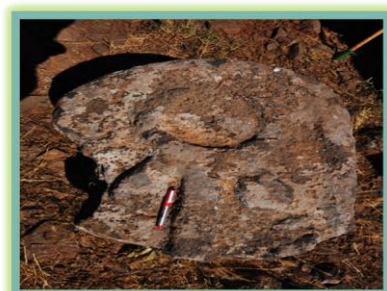


SC-SEC-2018-04

SURVEYS AND ASSESSMENTS ON BIODIVERSITY, SOCIO-ECONOMIC AND SOCIO-CULTURAL ASPECTS, ONGOING GRAZING ACTIVITIES AND LIVESTOCK SITUATION



# *KARACADAĞ*

## *Steppes*



## *FINAL REPORT*

### *SUMMARY*

## SUMMARY

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### 1. General Landscape Features

**1.1. Main Results;** Karacadağ is the extinct volcanic mountain spreading over an oval-shaped area of 120 km in diameter with approximately 2000 meters of thickness. It consists mainly of poor vegetation cover area. Continental climate is dominant and generally composed of Basaltic Soil Group with a few parts of rocky areas. The region has been inhabited since the Chalcolithic Age (7000 BC). The area has four different Landscape Character Types and Six Different Landscape Character Areas.

**1.2. Recommendations;** The vegetative process is unable to complete its lifecycle due to early grazing and overgrazing in the area. For the maintenance of plant diversity, certain regions should be protected and overgrazing should not be allowed in these regions.

### 2. Biodiversity

**2.1. Main Results;** In terms of vegetation, Karacadağ is in the Iran-Turanian phytogeographical region with Iran-Turanian steppes classified as low mountain steppes depending on the elevation and as malacophile and tragantic steppe in terms of physiological features. According to the EUNIS habitat types classification, it is located in Iran-Anatolian steppe habitat class defined as E1.2E habitat code. The vascular plants of Karacadağ represent 44 families, 199 genera and 332 taxa, 15 of which are endemic. 41 taxa (including 1 endemic) were identified as new local records. There are nearly 55 taxa and 34 genera belonging to 55 families of Cryptogamae group. All Cryptogam taxa are reported for the first time from the Karacadağ Steppes. There are 99 species belonging to 15 orders and 53 families in the Karacadağ under the Insects groups. In terms of Herpetofauna, there are 16 species including 3 species of amphibians, 8 species of lizards, 3 species of snakes and 2 species of turtle. In terms of Avifauna, there are 84 bird species belonging to 38 families and 21 species were included as new records for this area. There are 8 species belonging to the Rodentia (Rodents) order identified under the small mammals and 6 species belonging to Rabbits, Predators and Ungulates identified in the Karacadağ steppes under the large mammals. Karacadağ Steppe is a particularly important area in terms of Karacadağ rice with its related traditional knowledge. Karacadağ Steppes accommodate the populations of wild siyez (*Triticum diccoccoides*) and wild gernik (*Triticum boeoticum*) species, which are known as the ancestors of wheat and gen parents (genitor) in the emergence of modern wheat.

**2.2. Recommendations;** Rare and endemic plant specimens and seeds should be sent to gene banks and / or investigating onsite (*in-situ*) conservation opportunities, and providing incentives and support for the cultivation of some steppe plants in habitats suitable for their habitats, enriching these areas with local species specific for the purpose of increasing species diversity. The Karabahçe mountain road, Kollubaba Hill and Simo Creek sections together with other biodiversity important points should be conserved and the integrated management plan should be prepared to conserve both species and genetic resources in the region. The afforestation area in Karacadağ does not have negative effects on species and steppe ecosystem. However, monitoring and observing the positive and negative effects of steppe ecosystem and steppe species over time. Areas in Karacadağ are important gene points for conservation of genetic diversity. The “Globally Important Agricultural Heritage Sites (GIAHS)” approach can be considered as an alternative approach when preparing conservation plans in the region. Relevant Oak Forest, Karacadağ Afforestation Area, Karacadağ Honey Forest and Soydan Irrigation Pond are recommended areas for monitoring the flora and fauna species. **A preliminary study and species action plans for the determination of the current status of wild pea (*Pisum sativum*), wild wheat (*Triticum diccoccoides* and *triticum boeoticum*, *A. triuncialis*, *A. biuncialis*, *A. Columnaris* etc.) , lentil (*Lathyrus cicero* subsp. *Orientalis*), chickpea (*Cicer sp.*), *Lathyrus trachycarpus*, *Paracarium kurdistanicum*, *Hesperis hedgeri* species unique to Karacadağ.**

### **3. Socio-Cultural and Socio-Economic Aspects**

#### **3.1. Main Results;**

The tribal system has long been strong in the settlements. The economy is generally based on agriculture and animal husbandry, and trade is low. Karacadağ is still an important area for nomadic livestock breeding.

**3.2. Recommendations;** Basic recommendations for social aspects include; conducting studies on product diversity, performing demo studies on closed soilless vegetable production encouraging villagers to be carried out through cooperative initiatives, establishment of forage supply facilities, mushroom cultivation for women, pilot activities such as poultry farming, development of products for rural tourism and integration of tourism activities with agriculture.

### **4. Ongoing Grazing Activities**

**4.1. Main Results;** In 27 settlements within Karacadağ project area, there are 255676 ruminants, 30569 cattle and 195 breeds of culture. There are 446961 ha rangeland in the area. Karacadağ steppe pastures are grazed above the grazing capacity (7-8 times more animals) and these steppes are included in the steppe pasture groups which are poor in terms of yield and quality.

**4.2. Recommendations;** The pastures are unable to feed the animals in good condition in Karacadağ. There is a 143,522 tons of roughage deficit for the existing animals in Karacadağ. One of the ways to meet this forage deficit is cotton farming in 1st and 3rd class soils in Karacadağ. The way to prevent this is not to graze the animals in the pasture in early spring. A controlled grazing should be practiced. A good pasture management planning is required for the sustainability of steppe areas. Emergency action plans should be prepared on the basis of sustainability in order to protect the natural structure of the steppe areas and to prevent further negative impacts on biological diversity.

### **5. Livestock Situation**

**5.1. Main Results;** Ruminant and cattle breeding in the region are carried out by traditional methods based on pasture management. The animals are grazed in the pasture from spring to late autumn. A large part of the cattle raised in Karacadağ (about 72%) is composed of native and native hybrids. The widespread sheep breed in Karacadağ is Zom which is important in terms of native gene resources.

**5.2. Recommendations;** Overgrazing and unseasoned grazing are the major problems in the region. Producers should be provided with basic training information (care-feeding) and general health protection rules (isolation: keep disease factors away, immunization: vaccination against common diseases and hygiene: pay attention to healthcare). Cattle farming should be encouraged rather than sheep farming to reduce the intensive grazing pressure on pastures. In order to increase quality of the pastures, grazing plan and monitoring plan should be prepared and grazing activities should be limited by applying pasture rehabilitation activities.

### **6. Core Areas, Buffer Zone and Ecological Corridors**

**6.1. Main Results;** Five conservation priority areas (CA: Core area) were identified according to the biotic and abiotic criteria together with field survey results of the consultants in the Karacadağ Steppes. CA1 is 5891,77 ha, CA2 is 609,58 ha, CA3 is 1722,81 ha, CA4 is 2415,10 ha and CA5 is 2196,27 ha. The important regions and the proposed buffer regions identified by the specific experts were overlaid on top of each other and the resulting biodiversity hotspots were generated as core areas

**6.2. Recommendations;** Except the planted areas by the General Directorate of Forestry, the core areas, which have been identified by the project, have no regular conservation and management program. The proposed core areas can only be protected with an integrated management plan and good governance approach.

## **1. GENERAL LANDSCAPE FEATURES**

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Karacadağ is the extinct volcanic mountain, a large part of which lies in Diyarbakır and Şanlıurfa and small part of it is within the boundaries of Mardin Province (Figure 1). The thickness of the Karacadağ volcanites spreading over an oval-shaped area of 120 km in diameter is approximately 2000 meters. Volcanism in Karacadağ, which generally consists of basaltic lava and pyroclastic rocks, took place in three stages and displaced from the northwest to the southeast by being rejuvenated. Due to volcanic activities, geomorphological elements such as volcanic cones, volcanic plateau and volcanic slope were formed in the region.

Continental climate is dominant in the area. Summers are very dry and hot, winters are rainy and relatively temperate.

Karacadağ Steppes are generally composed of Basaltic Soil Group and a few parts of rocky areas. Soils with high clay and low lime content were formed as a result of the decomposition of the parent basalt material in the area. Karacadağ soils are neutral, salt-free, low amount of organic matter, low amount of lime, fine textured soils. In terms of Land Use Capability, Karacadağ has generally VII and VIII Class land and II and III Class in a few parts. Soil depth is low in the parts that can be used for cultivation.

Although the ruins of Karacadağ region are not very dense, 7 sites have been identified in the studies conducted so far. These are the ruins of Zinare Zer Ruin, Kamer Sekü Region Ruin, Acem Hill, Selamün Aleykum Hill Tumulus, Mendel Ruin, Zinnare Zıçey Ruin and Zinnare Zıçey Temple Area. It is understood that the region has been inhabited since the Chalcolithic Age (7000 BC). In the archaeological researches, animal barns surrounded by stone walls were observed around each settlement. This shows that the region has had a highland characteristic since the ancient time due to the elevation of 2000 m.

According to CORINE 2012 data; the current land use in the study area consists mainly of poor vegetation cover area, broadleaf forests, natural meadow, pasture and agriculture, except rural settlements.

To the south of Karacadağ, there is an area of 7367.5 ha which has been allocated to the General Directorate of Forestry for afforestation.

Four different Landscape Character Types and Six different Landscape Character Areas were defined in Karacadağ Steppes.

### **1.1. Threats and Recommendations**

Soils in all three study areas have some problems such as depth, slope, low organic matter, high clay, stony and rocky, but have sufficient root depth for steppe plant development. In addition, uncultivated land and higher rates of stony / rocky coverage impair the habitat of the natural flora. Although livestock breeding in the region damages the steppe vegetation, there are ample areas for the continuation of diversity. In spite of all these, certain regions should be protected and animal husbandry and stone / rock clearing should be prevented in these regions for the continuity of diversity.

In addition, untreated/unmanaged lands in all three study areas are important in terms of protection of natural life. The parts cultivated and managed in this region should be used

effectively in a way that less chemicals are used, different organic agriculture productions are supported and high income is obtained from small areas that should be protected. Plant and animal residues added to the soil in these areas will positively affect the level of organic matter.

Although the animal husbandry in the areas damages the steppe vegetation, there are larger areas for the maintenance of plant diversity. In spite of all these, for the maintenance of plant diversity, certain regions should be protected and overgrazing should not be allowed in these regions.

Intense illicit diggings were conducted in ruins. Destruction is present due to extensive illicit diggings on Acem Hill. The Regional Museum is urgently required to carry out rescue excavations at these illegal excavation sites. There are rock tombs belonging to Late Roman Period in Gözler Village which is located on a rocky hill to the south of Karacadağ study area (**Gözler Village Rock Tombs**). The area declared as 2<sup>nd</sup> degree Archaeological Site has been destroyed by the local people. Today, these rock tombs are used by the local people as a warehouse where cheeses are stored.

## **2. BIODIVERSITY**

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The Karacadağ Steppes are in the Iran-Turanian phytogeographical region. In terms of vegetation, most of the region is composed of Iran-Turanian steppe. Karacadağ steppes can be classified as low and high mountain steppes depending on the elevation, whereas these steppes can be classified as malacophile and tragantic steppe in terms of physiological features. Karacadağ has steppe and dry river vegetation. Two alliances and five associations belonging to steppe vegetation and one association belonging to dry river vegetation were determined.

In Karacadağ, besides the steppe vegetation, there are also some bushes with oak trees. Unfortunately, these areas, which were covered with oak trees until 40-50 years ago, were heavily destroyed due to anthropogenic factors. As a result, today small communities with few individuals stand out in these areas.

According to the EUNIS habitat types classification, Karacadağ Steppes are located in Iran-Anatolian steppe habitat class defined as **E1.2E** habitat code and within the **E1** Dry Meadows sub-category of the Landfills and Pastures category of Moss, Lichen and Non-Weed Plants (Forbs) defined under “**E category**”.

✓ **Seed Plants (Vascular Plants):** As a result of the studies carried out within the scope of the project, 44 families, 199 genera, 15 of which are endemic, 332 taxa were identified to grow in the pilot sites. One of them was endemic and 41 taxa were identified as new local records.

✓ **Cryptogamae:** Nearly 55 taxa and 34 genera belonging to 55 families of Cryptogamae group were identified in Karacadağ. All Cryptogam taxa collected from the field and given in this table are reported for the first time from the Karacadağ Steppes.

✓ **Insects:** As a result of field surveys conducted in Spring and Fall seasons, 99 species belonging to 15 orders and 53 families were identified in the Karacadağ. Due to the fact that the duration of the project was completed in the spring, possible insect species spreading in the highlands of Karacadağ could not be reached due to time constraints.

Karacadağ also hosts some endemic and rare insect species. According to the results obtained from the field studies, especially *Paranothrotus opacus rectus*, *Callimenus / bradyporus* *karabagi* and *Isophya sikorai* are known as rare and endemic grasshopper species.

✓ **Herpetofauna:** In the field studies, 16 species, 3 species of amphibians, 8 species of lizards, 3 species of snakes and 2 species of turtle, were identified.

✓ **Birds:** As a result of field studies, 84 bird species belonging to 38 families were identified and 21 species were included as new records for this area.

✓ **Small Mammals:** As a result of the field survey conducted in certain locations and period of field missions, 8 species belonging to the Rodentia (Rodents) order was identified.

✓ **Large Mammals:** As a result of field studies conducted directly and indirectly in the region, 6 species belonging to Rabbits (Lagomorpha) such as *Lepus europaeus* (Wild rabbits), Predators (Carnivora) such as *Canis lupus* (Wolf) *Vulpes vulpes* (Red fox), *Martes foina* (Rock marten), *Meles meles* (Badger) and Ungulates (Cetartiodactyla) such as *Sus scrofa* (Wild boar) were identified in the Karacadağ steppes with direct and indirect observations.

✓ **Agricultural Biodiversity:** Karacadağ Steppe is a particularly important area in terms of Karacadağ rice and its related traditional knowledge. Karacadağ Steppes accommodate the populations belonging to the wild siyez (*Triticum diccoccoides*) and wild gernik (*Triticum boeoticum*) species, which are known as the ancestors of wheat and gen parents (genitor) in the emergence of modern wheat. In addition, Üçkılçık (*Aegilops triuncialis*), Kılbuğday (*Aegilops columnaris*), Pisipisiotu (*Hordeum murinum*) and Boncuk arpa (*Hordeum bulbosum*) were also observed in the studies, samples were taken and prepared as an herbarium sample.

### 2.1. Threats and Recommendations

The biodiversity threats encountered in Karacadağ are; 1. Human-induced threats and damages to be restored; (Converting natural habitats to agriculture and settlement areas, Unconscious livestock and overgrazing, Unconscious agricultural activities, (use of artificial fertilizer and unnecessary pesticides etc.), Environmental and plastic pollution, Other human activities that reduce soil quality, Replacement of natural river beds and pollution of waters, especially in winter and early spring periods, Stubble burning etc.) and 2. Natural threats; (Global warming, Falling rainfall rates or irregular rainfall regime, Reduction of groundwater resources).

**Recommendations for eliminating the threats factors for biodiversity conservation in Karacadağ Steppes are given below.**

- Improving the existing meadows and pastures in the study areas; supporting local plant species in breeding studies and looking for rotational grazing opportunities will provide significant improvement in terms of conservation,

- Investigating alternative opportunities (such as ornamental and medicinal plants, ecotourism) in livestock and agriculture-based areas; creating opportunities for cultivation of plants with significant potential in park and garden landscaping as ornamental plants,
- Sending rare and endemic plant specimens and seeds to gene banks and / or investigating onsite (*in-situ*) conservation opportunities, and providing incentives and support for the cultivation of some steppe plants in habitats suitable for their habitats, enriching these areas with local species specific for the purpose of increasing species diversity,
- A preliminary study and species action plans for the determination of the current status of wild pea (*Pisum sativum*), wild wheat (*Triticum diccoccoides* and *triticum boeoticum*, *A. triuncialis*, *A. biuncialis*, *A. Columnaris* etc. ) , lentil (*Lathyrus cicero* subsp. *Orientalis*), chickpea (*Cicer sp.*), *Lathyrus trachycarpus*, *Paracarium kurdistanicum*, *Hesperis hedgei* species unique to Karacadağ,
- Prohibition of the removal from nature and investigation of in-situ cultural opportunities of *Ornithogalum spp.* (akbaldır) species, species such as *Eremurus spectabilis* (çiriş) used as food plants,
- Exploring alternative (ecotourism, ornamental and medicinal plant growing) opportunities in livestock and agriculture-based areas; cultivation of *Tulipa aleppensis*, *Iris masia* and *Iris aucheri* species as ornamental plants without damaging their natural habitats (reproduction of *Fritillaria persica* species as an ornamental species is ongoing in the area),
- Supporting the breeding activities in the meadows and pastures with local plants and creating rotational grazing opportunities,
- Urgent priority protection of Karabahçe mountain road, Kollubaba Hill and Simo Creek sections,
- Ensuring the cooperation with administrative and local authorities and non-governmental organizations for the protection of plant diversity,
- Preparing guidelines for training of plant pickers in the region and informing the public,
- Organizing periodical trainings, presentations, artistic and cultural activities in a visitor promotion center to be established in the region to guide and raise the awareness of tourists coming to the area correctly,
- Panels, educational materials and brochures for the promotion and awareness of the biodiversity of the study area for the stunning information and photographs about the resource values of the site in the visitors' introduction center,
- Preparing information and promotional materials for visitors in these buildings and explaining the importance of protection of wild relatives of cultivated species as well as other resource values,
- Implementing information, warnings, inspections and sanctions to the stakeholders in order to prevent the destruction of the areas within the scope of the study for reasons such as overgrazing, opening agricultural areas, road construction and extension, illegal building construction,

- Keeping as far away from the natural steppe ecosystem as possible due to all kinds of activities (overgrazing, creating agricultural areas, road expansion, construction, transportation, operation, incineration, demolition, waste storage, noise and light pollution, earthmoving, etc.) to be carried out in the area, conducting continuous control in the process,
- Establishment of a mechanical barrier (fence, wall, etc.) between the floristic / faunistic and ecologically critical sensitive points determined by the project in order to preserve and maintain the natural structure of the steppe ecosystem in the study area,
- Implementation of conservation practices and conducting monitoring activities in areas where the distribution areas of Tortoise are concentrated in the area,
- The afforestation area in Karacadağ does not have negative effects on species and steppe ecosystem. However, monitoring and observing the positive and negative effects of steppe ecosystem and steppe species over time,
- Areas in Karacadağ are important gene points for conservation of genetic diversity. Evaluation of these areas considered as “hot spots” for many wild relatives of agricultural biodiversity,
- Protection of priority areas identified in Karacadağ with *in-situ* conservation approach,
- Preserving Karacadağ rice *in situ* (on farm), regulating and planning irrigation and grazing regimes as conservation priority activities in order to maintain the balance and interaction between anthropological and natural systems in the region,
- The preservation of Karacadağ rice and related traditional knowledge will ensure that a unique production system in the world and a unique local genotype adapted to local conditions will be transferred to the future as an agricultural heritage system,
- In addition, if training and promotional activities are carried out to increase the value of Karacadağ rice in the food chain, the socio-economic conditions of the local people, whose livelihood is based on livestock husbandry and cereal production, will be positively affected –positive contribution will prevail,
- Relevant Oak Forest, Karacadağ Afforestation Area, Karacadağ Honey Forest and Soydan Irrigation Pond are recommended areas for monitoring birds,
- Conducting monitoring activities regarding *Sylvia conspicillata* (Temminck, 1820) species.
- Preparing in-situ conservation strategies and development of conservation plans are important to evaluate the targeted Karacadağ Steppes, agricultural biodiversity and agricultural heritage systems together under the scope of “*Conservation and Sustainable Management of Turkey's Steppe Ecosystems Project*”. In this respect, the “Globally Important Agricultural Heritage Sites (GIAHS)” approach can also be considered as an alternative approach when preparing conservation plans in the region by consulting the experts within GDNCNP regarding the change of habitat integrity as a result of agricultural area opening, stone and rock collection and creation of possible new habitats,



### 3. SOCIO-CULTURAL AND SOCIO-ECONOMIC FEATURES

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Considering the social, economic, cultural and gender roles in the Karacadağ Steppes, it is possible to list the results/observations and recommendations as follows:

✓ **Socio-cultural features;** All villages are Kurdish villages. The villages are generally relatives with each other and tribal relations continue. There are only primary and secondary schools in the villages. There were no blood feuds within the region. Minor disagreements are sometimes seen. Traditional leaders in the village and their function is diminishing. There is no Landlord/ağa system in the villages. Sheikhs and headmen are dominant in the villages. Farmers, shepherds and traders constitute the general groups in villages. Most of the villages have no occupation and craftsmen. Refrigerators and televisions are the technological tools available in the villages. The culinary culture in the region is mainly meat and grain. Nomadic animal husbandry is shrinking and the number of nomads is decreasing. However, Karacadağ is still an important area for nomadic livestock breeding. The Karacadağ highlands are one of the few accommodation areas that nomadic tribes use as pastures. The only shelter they accommodated during all these migration movements is the traditional hair and / or nylon coating tents that can be easily installed and removed (Kılıç 2014). In addition to the Kejan tribe which forms the majority of nomads in Karacadağ. Karacadağ Turkmen, Karakeçililer and Beritan tribes also use Karacadağ as a plateau. While they use Karacadağ as a plateau in summer, they spend the winter in their villages around Karacadağ. Karacadağ nomads stay in the same place every year when they go to the plateau. Mother, father and married children live together on the same plateau. In addition to tents for accommodation and basic needs of nomads, there are other tents and / or pens/barns that are surrounded by stones for domestic animals. These structures are built with stones and are open. There is almost no literacy among elderly women. However, most of the young population is literate. In general, girls can go to school as much as they want.

Women go to the city center to benefit from modern institutions. Since most of the villages do not have health services, they go to city hospitals. Multiple childhood is common here. Polygamy is not seen. Since there are no agricultural practices in the areas used by nomads as highlands, pesticides are not used. In this case, animal husbandry is important in terms of human health as it can be evaluated within the scope of organic animal husbandry. The Karacadağ highlands are one of the few accommodation areas that nomadic tribes currently use as pastures.

✓ **Socio-economic features:** The economy of villages is mostly based on agriculture and animal husbandry. However, animal husbandry is gradually decreasing in some villages due to the increase in forage prices. In the settlements in Karacadağ region, “wheat and barley” are the most cultivated products followed by lentils. Irrigated farming in the area is very small. Karacadağ paddy rice whose name is taken from the region is cultivated in Karacadağ region. There is a seasonal migration out of the village-neighborhood in the project area due to limitations in agricultural production, large family structure and limitation of employment opportunities. The most important livelihood of families in the area constitutes “recycling labor” and “seasonal agricultural labor” primarily carried out by young men in Istanbul. Livelihoods obtained from livestock activities are low in terms of productivity, breed

characteristics and product evaluation methods. The main livelihoods of nomads are sales of live animals, milk, cheese, fat and wool obtained from animals. Milk collected from the plateaus is purchased by dairy holders from Siverek. The nomads sell their cheese and butter to the merchants in Siverek. For the nomads, the sale of live lambs and sheep and the wool obtained from them are also an important source of income.

✓ **Recreation and Tourism:** The Karacadağ pilot site has the “Karacadağ Ski Center”, the only ski resort in the Southeast region. The center with 700m-long ski runways has an idle cafeteria constructed for the visitors and there is no accommodation facility. Potential types of tourism prominent in the project area are as follows; **i. Rural Tourism – Ecotourism** (Bird watching, Wildlife monitoring, Nature hiking, Photo safari), **ii. Culture tourism**, **iii. Agro-tourism**, **iv. Youth and sports tourism concept.**

### **3.1. Threats and Recommendations**

- Greenhouses, apiculture, cooperatives and project-based economic activity seem to be absent with exceptions. Priority should be given to the necessary training and incentives.
- Rangeland is threatened by drought, misuse and construction.
- Both ruminant and cattle breeding are widespread in the region. However, there is a decrease and a slowdown in the sector.
- Infrastructure, superstructure and sewerage services are largely inadequate. While the roads are relatively good, in-village services are inadequate in most places.
- Protected wildlife in the region is at risk of hunting and theft.
- Vocational training and courses for women in the region are very poor. However, women demand training courses. Since most of the villages do not have health services, they go to city hospitals.
- Karacadağ nomads face other problems in addition to the problems related to animal husbandry as their main economic activity. One of these problems is the education problem of their children.
- In recent years, it has been observed that stone and concrete structures are being built by nomads instead of temporary structures. The legal and administrative dimension of this situation needs to be examined.

### **3.2. Recommendation on Socio-cultural and Socio-economic Features**

It is important to increase productivity in agricultural activities in the field, diversification of income sources, adding value to the products and creating income areas based on tourism. The proposals for working areas for rural development are discussed under four main sections. These are related to the economic, organizational, socio-cultural, environmental recommendations.

✓ **Basic recommendations for economic purposes;** increasing irrigation opportunities in crop production, increasing productivity in crop production, conducting studies on product diversity, performing demo studies on closed soilless vegetable production, providing input support to reduce costs, breeding on animal husbandry establishment of processing plants for milk and dairy products, diversification of products and marketing high value-added products, encouraging them to be carried out through cooperative initiatives, establishment of forage supply facilities, mushroom cultivation for women, pilot activities such as poultry farming,

development of products for rural tourism and integration of tourism activities with agriculture.

✓ *For organizational purposes;* establishing co-operatives that will bring women's presence to the forefront in crowded populations and improving the existing cooperatives, common attitudes to reduce input costs, training for women and men. on the subject of cooperatives.

✓ *For socio-cultural purposes;* establishment of social facilities to engage women in joint activities; creation of special programs for young people; vocational education, technology literacy, identifying activities that will facilitate the integration of home and work life for women and providing the folkloric values specific to the region.

✓ *For environmental purposes;* Rehabilitation of pasture and improving the productivity, village-settlement landscaping, initiation and completion of sewerage works, improvement of village-settlement roads, providing sustainable use of medicinal and aromatic plants and transforming them into economic value, conservation of biodiversity and awareness raising and taking measures for drinking water, especially in summer months.

The main activity components of the Strategic Plan in terms of Development in the study area can be grouped under 4 main areas such as;

1. Processing and selling of agricultural products,
2. Activating livestock potential,
3. Increasing the value added income from agriculture,
4. Development of tourism on the common basis of tourism-agriculture-history-culture.

If it is desired to reduce dependence on foreign products and increase local production in animal products, necessary arrangements can be made and incentives can be provided to the nomads.

Here are the recommendations for revitalizing and strengthening the rural tourism economy in the project area; Traditional tattoo motifs are produced in the form of a temporary tattoo as “stickers and introduced to the tourists for promotional purposes, The use of traditional motifs in the production of wooden toys for children and the production and marketing of wooden toys with local identity in toy workshops, Analysis of needs in rural districts (villages) where ecotourism can be initiated, Providing storage facilities for the lovers of nature sports to come to the same place in rural settlements which will be determined as the focus of ecotourism, Branding of products such as lentil, chickpea, pistachio, milk and dairy products, Introducing and marketing of souvenirs and natural / organic products as “**Karacadağ Products**”, Training women living in rural areas (villages) on rural/ecotourism and ensuring their role in tourism, Implementing the operation of pensions in rural areas (villages), Planning of accommodation center compatible with nature for eco-tourism in the center of Karacadağ neighborhood, Implementation of horse riding trip programs in rural / ecotourism districts suitable for nature excursions with camel and horse, Establishment of sales points where local people can sell touristic products, local souvenirs and local foods in settlements, Organizing photo-safari tours at certain points in Karacadağ with a beautiful view, inviting nature photographers of travel magazines for this purpose, It is important in terms of tourism mobility that the tourists

who come to Diyarbakır and Şanlıurfa for cultural and nature tourism are directed to the focus of rural / ecotourism.

#### **4. ONGOING GRAZING ACTIVITIES**

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According to 2019 data of Şanlıurfa Provincial Directorate of Agriculture and Forestry in 27 settlements within Karacadağ pilot study area; there are 255676 ruminants, 30569 cattle and 195 breeds of culture. There are 446961 ha rangeland in the area.

Karacadağ steppe pastures are grazed above the grazing capacity (7-8 times more animals) and these steppes are included in the steppe pasture groups which are poor in terms of yield and quality. Animals are unable to feed on a quality way at the project site.

Total 43754 tons of roughage from steppe pastures. The forage requirement of the existing animals in the project area is calculated to be 187276 tons.

According to this situation; there is a shortage of 143522 tons of roughage for the animals in the project site. This forage shortage can be met by rehabilitating steppe rangelands, controlled grazing, increasing the rate of forage crops grown in field farming and purchasing external forage.

##### **4.1. Threats and Recommendation**

While it is not possible to increase the areas of steppe pastures, the pastures are unable to feed the animals in good condition. However, it is possible to increase the yield of the rangelands by 2-3 times as a result of pasture rehabilitation and controlled grazing practices in steppe pastures. Even in this case, the animals in the region are not fed at required level. In order to ensure healthy nutrition of animals, external feed must be provided.

There is a 143,522 tons of roughage deficit for the existing animals in the project site. This forage deficit can be met by rehabilitating the steppe rangelands, controlled grazing, increasing the rate of forage crops grown in field farming and purchasing external forage. One of the ways of closing this forage deficit is cotton farming in 1st and 3rd class soils in the project site.

The ratio of other pasture plants in the grazing area was higher than that of both cereals and legumes. This is not desirable situation. This is due to the fact that the animals in the pasture graze primarily plants which are delicious and of good quality. As these plants are grazed, the proportion of plants in the reproductive and invasive groups increases. Ideally, the ratio of cereals should be 70% and legumes should be 30% in a pasture. In order for this ideal cycle to occur, the animals should be grafted/ inoculated in the pasture and the seeds of the grass and legume plants compatible with the pasture should be grafted/inoculated. In addition, poisonous, prickly plants that are not grazed by animals should be controlled.

It is risky for wild and cultivated animals to maintain their life and yield shares in a sustainable manner due to the poor and insufficient vegetation of the pastures in the project area. However, the region is threatened by drought, temperature and desertification in some seasons. In addition, yields of pastures decrease in terms of both quality and quantity due to early and overgrazing of pastures.

As a result of this vicious cycle and continuity, plant and soil loss as well as erosion are

significant problems in the pastures.

The way to prevent this is not to graze the animals in the pasture in early spring. A controlled grazing should be practiced, if necessary, appropriate seeds from outside the region should be sowed in the pasture, and inoculation and fertilization should be conducted. Among the pasture restoration techniques, wells should be drilled for the purpose of animal watering in appropriate sections of the study areas and salt shakers, water-bowls, shades, pasture paths, itching stakes should be facilitated for the animals in the pasture.

A good pasture management planning is required for the sustainability of steppe areas. This plan has four basic principles. The success of these plans depends on their thorough implementation.

- 1-Grazing in appropriate season grazing,
- 2-Grazing with the appropriate type of animal,
- 3-Uniform grazing,
- 4-Grazing with the number of animals according to the grazing capacity.

In order to increase both pasture productivity and animal production in pastures, “Rotational Grazing System” should be applied in the study area.

The best grazing period for the pilot areas should start from mid-April to the end of October or early November. As a result of the continuous grazing on the pasture area except snowy and rainy days all year round, the plants are not given an opportunity to continue their regeneration in the spring. Grazing should be stopped at least 3-4 weeks in advance particularly in winter frosts in Karacadağ steppes. If not, plants will become more susceptible to drought, cold, heat and grazing, and will be damaged as the root system of plants shrinks.

In order for the vegetation of steppe pastures to recover, a timely and controlled grazing must be practiced.

Pasture users, farmers, peasants, animal owners, nomads and shepherds should be trained in order to create such awareness. In addition, in order to prevent grazing of animals in the pastures in winter conditions and in early spring, pasture users should be provided with high quality roughage support by the state during these periods.

## **5. LIVESTOCK SITUATION**

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There are 255676 ruminants, 30569 cattle and 195 culture breeds in the villages within the Karacadağ pilot study area.

In terms of animal husbandry, the Karacadağ region is significantly different from the other two regions (Kızılıkuyu WDA and Tek Tek Mountains NP). First of all, unlike the other two regions, a large part of the cattle raised in Karacadağ (about 72%) is composed of native and native hybrids. However, similar to the other two project sites, the number of cattle breeds of culture and hybrids, which were almost never found in the Karacadağ region until recently.

The second apparent difference is the widespread sheep breed of Zom in Karacadağ which is important in terms of native gene resources. Zom sheep is a native breed that is highly

adapted to the conditions of the region; it can be considered as a breed to be protected under native genes.

Another difference is that the sheep growing in the Karacadağ region is carried out as a nomadic / semi-nomadic transhumant. This semi-nomadic cultivation, which is exercised as a migration to the places, started primarily from Tek Tek Mountains, located in the south of Karacadağ and returning in spring, is not seen in the other two project areas.

### 5.1. Threats and Recommendation

It is a common practice to rent pastures as wintering areas or barracks in the region. There are 46 pastures that are rented out as a wintering areas in Şanlıurfa province. The ones related to Karacadağ are given in Table 1. This mode of operation leads to intensive grazing of pastures not only in this area but also in other areas.

**Table 1.** Rangeland enterprises related to Karacadağ Steppes

RANGELAND ENTERPRISES		Location of protected areas and rangeland	Status of enterprises
Town	District		
SİVEREK	AVURTEPE	Located within the project area of Karacadağ	Active
SİVEREK	KARABAHÇE	Located within the project area of Karacadağ	Active
SİVEREK	SÖYLEMEZ	Located within the project area of Karacadağ	Active
VİRANŞEHİR	GÖLCÜK	Located within the project area of Karacadağ	Active
VİRANŞEHİR	BALLICA	Located within the project area of Karacadağ	Active

The following conclusions and suggestions are presented based on the results of observations and researches about animal husbandry activities.

1. An alternative marketing network (Marketing cooperative?) should be sought to change the favor of producers in introducing animal products to the market.
2. Because of sharing the same pasture, animals in the Karacadağ Steppes (especially small ruminants) should be vaccinated for epidemic diseases (Brucella, alum, smallpox, echtyma etc.) which carry the risk of contamination to the gazelles. As well, regular monitoring of vaccination should be ensured.
3. Producers should be provided with basic training information (care-feeding) and general health protection rules (**isolation**: keep disease factors away, **immunization**: vaccination against common diseases and hygiene: pay attention to healthcare).
4. Grazing should be prohibited in areas where intensive grazing is carried out and which are important for the steppe ecosystem and grazing activities should be limited by applying pasture rehabilitation activities.
5. Support for animal production (credit, direct income support, tax exemptions, reduction of input costs, marketing support, etc.) should be reviewed in favor of the producer and an integrated, coherent support policy should be established.
6. Cattle farming should be encouraged rather than sheep to reduce the intensive grazing pressure on pastures.
7. The rented areas in and around Karacadağ region as wintering areas should be shut for operation, enterprises in other areas should be limited.

8. Uncontrolled animal movements should be prevented to combat epidemic diseases.

## 6. PRIORITY PROTECTED AREAS AND BUFFER ZONES IN KARACADAĞ STEPPES

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### 6.1. Priority Protected Areas for Karacadağ Steppes

In this study, two methods based on multi-criteria decision making approach have been followed in order to determine priority protected areas for Karacadağ Steppe Landscape.

Within the scope of this method, conservation priority area criteria to be used in Karacadağ Steppe Landscape were determined based on the literature / field survey and the opinions of experts and representatives of institutions participating in the workshops held during the project duration. Following the preparation of the determined core area criteria, ARCGIS 10.2 geographic information system was used to conduct suitability analysis. Criteria used in the analysis; CORINE (2016), soil, flora, avifauna, herpetofauna, mammals and rivers under the main sections of the abiotic and biotic landscape components. The subclasses / groups of these criteria used in the study were classified considering the importance of the development and sustainability of the steppe ecosystem for the protection and support of biodiversity. Weighting analysis was conducted by applying different weights to the criteria determined by the representatives of the attended organizations and survey experts to develop three conservation priority alternatives for Karacadağ Steppes. All the criteria layers are overlaid and the appropriate areas of protection priority - within the range of *very suitable, medium suitable and less suitable* - were identified.

The second method used to determine the conservation priority areas in Karacadağ Pilot site is based on the assessments of the field observations of the experts who conducted the field survey. In this context, polygons indicating important habitats identified by each expert within the boundaries and vicinities of work area for the Karacadağ Steppes were overlaid in geographic information system. Habitat data used in this context are;

- **Flora;** Important plant areas reflecting the steppe vegetation
- **Insects;** Habitats important for insect species in Karacadağ region
- **Herpetofauna;** Herpetological stock area, Areas where *Varanus griseus*, *Macrovipera lebetina* and *Testudo graeca* species were observed
- **Avifauna:** Areas where *Sylvia conspicillata* and *Otis tarda* were observed
- **Mammals;** Polygons defined as important habitat areas for small mammals in Karacadağ

In both methods, the conservation priority areas identified were found in almost of the same regions such as the north east, east, south, south east and south west of Karacadağ. During the planning process, the criteria to be preferred, the importance weights of the criteria and the desired level of detail will be guiding in the determining the regions to be defined as priority areas for protection for Karacadağ.

As a result of the analyzes, five conservation priority areas were identified in the Karacadağ Steppes (Figure 1).

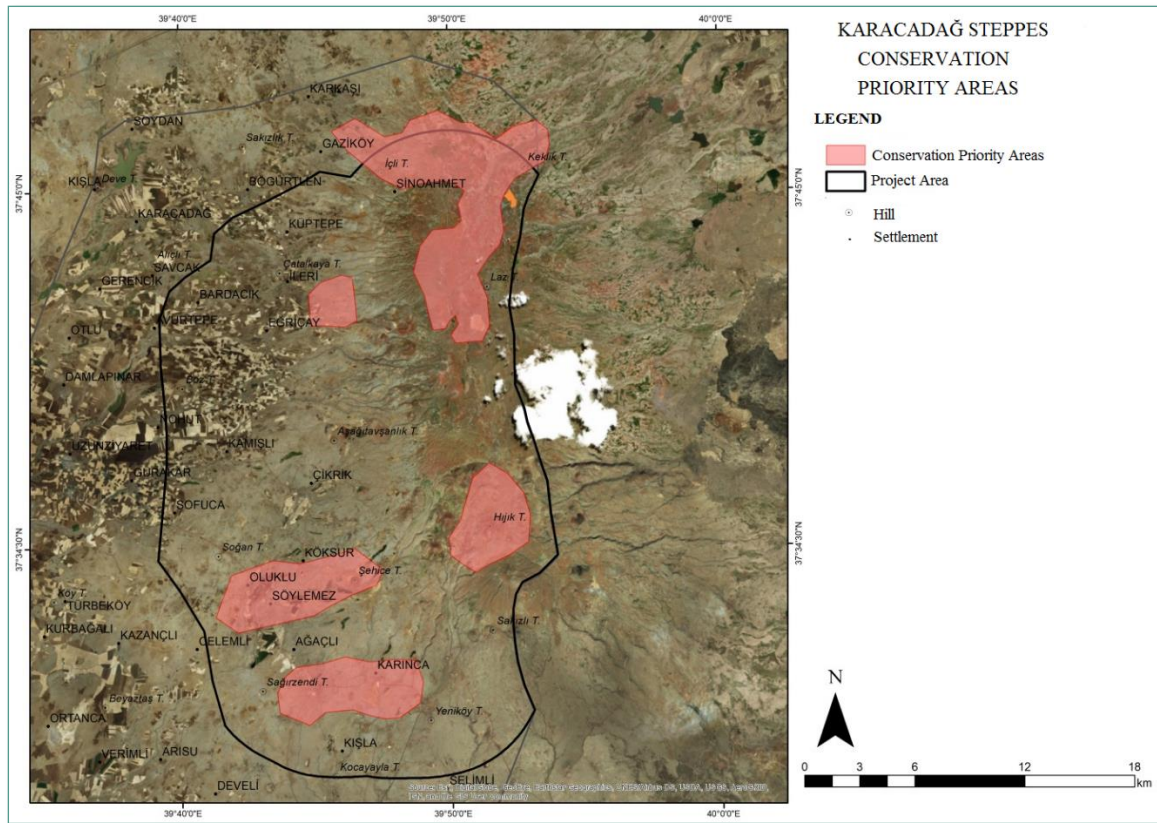


Figure 1. Conservation Priority in Karacadağ Steppes Landscape

## 6.2. Buffer Zones in Karacadağ Steppes

Ecological, social pressure and threat characteristics were taken into consideration in the formation of buffer zone for Karacadağ Steppes by considering time and data accessibility limitations. Based on these characteristics, the criteria given in Table 2 are taken into consideration.

Table 2. Criteria used in determining buffer zone (taken from Anonymous 2004)

Criteria		High Sensitivity	Low Sensitivity
Ecologic	Slope	Steep slope > 10%	Plain or slight steep areas
	Aspect	Southern and western aspects	Northern and eastern aspects
	Available species	Important flora and fauna areas	General species and exotic species
	land use / land cover in vicinities	Steppe vegetation	Open areas
	Surface water	Spring waters, streams	
Cultural/Social	Historical / Archaeological sites	Registered and unregistered archaeological sites	
Pressure/threats	Structured Areas (Land use / land cover in the vicinity)	Urban Texture, Industry, Trade and Transportation Areas, Mine, Garbage Discharge and Construction Areas	



The buffer zones identified for the Karacadağ Steppes were determined based on both the evaluations of experts in the field survey and the literature data. Equal weight was given to the criteria used here. Land uses outside the boundaries of the project sites but which are important in terms of biodiversity, ecosystem representation, archaeological / historical elements and which create pressure / threat are also taken into consideration. The buffer zones were then created by overlying all these data in the ArcGIS environment.

The Karacadağ protection priority areas and buffer zones obtained as a result of overlapping important habitats suggested by the experts within the scope of their expertise and buffer zone criteria in Karacadağ Steppes are given in Figures 2.

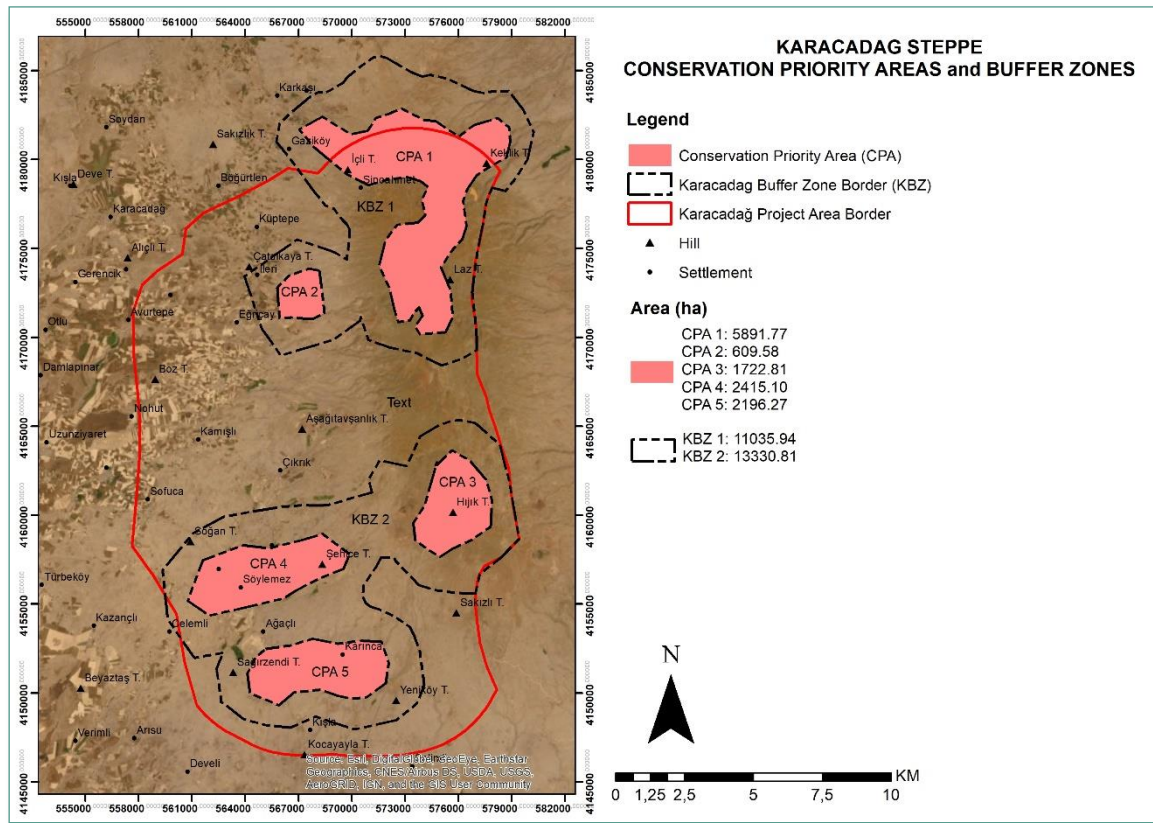


Figure 2. Protection Priority and Buffer Areas in Karacadağ Steppes and Their Surroundings

The sizes of protection priority areas and buffer zones determined as a result of the studies are given in Table 3 and the characteristics of the identified protection priority areas are given in Table 4.

Table 3. The Spatial Data for Conservation Priority Areas and Buffer Zones

Name of the Region	Conservation Priority Area (CPA) (Ha)					Buffer Zone (Ha)		Total Area (Ha)		
	CPA-1	CPA-2	CPA-3	CPA-4	CPA-5	TB-1	TB-2	CPA (Ha)	Buffer Zone (Ha)	Other Area (Ha)e
Karacadağ Steppes	5891,77	609,58	1722,81	2415,10	2196,27	11035,94	13330,81	12835,53	24366,75	23595,72

**Table 4.** Characteristics of Conservation Priority areas of Karacadağ Steppes

Conservation Priority Areas	Area (ha)	Characteristics	
		Flora	Fauna
CPA 1	5891,77	<ul style="list-style-type: none"> <li>• <i>Lathyrus trachycarpus</i> (gelin burçağı); endemic to Karacadağ, IUCN; VU: Vulnerable.</li> <li>• <i>Paracaryum kurdistanicum</i> (karaca çarşağı); endemic to Karacadağ, IUCN; NT Near Threat.</li> <li>• <i>Crocus leichtlinii</i> (mardin çiğdemi), endemic to the region, IUCN; “NT: Near Threat”.</li> <li>• <i>Symphytum aintabicum</i> (antep kafesotu), endemic to the region, IUCN; “VU Vulnerable”.</li> <li>• <i>Ranunculus bingoldaghensis</i> (karaz); an endemic species identified as a new record in Şanlıurfa province, grown in Karacadağ and Bingöl mountains, “EN Endangered”.</li> <li>• <i>Astragalus erythrotaenius</i> (süslü geven); spread around Karacadağ, known as endemic species prior to the detection of the spread in Syria that has ceased to be endemic to Turkey. Although it is a common species that prefers stony steppes, it is endangered due to agricultural practices.</li> <li>• It is the gene center of cultivated wheat, chickpea and lentil and hosts its wild relatives.</li> <li>• Population of wild siyez (<i>Triticum diccoccoides</i>) and wild gernik (<i>Triticum boeoticum</i>) species known as the ancestor of wheat and which are genitors at the emergence of modern wheat.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Testudo graeca</i>, Herpetofaunistically important species, listed in IUCN Red Data Book, VU: Vulnerable both globally and Europe, thus need to be protected.</li> <li>• They also contain temporary wetlands. Therefore, important for herpetofaunistic and insects.</li> <li>• Karacadağ afforestation area is located in the region. 21% of the species observed in Karacadağ (12 bird species belonging to 9 families) were identified in this area.</li> <li>• The area is important for migratory and indigenous birds as it provides feeding, nesting and protection to bird species.</li> <li>• <i>Sylvia conspicillata</i> (Temminck, 1820) (Steppe Warbler) and <i>Otis tarda</i> (Linnaeus, 1758) (Great bustard) species exist in the area.</li> <li>• Suitable habitats for small mammals.</li> <li>• <i>Bradyporus</i> (Callimenes), an endemic species of endemic grasshoppers, Ünal 2011, found in the highlands of Karacadağ, suitable habitats around Karabahçe need to be protected.</li> <li>• <i>Paranothrotres opacus rectus</i> (Mistshenko, 1951); The fact that the species lives only in Karacadağ region among the three sites indicates that the species is a cold-bearing species. The presence of the population in the Karacadağ elevation, especially at the southern end of a cold-loving group is extremely important.</li> <li>• <i>Saga ephippigera syriaca</i> Lucas, 1864; It is one of the largest grasshopper species in Turkey. It is known in many points of the steppes of Şanlıurfa. It is a species that is at the highest levels of nutrient pyramid in terms of insects and has a very impressive body structure. This species can be suggested as “Flag Species” or “Indicator Species” due to its carnivore feeding on other insect species, its representation in almost the whole area, its adaptation to arid environments and its impressive-ostentatious appearance.</li> </ul>

Conservation Priority Areas	Area (ha)	Characteristics	
		Flora	Fauna
CPA 2	609,58	<ul style="list-style-type: none"> <li>• <i>Hesperis hedgei</i> (dost akşamyıldızı); Endemic to Karacadağ, “C: Critically endangered”.</li> <li>• <i>Scrophularia mesopotamica</i> (sahra sıracası); “LC Least Concern”, endemic to Eastern Anatolian Region.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Testudo graeca</i>, Herpetofaunistically important species, listed in IUCN Red Data Book, VU: Vulnerable both globally and Europe, thus need to be protected.</li> <li>• They also contain temporary wetlands. Therefore, important for herpetofaunistic and insects.</li> </ul>
CPA 3	1722,81	<ul style="list-style-type: none"> <li>• <i>Tanacetum cadmeum</i> subsp. <i>orientale</i> (hoş dağçiçeği), an endemic subspecies, “LC least Concern”.</li> <li>• It is the gene center of cultivated wheat, chickpea and lentil and hosts its wild relatives.</li> <li>• Population of wild siyez (<i>Triticum diccoccoides</i>) and wild gernik (<i>Triticum boeoticum</i>) species known as the ancestor of wheat and which are genitors at the emergence of modern wheat.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Testudo graeca</i>, Herpetofaunistically important species, listed in IUCN Red Data Book, VU: Vulnerable both globally and Europe, thus need to be protected.</li> <li>• They also contain temporary wetlands. Therefore, important for herpetofaunistic and insects.</li> <li>• There is Karacadağ Honey Forest in the area and this area is important because it provides feeding, nesting and protection opportunities for bird species. Therefore, it is a protected area for birds. 25% of the species observed in Karacadağ (14 bird species belonging to 11 families) were identified in this area.</li> <li>• <i>Bradyporus</i> (Callimenus), an endemic species of endemic grasshoppers, Ünal 2011, found in the highlands of Karacadağ. It is absolutely necessary to preserve the appropriate habitats in and around Honey forests in Karacadağ.</li> </ul>
CPA 4	2415,10	<ul style="list-style-type: none"> <li>• <i>Allium variegatum</i> (dicle körmeni), an endemic species, “VU Vulnerable”.</li> <li>• It is the gene center of cultivated wheat, chickpea and lentil and hosts its wild relatives.</li> <li>• Population of wild siyez (<i>Triticum diccoccoides</i>) and wild gernik (<i>Triticum boeoticum</i>) species known as the ancestor of wheat and which are genitors at the emergence of modern wheat.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Testudo graeca</i>, Herpetofaunistically important species, listed in IUCN Red Data Book, VU: Vulnerable both globally and Europe, thus need to be protected.</li> <li>• They also contain temporary wetlands. Therefore, important for herpetofaunistic and insects.</li> <li>• The area is important for migratory and indigenous birds, as it provides feeding, nesting and protection opportunities for birds.</li> </ul>

Conservation Priority Areas	Area (ha)	Characteristics	
		Flora	Fauna
CPA 5	2196,27	<ul style="list-style-type: none"> <li>It is the gene center of cultivated wheat, chickpea and lentil and hosts its wild relatives.</li> </ul> <p>Population of wild siyez (<i>Triticum diccoccoides</i>) and wild gernik (<i>Triticum boeiticum</i>) species known as the ancestor of wheat and which are genitors at the emergence of modern wheat.</p>	<ul style="list-style-type: none"> <li><i>Testudo graeca</i>, Herpetofaunistically important species, listed in IUCN Red Data Book, VU: Vulnerable both globally and Europe, thus need to be protected.</li> <li>They also contain temporary wetlands. Therefore, important for herpetofaunistic and insects.</li> <li><i>Isophya sikorai</i> Ramme, 1951; It is an endemic large green grasshopper whose distribution in the world is limited to the Southeastern Anatolia Region. Although it is represented in all three sites surveyed, the population density in the Karacadağ region has not been adequately observed.</li> <li><i>Paranothrotres opacus rectus</i> (Mistshenko, 1951); The fact that the species lives only in Karacadağ region among the three sites indicates that the species is a cold-bearing species. The presence of the population in the Karacadağ elevation, especially at the southern end of a cold-loving group is extremely important.</li> </ul>

