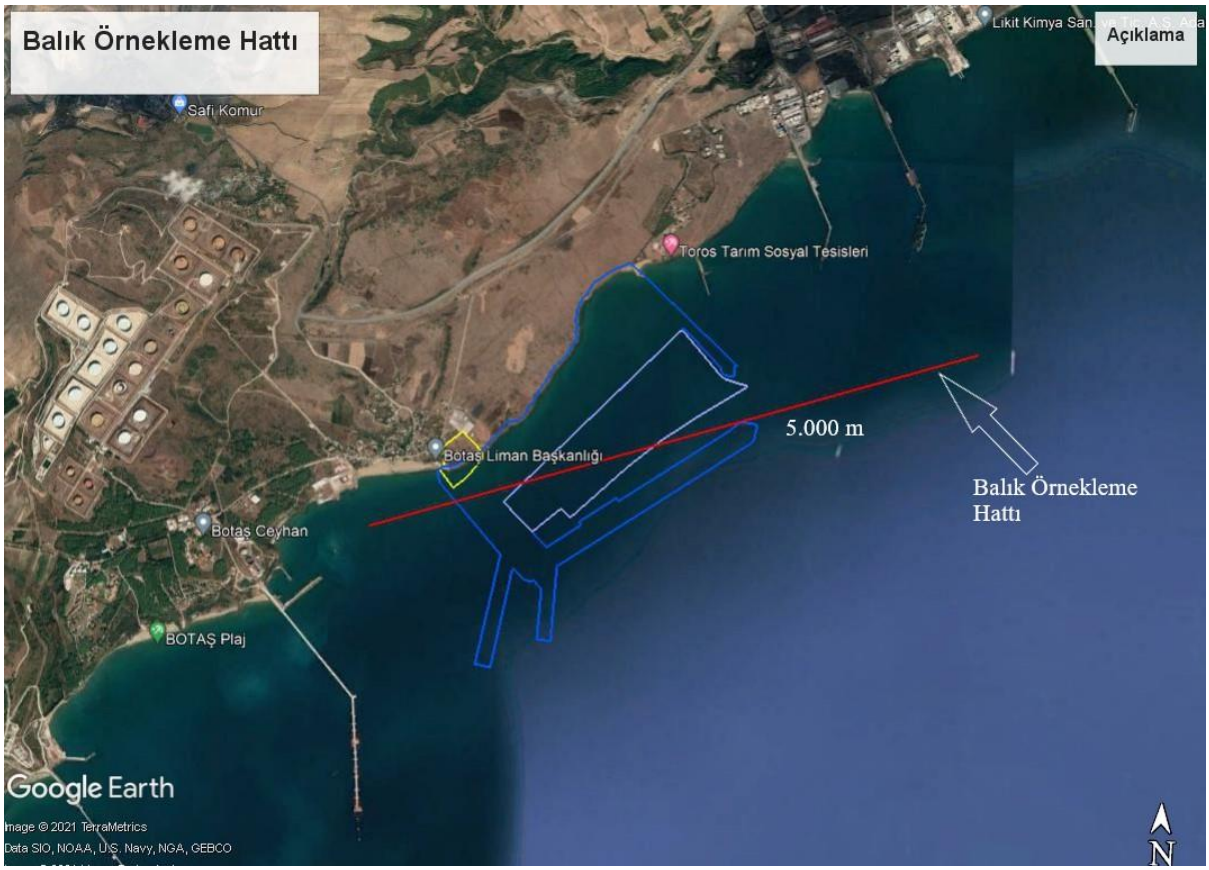


Figure II.3. 3. 5,000 m line where Fishing Nets were laid

Photograph II.3. 10. Laying fishing nets _1

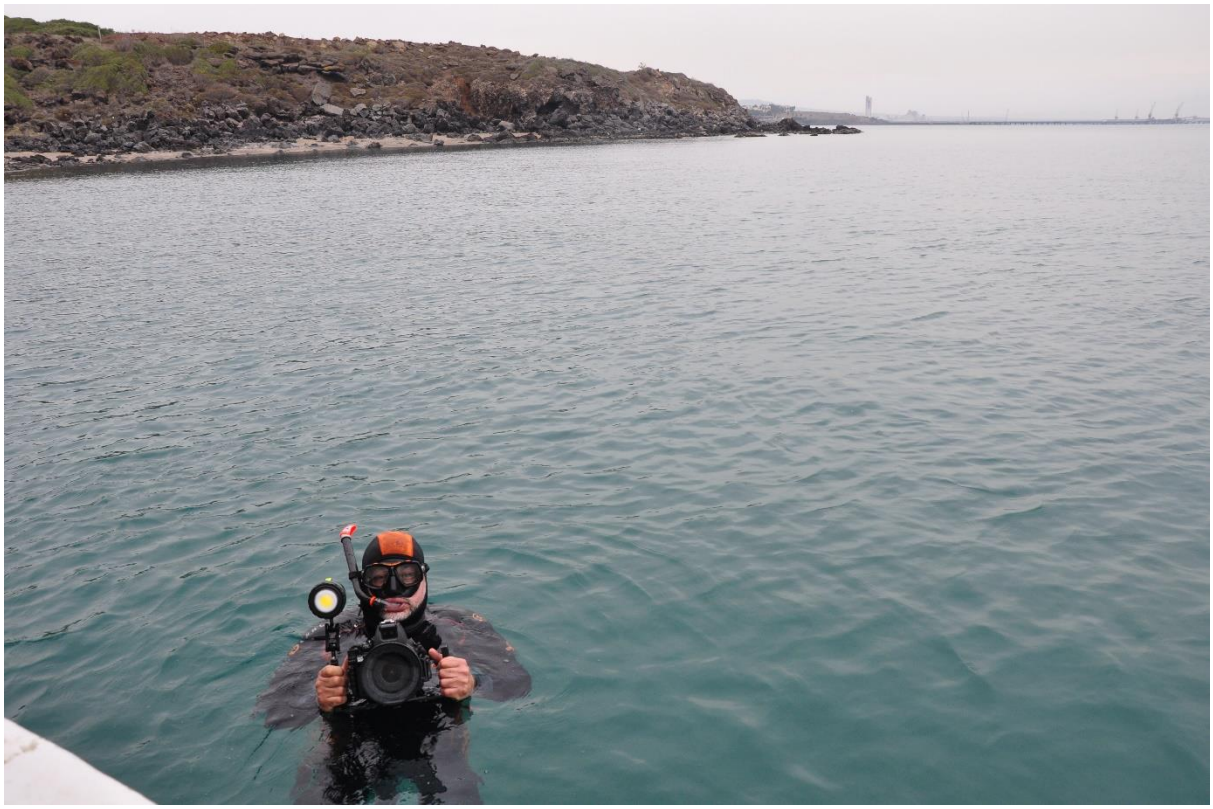
Photograph II.3. 11. Laying fishing nets _2

Photograph II.3. 12. Laying fishing nets _3

Photograph II.3. 13. Laying fishing nets _4

In addition, biotope (habitat) structure and status information and macro biological diversity were determined by applying the Underwater Visual Counting (SGS) technique. During these studies, imaging techniques (photo - camera) were also applied (Photo II.3.14-II.3.15).

Photograph II.3. 14. Diving studies for underwater observation _1



Photograph II.3. 15. Diving studies for underwater observation _2

Among the different sampling techniques used to assess the diversity of macro fauna and flora in the marine ecosystem, SGS has been adopted to study shallow and near coastal habitats (which may have heterogeneous substrates such as artificial reefs, rocks or corals) (De Girolamo, Mazzoldi, 2000).

The regions visited during SCUBA and snorkeling dives were also evaluated in terms of the general condition of the marine environment and biodiversity. Underwater Visual Counting (SGS) technique was used in biodiversity assessment studies.

The sources used for the fish identification during the studies are given below.; Bibby, et al., 1998, Bilecenoğlu, M. (2005), Claudet and Fraschetti (2010), El-Din (2004), Fischer, et al. (1987a), Fischer et al. (1987b), Fishbase (2014), Golani (1996), Golani (2002), Gözcelioğlu ve Aydıncılar (2001), Kocataş ve Bilecik (1992), Öztürk ve ark. (2003), Whitehead et al. (1984a), Whitehead et al. (1984b), Whitehead et al. (1984c).

II.3.4.3.2. Findings Related to Marine Vertebrates

Fish are important biological components in the upper ring of aquatic systems. Ecologically, fish that feed on algae, zooplankton or benthic organisms are at the top of the chain in the water. Birds and finally humans complete the upper links of the chain. It constitutes an important input source in terms of economic as well as ecological importance.

In Table II.3.5,in terms of conservation studies, marine mammals and fish observed are listed. Detailed information regarding Sea turtles and Mediterranean monk seals were provided as a seaparate report within the scope of this study. However, three species of marine mammals (Stenella coeruleoalba, Balaenoptera physalus and Monachus monachus) are listed in this report. These species are likely to use the area for feeding purposes only. Apart from this, there is no suitable habitat for nesting or long-term stay in the study area. There are no caves where the seals can breed and breed. However, since seals are very good wandering creatures, the entire Mediterranean ecosystem constitutes the feeding and living areas of these creatures. For this reason, even if there is a low probability, they can visit this region and feed. The built port does not pose a risk to the life of the seals during its construction and operation.

As a result of the sampling and literature studies, 82 fish species and 3 marine mammal species belonging to 2 families and a total of 85 marine vertebrate species records are reported in the project area and its immediate surroundings. 39 of these species were caught and identified in

the samplings made by us. Information on the protection status of these species under international conventions is also given in Table II.3.5.

In terms of international protection status, the red list of the IUCN institution, the species in the Annex lists of the Bern Convention and the supplementary lists of the CITES Convention on the international trade of plant-animal species were used as a base.

Accordingly, 5 species in the CR category (critically endangered), 3 species in the EN (endangered) category, 11 species in the VU (sensitive) category, 3 species in the NT (close to extinction) category, 51 species in the LC (low risk) category. 2 species in NE (not evaluated) category and 9 species in DD (data missing) category within the IUCN red list.

According to the Bern convention annexes, 4 species are included in Appendix II and 4 types are included in Appendix III lists. Species in Annex II are known as species in need of protection, while those in Annex III are classified as species in need of protection. According to the CITES convention, 2 species are on the Annex I list, while 3 species are on the Annex II list. While the trade of living things in the CITES Annex I list is strictly prohibited, the trade of the animals in the Annex II list is allowed in a controlled manner. According to the Barcelona contract annexes, 6 species are in Annex II and 5 species are in Annex III.

The fish species caught according to the results of the observation and sampling made by us in the Project Area and its immediate surroundings are given in Photograph II.3.16- II.3.58.

Table II.3. 5. Marine Vertebrates (Fish and Marine Mammals) Detected in the Project Area and Its Neighborhood

Order	Family	Species	Observation/Literature	IUCN Red List	Bern	CITES	Barcelona
Lamniformes	**Lamnidae**	***Isurus oxyrinchus***	**Observation**	**CR**	**Annex III**	**Annex II**	**Annex II**
Carcharhiniformes	Triakidae	*Mustelus mustelus*	Literature	VU	--	--	Annex III
Myliobatiformes	Dasyatidae	*Dasyatis pastinaca*	Observation	VU	--	--	
Myliobatiformes	Dasyatidae	*Bathytoshia centroura*	Literature	VU	--	--	
Myliobatiformes	Dasyatidae	*Dasyatis marmorata*	Observation	DD	--	--	
Myliobatiformes	**Myliobatidae**	***Aetomylaeus bovinus***	**Literature**	**CR**	**--**	**--**	
Myliobatiformes	Myliobatidae	*Myliobatis aquila*	Observation	VU			
Rajiformes	**Gymnuridae**	***Gymnura altavela***	Literature	**CR**	**--**	**--**	**Annex II**
Rajiformes	Rajidae	*Raja clavata*	Literature	NT	--	--	
Rajiformes	Rajidae	*Raja miraletus*	Literature	LC	--	--	
Rajiformes	**Rajidae**	***Raja radula***	**Literature**	**EN**	**--**	**--**	
Rhinopristiformes	**Rhinobatidae**	***Rhinobatos rhinobatos***	Observation	**EN**	**--**	**--**	**Annex II**
Rajiformes	Rhinopteridae	*Rhinoptera marginata*	Literature	DD	--	--	
Rajiformes	Torpedinidae	*Tetronarce nobiliana*	Literature	LC	--	--	
Rajiformes	Torpedinidae	*Torpedo marmorata*	Observation	LC	--	--	
Anguilliformes	**Anguillidae**	***Anguilla anguilla***	**Literature**	**CR**	**--**	**Annex II**	**Annex III**
Aulopiformes	Synodontidae	*Saurida undosquamis*	Observation	LC	--	--	
Aulopiformes	Synodontidae	*Synodus saurus*	Literature	LC	--	--	
Clupeiformes	Dussumieriidae	*Dussumieria acuta*	Literature	LC	--	--	
Clupeiformes	Engraulidae	*Engraulis encrasicolus*	Observation	LC	--	--	
Gadiformes	Merlucciidae	*Merluccius merluccius*	Observation	VU	--	--	

Order	Family	Species	Observation/Literature	IUCN Red List	Bern	CITES	Barcelona
Beloniformes	Belonidae	*Belone belone*	Observation	LC	--	--	
Lophiiformes	Lophiidae	*Lophius piscatorius*	Literature	LC	--	--	
Mugiliformes	Mugilidae	*Chelon auratus*	Observation	LC	--	--	
Mugiliformes	Mullidae	*Mullus barbatus*	Observation	LC	--	--	
Mugiliformes	Mullidae	*Mullus surmuletus*	Observation	LC	--	--	
Acanthuriformes	Siganidae	*Siganus luridus*	Observation	LC			
Acanthuriformes	Siganidae	*Siganus rivulatus*	Literature	LC	--	--	
Perciformes	Nemipteridae	*Nemipterus randalli*	Observation	LC			
Perciformes	Serranidae	*Serranus scriba*	Observation	LC			
Clupeiformes	Sciaenidae	*Argyrosomus regius*	Literature	LC	--	--	
Carangiformes	Carangidae	*Caranx crysos*	Literature	LC	--	--	
Carangiformes	Carangidae	*Seriola dumerili*	Literature	LC	--	--	
Carangiformes	Carangidae	*Lichia amia*	Observation	DD	--	--	
Carangiformes	Carangidae	*Trachurus trachurus*	Observation	LC	--	--	
Carangiformes	Echeneidae	*Echeneis naucrates*	Literature	DD	--	--	
Perciformes	Sillaginidae	*Sillago suezensis*	Observation	NE	--	--	
Perciformes	Sciaenidae	*Sciaena umbra*	Literature	VU	Annex III	--	Annex III
Perciformes	Scianedae	*Umbrina cirrosa*	Observation	VU	Annex III	--	Annex III
Perciformes	Sparidae	*Boops boop*	Observation	LC	--	--	
Perciformes	Sparidae	*Boops salpa*	Literature	LC	--	--	
Perciformes	Sparidae	*Dentex dentex*	Literature	VU	--	--	
Perciformes	Sparidae	*Diplodus annularis*	Literature	LC	--	--	
Perciformes	Sparidae	*Diplodus cervinus*	Literature	LC	--	--	

Order	Family	Species	Observation/Literature	IUCN Red List	Bern	CITES	Barcelona
Perciformes	Sparidae	*Diplodus sargus*	Literature	LC	--	--	
Perciformes	Sparidae	*Diplodus vulgaris*	Literature	LC	--	--	
Perciformes	Sparidae	*Sarpa salpa*	Literature	LC	--	--	
Perciformes	Sparidae	*Lithognathus mormyrus*	Observation	LC	--	--	
Perciformes	Sparidae	*Oblada melanura*	Observation	LC	--	--	
Perciformes	Sparidae	*Pagellus erythrinus*	Observation	LC	--	--	
Perciformes	Sparidae	*Pagellus mormyrus*	Literature	LC	--	--	
Perciformes	Sparidae	*Pagrus caeruleostictus*	Literature	DD	--	--	
Perciformes	Sparidae	*Sparus aurata*	Observation	LC	--	--	
Perciformes	Sparidae	*Spicara maena*	Literature	LC	--	--	
Perciformes	Moronidae	*Dicentrarchus labrax*	Observation	NT	--	--	
Perciformes	Serranidae	*Epinephelus costae*	Observation	DD	--	--	
Perciformes	**Serranidae**	***Epinephelus marginatus***	**Literature**	**EN**	**Annex III**	--	**Annex III**
Perciformes	Haemulidae	*Pomadasys stridens*	Literatür	LC	--	--	
Perciformes	Trachinidae	*Trachinus draco*	Observation	LC	--	--	
Perciformes	Trachinidae	*Trachinus araneus*	Observation	LC			
Perciformes	Uranoscopidae	*Uranoscopus scaber*	Observation	LC	--	--	
Mulliformes	Mullidae	*Upeneus moluccensis*	Observation	LC	--	--	
Scombriformes	Pomatomidae	*Pomatomus saltatrix*	Literature	VU	--	--	
Scombriformes	Scombridae	*Scomber japonicus*	Literature	LC	--	--	
Scombriformes	Trichiuridae	*Trichurus lepturus*	Literature	LC	--	--	
Gobiiformes	Gobiidae	*Gobius niger*	Observation	LC	--	--	
Acanthuriformes	Leiognathidae	*Equulites klunzingeri*	Literature	NE	--	--	

Order	Family	Species	Observation/Literature	IUCN Red List	Bern	CITES	Barcelona
Labriformes	Labridae	*Xyrichtys novacula*	Observation	LC			
Pleuronectiformes	Soleidae	*Monochirus hispidus*	Literature	DD	--	--	
Pleuronectiformes	Soleidae	*Pegusa lascaris*	Literature	DD	--	--	
Pleuronectiformes	Soleidae	*Solea solea*	Observation	DD	--	--	
Scorpaeniformes	Scorpaenidae	*Pterois miles*	Observation	LC			
Scorpaeniformes	Triglidae	*Trigla lyra*	Literature	LC	--	--	
Scorpaeniformes	Triglidae	*Chelidonichthys lucerna*	Observation	LC	--	--	
Dactylopteriformes	Dactylopteridae	*Dactylopterus volitans*	Literature	LC	--	--	
Syngnathiformes	Syngnathidae	*Nerophis ophidion*	Literature	LC	--	--	
Tetraodontiformes	Balistidae	*Balistes capriscus*	Literature	DD	--	--	
Tetraodontiformes	Tetraodontidae	*Lagocephalus spadiceus*	Literature	LC	--	--	
Tetraodontiformes	Tetraodontidae	*Lagocephalus suezensis*	Observation	LC	--	--	
Tetraodontiformes	Monacanthidae	*Stephanolepis diaspros*	Observation	LC	--	--	
Zeiformes	Zeidae	*Zeus faber*	Literature	LC	--	--	
Cetacea	Delphinidae	*Stenella coeruleoalba*	Literature	VU	Annex II	Annex II	Annex II
Cetacea	Balaenopteridae	*Balaenoptera physalus*	Literature	VU	Annex II	Annex I	Annex II
Carnivora	**Phocidae**	***Monachus monachus***	**Literature**	**CR**	**Annex II**	**Annex I**	Annex II

*** Species marked in bold were designated as critical.**

**** Species marked in gray are the fish observed and caught in this study.**

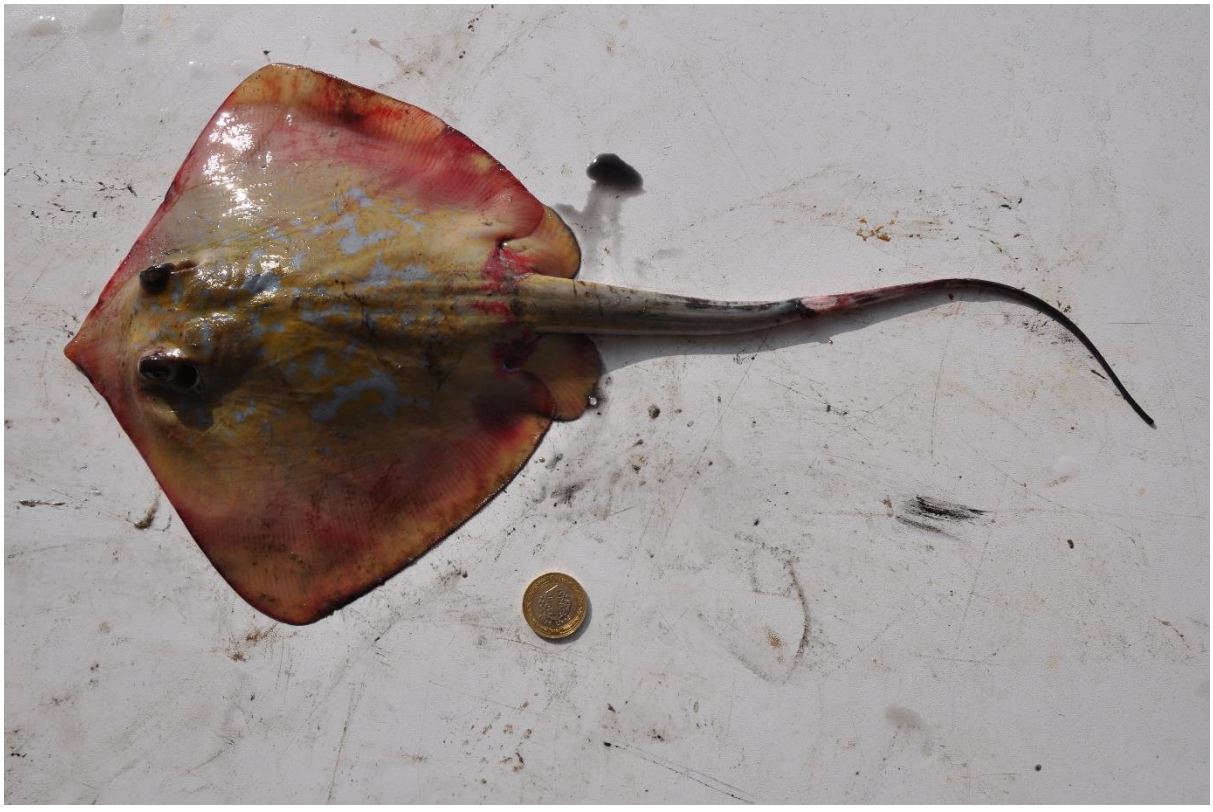
Photograph II.3. 16. Aggregate view of sampled species _1

Photograph II.3. 17. Aggregate view of sampled species _2

Photograph II.3. 18. *Isurus oxyrinchus*

Photograph II.3. 19. *Isurus oxyrinchus*

Photograph II.3. 20. *Dasyatis pastinaca*



Photograph II.3. 21. *Dasyatis marmorata*

Photograph II.3. 22. *Myliobatis aquila*

Photograph II.3. 23. *Rhinobatos rhinobatos*

Photograph II.3. 24. *Torpedo marmorata*

Photograph II.3. 25. *Saurida undosquamis*

Photograph II.3. 26. *Engraulis encrasicolus*

Photograph II.3. 27. *Merluccius merluccius*

Photograph II.3. 28. *Belone belone*

Photograph II.3. 29. *Chelon auratus*

Photograph II.3. 30. *Mullus barbatus*

Photograph II.3. 31. *Mullus surmuletus*

Photograph II.3. 32. *Siganus luridus*

Photograph II.3. 33. *Nemipterus randalli*

Photograph II.3. 34. *Serranus scriba*

Photograph II.3. 35. *Lichia amia*

Photograph II.3. 36. *Trachurus trachurus*

Photograph II.3. 37. *Sillago suezensis*

Photograph II.3. 38. *Umbrina cirrosa*

Photograph II.3. 39. *Boops boops*

Photograph II.3. 40. *Oblada melanura*

Photograph II.3. 41. *Lithognathus mormyrus*

Photograph II.3. 42. *Pagellus erythrinus*

Photograph II.3. 43. *Sparus aurata*

Photograph II.3. 44. *Dicentrarchus labrax*

Photograph II.3. 45. *Epinephelus costae*

Photograph II.3. 46. *Pomadasys stridens*

Photograph II.3. 47. *Trachinus draco*

Photograph II.3. 48. *Trachinus araneus*

Photograph II.3. 49. *Uranoscopus scaber*

Photograph II.3. 50. *Upeneus moluccensis*

Photograph II.3. 51. *Gobius niger*

Photograph II.3. 52. *Xyrichtys novacula*

Photograph II.3. 53. *Solea solea*

Photograph II.3. 54. *Pterois miles*

Photograph II.3. 55. *Pterois miles*

Photograph II.3. 56. *Chelidonichthys lucerna*

Photograph II.3. 57. *Lagocephalus suezensis*