

# Experience of Integrating Biodiversity into Forest Management Plans

Erzurum Regional Directorate of Forestry







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*It supports the implementation of "TANAP Biological Diversity Offset Strategy".*



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# GENERAL INFORMATION

## 30% OF TURKEY IS COVERED WITH FORESTS

Having a forest cover of approximately 30%, Türkiye is also located at the intersection of three of the world's 36 conservation hotspots with its forests in Northeastern Anatolia, the Aegean, Mediterranean and Eastern Anatolia regions. With these features, Turkey's forests are among the most important forests in the northern hemisphere.

## FUNCTIONAL FOREST MANAGEMENT

In Türkiye, forests are managed through forest management plans prepared with an ecosystem-based functional forest management approach. This approach does not assume that the forest is only a collection of trees; forest biodiversity, ecological functions and links are also considered, and plans are prepared accordingly.

## FOREST MANAGEMENT PLANS

Forest management plans involve quantifying the products and services provided by a particular forest ecosystem (forest functions), determining the management objectives and conservation targets in line with the capacity of the forest and the demands of the society, determining the plan constraints and the silvicultural intervention options that can be applied to each forest stand, and determining and supervising the option that will best achieve the management objective and conservation target.

Brown bear  
(*Ursus arctos*)

Image: DKM archive









# BIODIVERSITY OFFSET

Ardahan, Erzurum and Sarikamis Forest Management Directorates of Erzurum Regional Directorate of Forestry are located on the Trans-Anatolian Natural Gas Pipeline (TANAP) route. The integration of biodiversity into ecosystem-based functional forest management plans in this region has been carried out within the scope of the "TANAP Forest Biodiversity Conservation Offset Project" as one of the TANAP biodiversity offset projects.

This study supports the implementation of the "TANAP Biodiversity Offset Strategy" prepared in accordance with The European Bank for Reconstruction and Development (EBRD) Performance Requirement No. 6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources.

Offset projects support the conservation of degraded habitats and species in the vicinity of the project area,

where damage to nature cannot be compensated on-site. Offset projects are the last pillar of a four-stage mitigation hierarchy. These stages are avoiding any adverse impacts to nature, mitigating the damage by taking precautions when it cannot be avoided, restoring the damage after the work is completed, and compensating/offsetting the damage in similar habitats close to the working site if it cannot be restored.

Wolf  
(*Canis lupus*)

Image: DKM archive









# INTEGRATION OF BIODIVERSITY INTO FOREST MANAGEMENT PLANS

Forests, managed according to their economic, ecological and socio-cultural functions with "Ecosystem-Based Functional Forest Management Plans", are evaluated with a holistic ecosystem approach and are handled and planned together with all the biodiversity elements they host. This approach, called the integration of biodiversity into forest management plans, has been implemented in more than 1 million hectares of forest ecosystems in 78 Forest Management Directorates in cooperation with the Nature Conservation Centre and the General Directorate of Forestry (GDF) since 2008. The conservation areas identified with this approach have been protected by GDF.

Ecosystem-based functional forest management plans for 16 Forest Management Units in Ardahan, Erzurum, and Sankamış Forest Management Directorates under Erzurum Regional Directorate of Forestry have been prepared in collaboration with Nature Conservation Centre and General Directorate of Forestry. By applying the biodiversity integration process steps outlined in the "Integrating Biodiversity

into Forestry - Planner's Guide" and "Integrating Biodiversity into Forestry - Practitioner's Guide" publications prepared by Nature Conservation Centre and General Directorate of Forestry. Accordingly, biodiversity values were integrated into the forest management plans of 16 Forest Management Units and conservation was ensured in a total of 221,762 hectares of forest ecosystems.

Integration studies are based on an approach that focal species and biodiversity elements that are "dependent on forest and in need of conservation and the one for which the most effective conservation can be made by unit effort, while also having the potential to represent the biological diversity". In this process, focal species identified among 7 forest-related species groups (large mammals, small mammals, invertebrates, birds, plants, reptiles and amphibians) and critical forest areas representing ecological processes (natural old-growth forests, water resources, relict ecosystems, areas with high tree species richness, etc.) were considered together.





**Huberi sage** (*Salvia huberi*)  
Image: Zeki Aytac



**Merhaba blue** (*Polyommatus merhaba*)  
Image: Ahmet Baytas



**Wild goat** (*Capra aegagrus*)  
Image: Aykut Ince



**White-tailed Eagle** (*Haliaeetus albicilla*)  
Image: Naci Eyyüpoğlu

The integration approach applied at the Forest Management Directorate scale consists of five main stages:





**Levant mole** (*Talpa levantis*)  
Image: Ahmet Karataş



**Eurasian lynx** (*Lynx lynx*)  
Image: DKM archive



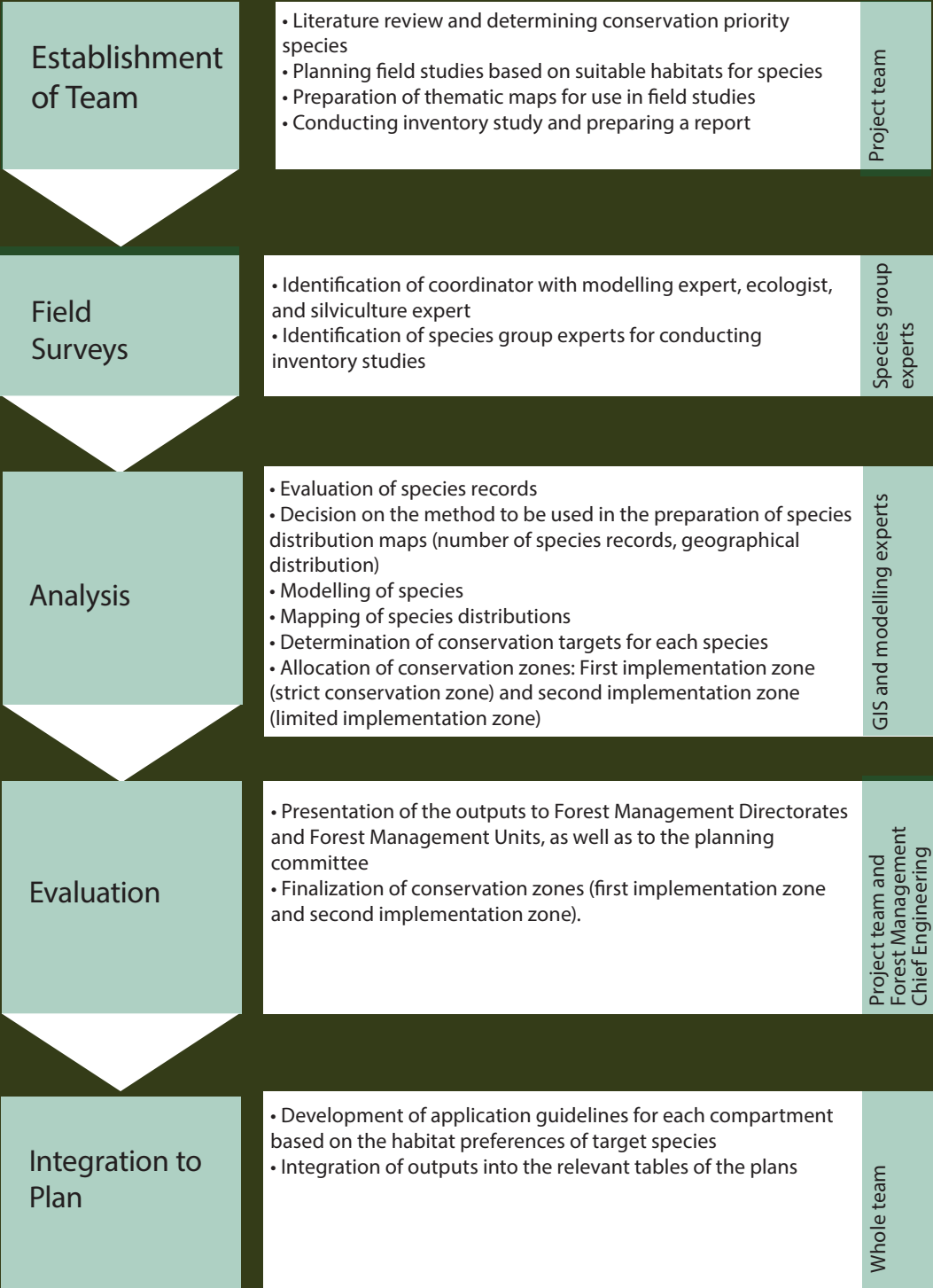
**Wanaturi's Sea Holly** (*Eryngium wanaturi*)  
Image: Murat Ekici & M. Erkan Uzunhisarcikli



**Black Woodpecker** (*Dryocopus martius*)  
Image: Ahmet Karataş

1. Identifying the focal species (conservation priority species) and ecological processes to be used in the integration process,
2. Mapping the distribution of species and processes using field records and modelling approach,
3. Identifying conservation targets for each biodiversity element and developing a conservation zone map using species distribution models,
4. Evaluating and finalizing the conservation zones specific to the Forest Management Unit together with the forest management planning team and Forest Management Directorate officials,
5. Developing guidelines for silvicultural practices at the compartment level in conservation zones and integrating them into the relevant sections of Forest Management Unit's forest management plans.

# Steps of integrating biodiversity into forest management plans









# FOCAL SPECIES

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## 4 large mammals

**Brown bear** (*Ursus arctos*)

**Wolf** (*Canis lupus*)

**Roe deer** (*Capreolus capreolus*)

**Eurasian lynx** (*Lynx lynx*)



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## 2 small mammals

**Levant mole** (*Talpa levantis*)

**Robert's snow vole** (*Chionomys roberti*)



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## 5 birds

**Eurasian goshawk** (*Accipiter gentilis*)

**Cinereous vulture** (*Aegypius monachus*)

**Egyptian vulture** (*Neophron percnopterus*)

**Great spotted woodpecker** (*Dendrocopos major*)

**Eastern imperial eagle** (*Aquila heliaca*)



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## 3 reptiles and 1 amphibian

**White-bellied lizard** (*Darevskia unisexualis*)

**Steppe viper** (*Vipera eriwanensis*)

**Darevsky's viper** (*Vipera darevskii*)

**Caucasian salamander** (*Mertensiella caucasica*)



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## 4 invertebrates

**Pearl-bordered fritillary** (*Boloria euphrosyne*)

**Dusky large blue** (*Phengaris nausithous*)

**Alcon blue** (*Phengaris alcon*)

**Zygaena** (*Zygaena armena*)



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## 6 plants

**Kesselring's Lily** (*Lilium kesselringianum*)

**Lathyrus karsianus** (*Lathyrus karsianus*)

**Tanacetum coccineum subsp. chamaemelifolium**

(*Tanacetum coccineum* subsp. *chamaemelifolium*)

**Lemon Fluff** (*Centaurea macrocephala*)

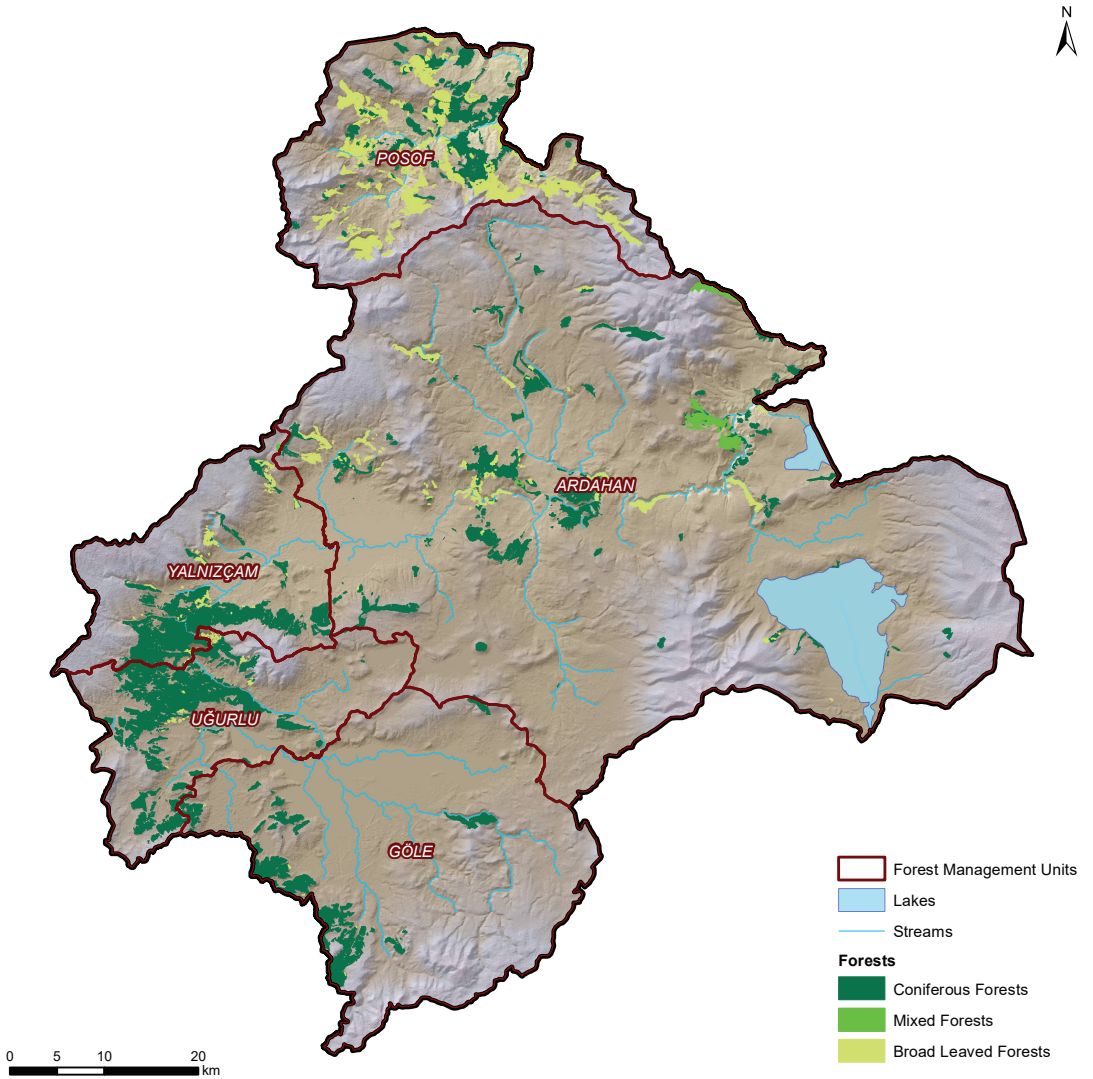
**Pontine oak** (*Quercus pontica*)

**Caucasian willow** (*Salix caucasica*)





# FORESTS OF ARDAHAN FOREST MANAGEMENT DIRECTORATE



# FOCAL SPECIES

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## 4 large mammals

**Brown bear** (*Ursus arctos*)

**Wolf** (*Canis lupus*)

**Eurasian lynx** (*Lynx lynx*)

**Wild goat** (*Capra aegagrus*)



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## 3 small mammals

**Marbled Polecat** (*Vormela peregusna*)

**Levant mole** (*Talpa levantis*)

**Robert's snow vole** (*Chionomys roberti*)



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## 6 birds

**White-tailed eagle** (*Haliaeetus albicilla*)

**Eurasian goshawk** (*Accipiter gentilis*)

**Eastern imperial eagle** (*Aquila heliaca*)

**Black woodpecker** (*Dryocopus martius*)

**Egyptian vulture** (*Neophron percnopterus*)

**Great spotted woodpecker** (*Dendrocopos major*)



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## 4 reptiles and 1 amphibian

**White-bellied lizard** (*Darevskia unisexualis*)

**Caucasian salamander** (*Mertensiella caucasica*)

**Uzzell's lizard** (*Darevskia uzzelli*)

**Common tortoise** (*Testudo graeca*)

**Wagner's viper** (*Montivipera wagneri*)



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## 4 invertebrates

**Pearl-bordered fritillary** (*Boloria euphrosyne*)

**Anatolian furry blue** (*Polyommatus antidolus*)

**Merhaba blue** (*Polyommatus merhaba*)

**Alcon blue** (*Phengaris alcon*)



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## 8 plants

**Ansin Birch-leaved Alder**

(*Alnus glutinosa* subsp. *betuloides*)

**Wanaturi Sea Holly** (*Eryngium wanaturi*)

**Acer divergens** (*Acer divergens*)

**Canoviridis Thyme** (*Thymus canoviridis*)

**Lathyrus karsianus** (*Lathyrus karsianus*)

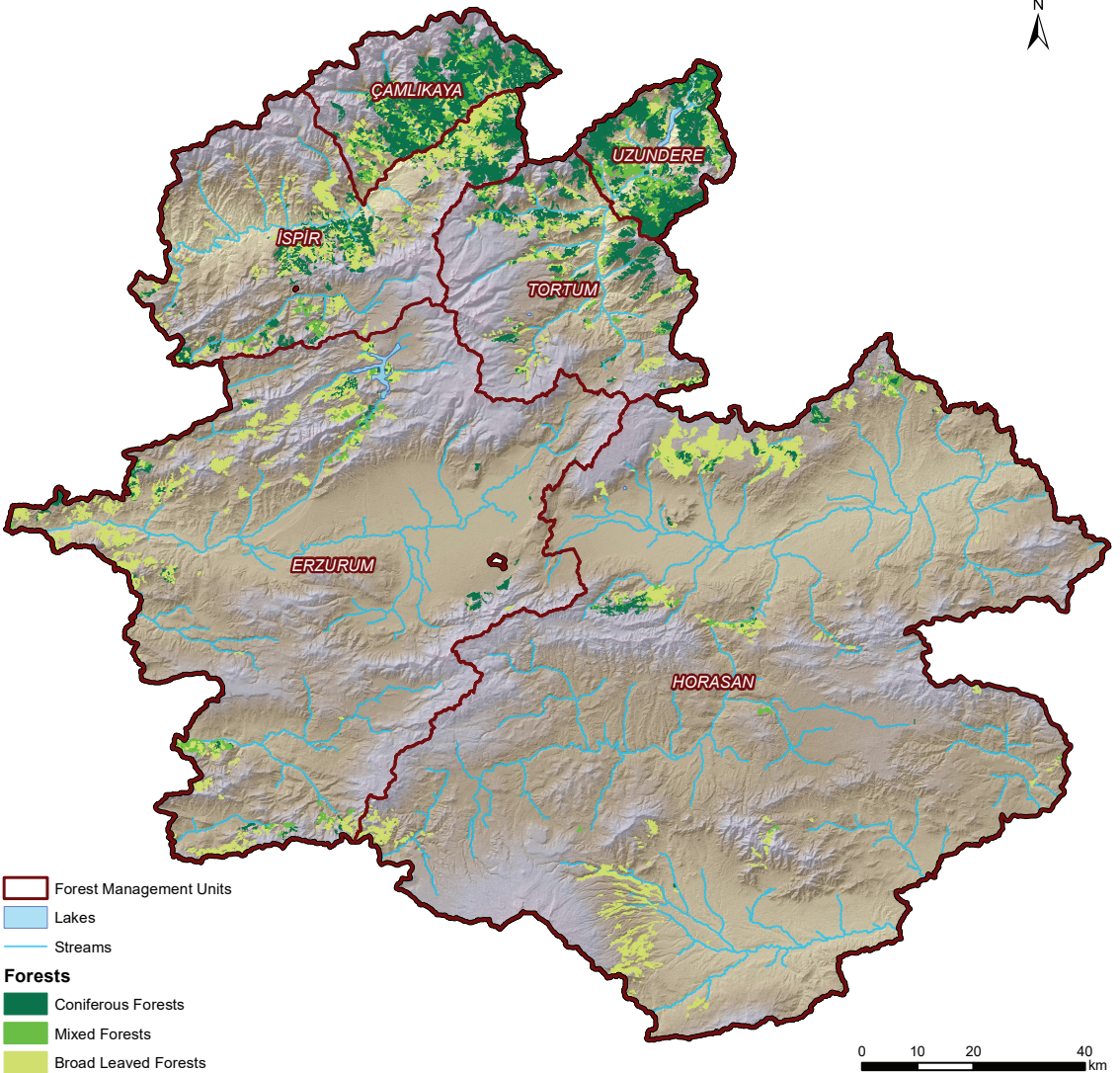
**Caucasian willow** (*Salix caucasica*)

**Cartilaginous Peppergrass** (*Lepidium caespitosum*)

**Huberi Sage** (*Salvia huberi*)



# FORESTS OF ERZURUM FOREST MANAGEMENT DIRECTORATE





# FOCAL SPECIES

---

## 3 large mammals

**Brown bear** (*Ursus arctos*)

**Wolf** (*Canis lupus*)

**Eurasian lynx** (*Lynx lynx*)



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## 1 small mammal

**Major's vole** (*Microtus majori*)



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## 6 birds

**Eurasian goshawk** (*Accipiter gentilis*)

**Cinereous vulture** (*Aegypius monachus*)

**Black woodpecker** (*Dryocopus martius*)

**Egyptian vulture** (*Neophron percnopterus*)

**Great bustard** (*Otis tarda*)

**Great spotted woodpecker** (*Dendrocopos major*)



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## 5 reptiles

**White-bellied lizard** (*Darevskia unisexualis*)

**Steppe viper** (*Vipera eriwanensis*)

**Uzzell's lizard** (*Darevskia uzzelli*)

**Common tortoise** (*Testudo graeca*)

**Wagner's viper** (*Montivipera wagneri*)



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## 3 invertebrates

**Eulasia** (*Eulasia chrysopyga*)

**Muzimes** (*Muzimes caucasicus*)

**Dusky large blue** (*Phengaris nausithous*)



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## 4 plants

**Lathyrus karsianus** (*Lathyrus karsianus*)

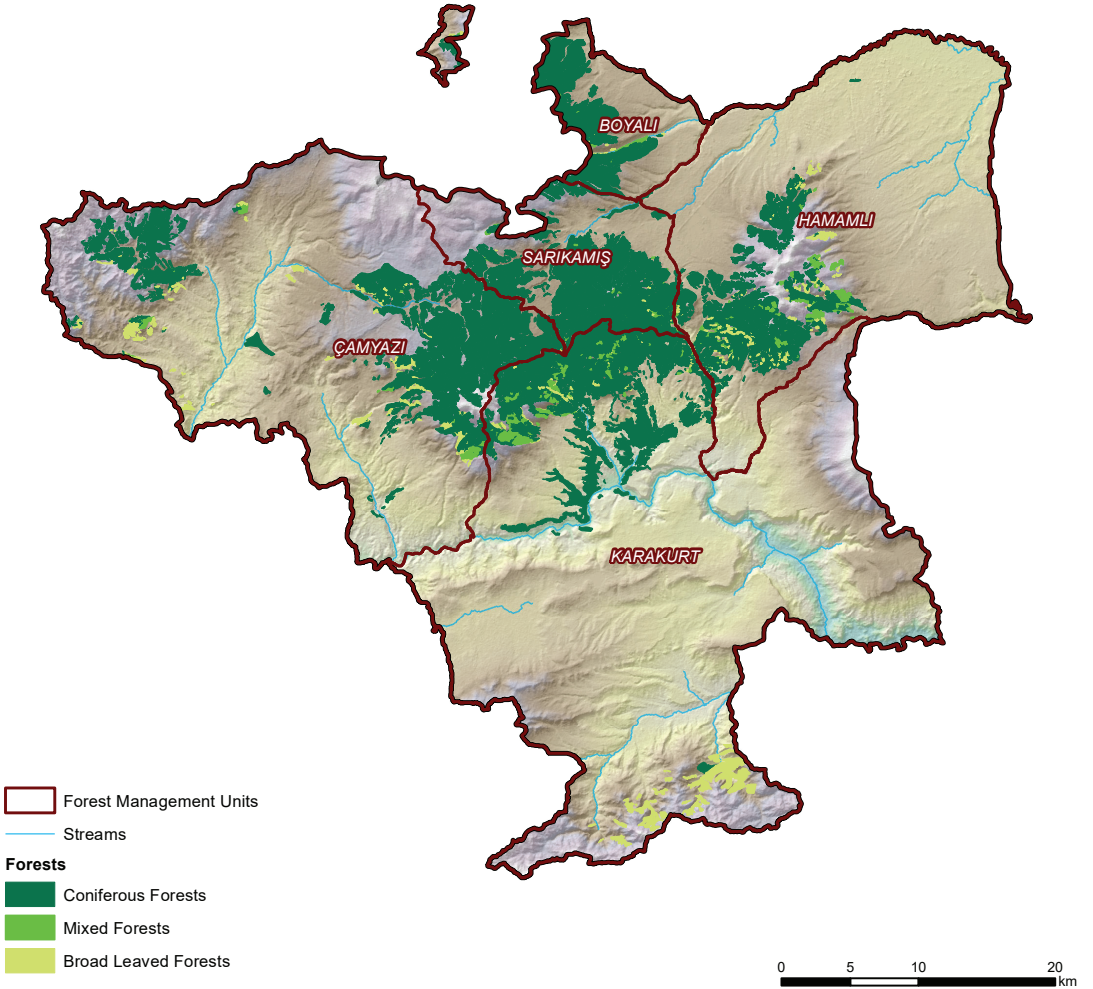
**Sarykamyschense hawkweed** (*Hieracium sarykamyschense*)

**Scattered-flowered Cephalaria** (*Cephalaria sparsipilosa*)

**Lemon Fluff** (*Centaurea macrocephala*)



# FORESTS OF SARIKAMIŞ FOREST MANAGEMENT DIRECTORATE











# IMPORTANT FOREST ECOSYSTEMS

The forest ecosystems of Ardahan, Erzurum and Sarıkamış Forestry Directorates located in the Caucasus Ecoregion are very rich in wildlife. This region hosts many large and small mammals, birds, reptiles, amphibians, invertebrates, and endemic plant species.

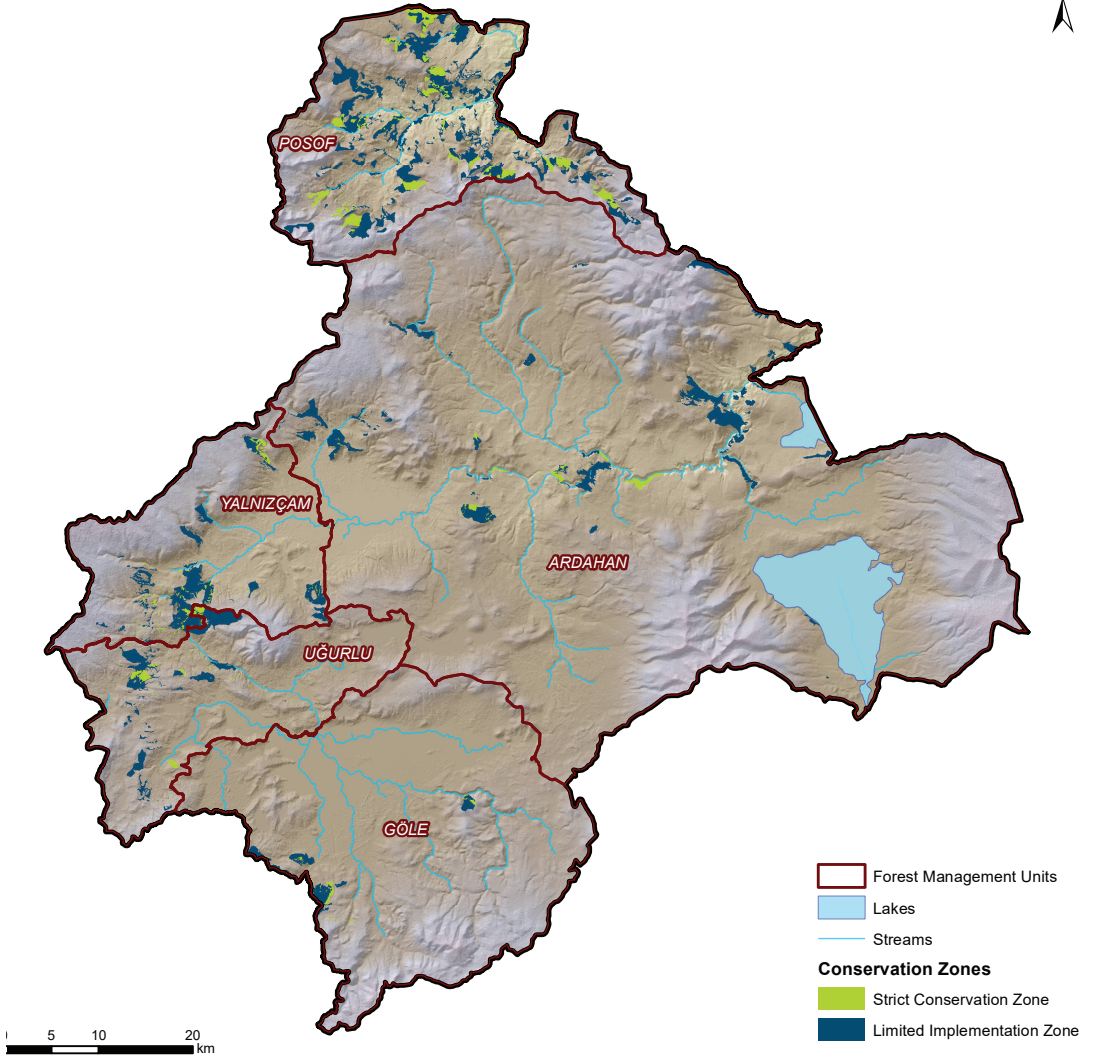
**Natural old-growth forests** are emerging as one of the most important conservation elements in forestry in the world and in Türkiye. These areas are rich in ecological processes, provide a unique habitat for many species and reflect the natural state of forest ecosystems in that region.

**Areas with high tree species richness** can be considered as indicators of biodiversity and ecological processes in the forest ecosystem. Such areas, which offer a rich habitat for different tree species, also provide different natural conditions and are considered as important areas for biodiversity and priority areas for conservation.









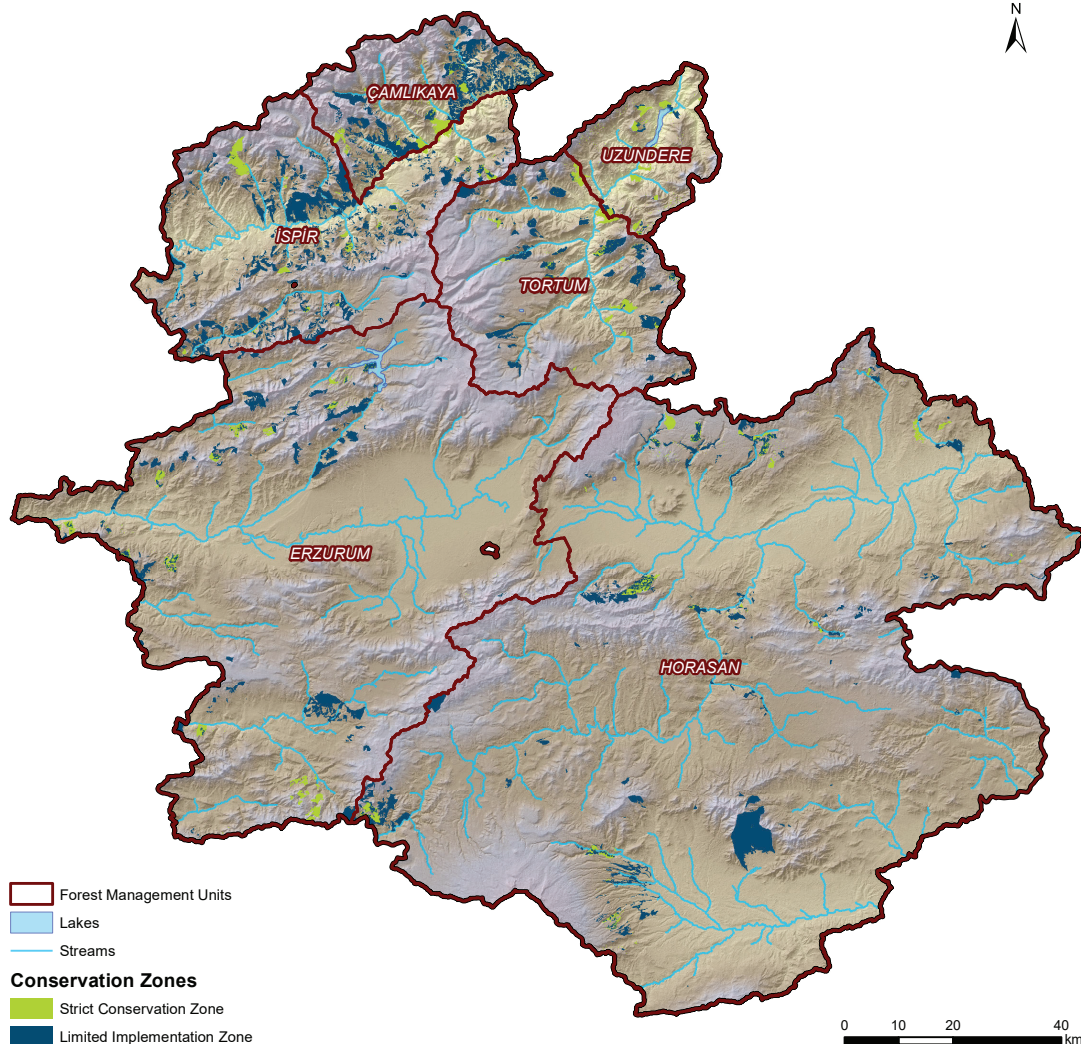
# ARDAHAN FOREST MANAGEMENT DIRECTORATE CONSERVATION ZONES

The presence of natural old-growth Scots pine forests and forests with high tree species richness including poplar, willow, birch, whitebeam and alder species support the rich wildlife in the region. These forest ecosystems are found especially in Posof, Yalnızçam and Uğurlu Management Units.









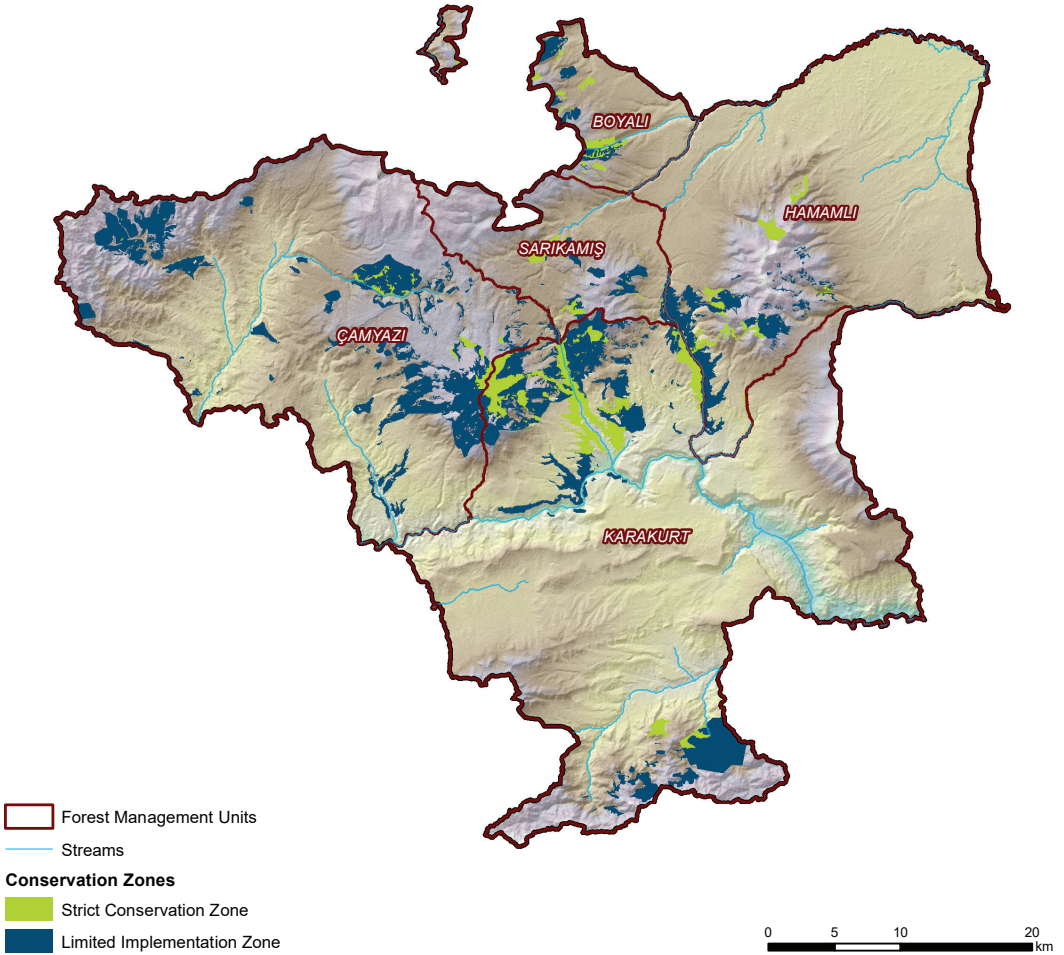
# ERZURUM FOREST MANAGEMENT DIRECTORATE CONSERVATION ZONES

The presence of natural old-growth Scots pine forests and forests with a high tree species richness, including poplar, juniper, oak, beech, spruce, hornbeam, hop-hornbeam, birch, whitebeam, etc., supports the rich wildlife in the region.









# SARIKAMIŞ FOREST MANAGEMENT DIRECTORATE CONSERVATION ZONES

The presence of natural old-growth Scots pine forests and forests with high tree species richness, including poplar, willow, birch, whitebeam and alder, supports the rich wildlife in the region. Forest ecosystems of this nature are found especially in the neighbouring areas of Çamyazı, Sarıkamiş, Hamamlı and Karakurt Forest Management Units.







# CONSERVATION ZONES

The minimum habitat area requirement for each species, the proximity of the selected areas to each other and the requirements of the General Directorate of Forestry for the site and forestry activities were considered while defining the conservation zones. The draft zoning studies were assessed in meetings and workshops with the forest management planning team and Forest Management Directorate officials and the conservation zones were finalized for each Forest Management Unit. These zones, called implementation zones, were defined in two different conservation categories.

The first one is the “first implementation zone”; priority areas for conservation. These forest areas will be adversely affected by any forestry intervention, need effective protection, and are important in terms of highly threatened species and other biodiversity elements. These areas are also called “strict conservation areas”.

The other conservation category, mostly designated to encircle these areas or establish connections among them, is the ‘limited application area’ where limited forestry activities will take place, known as the ‘second implementation zone’. Forestry activities should be planned and implemented to

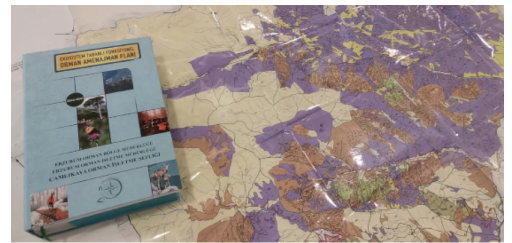
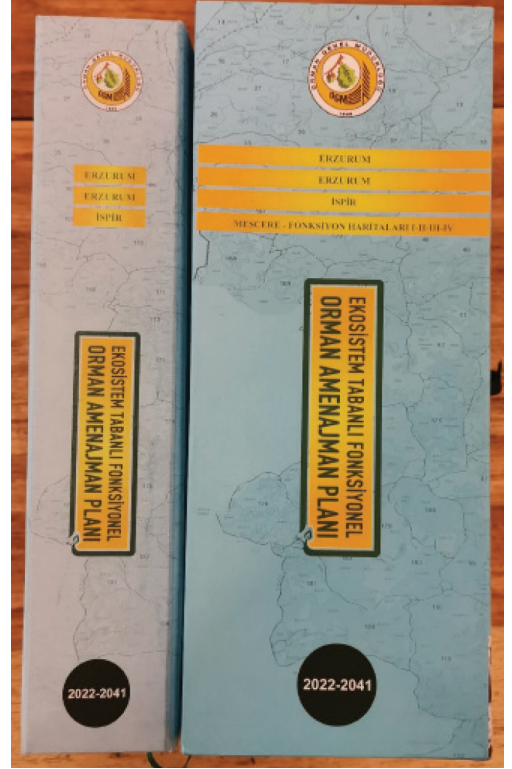
consider the habitat needs and life cycles of focal species and ecological processes in these areas. Application guidelines have been prepared for limited implementation areas. While preparing the guidelines which elements (focal species and ecological processes) coexist were determined, primarily on the basis of forest compartments.

The guidelines were prepared as recommendations for forestry activities to be implemented in that forest compartment according to the management plan, based on the characteristics of these elements such as the common habitat requirements and temporal constraints. These guidelines were placed at the end of the tables by referring to them in the relevant tables of the forest management plans.

In the integration studies, a report containing the recommendations for forestry activities developed for the focal species, species characteristics and the areas where they are recorded, together with species photographs for each Forest Management Unit, is given as an annex to each forest management plan.

Plans were prepared for 16 Forest Management Units and approved by GDF will be implemented for 20 years in the period 2022-2041.





The final versions of the conservation zones were given and forest management plans were prepared at the Ardahan, Erzurum and Sarıkamış meetings,













Within the scope of the 'TANAP Forest Biodiversity Conservation Project,' inventories of biological diversity elements (plants, birds, large mammals, small mammals, reptiles, and invertebrates, butterflies) and other biological diversity elements (old-growth forests, high tree species diversity areas, water sources) were conducted in Ardahan, Erzurum, and Şarkamış Forest Management Directorates. Conservation zones were determined, and recommendations were developed for the conservation and sustainable management of these species and critical forest areas. These recommendations were integrated into ecosystem-based functional forest management plans for each forest management unit.

