

## **An Authentic Approach for Managing Biodiversity at Pipelines**

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### **1. Introduction**

The Trans Anatolian Natural Gas Pipeline (TANAP), is the longest section of the Southern Gas Corridor (SGC) transporting Azerbaijani gas from the Shah Deniz-II gas fields in the Caspian Sea and other fields of Azerbaijan to Türkiye and to Europe, stretching for approximately 1,811 km, from the Georgian/Turkish border to the Turkish/Greek border (Figure 1).



Figure 1. Trans Anatolian Natural Gas Pipeline (TANAP)

The main objective of the biodiversity management activities of the TANAP Project is to achieve net gain of Critical Habitats and no net loss of Natural Habitats and Priority Biodiversity Features to meet the requirements of IFC's Performance Standard 6 (PS6) and EBRD's Performance Requirement 6 (PR6). TANAP strategies to achieve net gain and no net loss in critical and natural habitats include the implementation and monitoring of biodiversity offset projects.

TANAP is committed to managing the potential effects on biodiversity by implementing the biodiversity mitigation hierarchy (i.e. avoidance, minimization, remediation and, offset). The first three steps of the mitigation hierarchy have been incorporated in project design, environmental and social impact assessment, and biodiversity management planning.

To implement the last mitigation hierarchy step, a Biodiversity Offset Strategy (BOS) was adopted in 2017, and a Biodiversity Offset Management Plan (BOMP) in 2021, with the aim of generating positive impacts for biodiversity in a broad area throughout the whole Türkiye. The BOMP includes two types of Offset Projects: the “Resilient Steppe Offset Project” and the “Forest Biodiversity Conservation Offset Project” implemented in important ecosystems of Türkiye since 2022.

## **2. Resilient Steppe Offset Project**

The main objective of the Resilient Steppe Offset Project is to increase the resilience of the social-ecological system of the steppe in the context of changing social, ecological, economic and climatic conditions. This is achieved through the following activities:

1. Developing a rationale for the conservation, sustainable and regenerative use of the steppe ecosystems and biodiversity;
2. Improving effective management of the steppe ecosystems for conservation and sustainable livelihoods;
3. Conducting capacity building activities for steppe ecosystem management and conservation and for creating models for holistic and regenerative grazing.

To achieve biodiversity conservation through better land and grazing management, ecological and social analyses were conducted, a conservation and restoration plan, and an integrated rangeland management plan were prepared and implemented with a participatory approach in three sites (**Error! Reference source not found.**):

- Acıkır Gypsum Steppes [Eskişehir] offset site
- Bursa & Kütahya Serpentine Steppes offset site
- Hafik-Zara Gypsum Steppes (Sivas) offset site.



Figure 2. Resilient Steppe Offset Project Sites

The offset projects support the implementation of Türkiye’s National Steppe Conservation Strategy and Action Plan (2021-2030) with these high-level targets:

1. Conservation and rehabilitation: 0.2-0.5 % of the target habitats are rehabilitated using grazing exclusion, restoration activities, *in situ* and *ex situ* cultivation (seed bank, propagation and translocation of endemic and endangered species) at the sites listed in Table 1.

Table 1. Number of Species Conservation Areas and Rehabilitation Areas at offset sites

Offset Site	Species Conservation Areas	Rehabilitation Areas
Acikir	6	3
Bursa-Kütahya	4	1
Hafik-Zara	7	0

2. Integrated rangeland management: 25-50% of the target habitats within grazing activities are managed with the aim of achieving biodiversity enhancement and sustainable use of the steppe. To effectively implement the grazing management plans, local communities have been supported by providing water trough and piping for existing natural springs, solar panels for water pumping, trailer as shepherd

shelter, fencing systems as overnight herd shelters and portable electric fencing systems for temporary paddock division.

Adaptive management and monitoring of conservation, rehabilitation and integrated rangeland management activities are managed by local project staff at each offset site.

## 2.1. Monitoring and Results

Monitoring Protocols were prepared for each offset site, giving detailed description of the site characteristics, monitoring methodologies and indicators for:

- target habitats (principal indicators);
- target species (secondary indicators);
- forage production (secondary indicators); and
- carbon sequestration and storage (secondary indicators).

Table 2. Number of monitoring quadrants for target habitats and species in the offset sites

<b>Offset Site</b>	<b>Number of monitoring quadrants for target habitats</b>	<b>Number of monitoring quadrants for target species</b>
<b>Acıkır</b>	31	23
<b>Bursa-Kütahya</b>	20	8
<b>Hafik-Zara</b>	17	15

Ecological Outcome Verification (EOV - Savory Institute, 2021) is used for integrated rangeland management monitoring. EOV provides a holistic assessment of ecosystem health, evaluating both leading indicators found aboveground and lagging indicators found both above and below ground. EOV assesses five key outcomes that define land regeneration: a) ground vegetation cover, b) water infiltration, c) biodiversity, d) primary productivity, e) soil carbon and health.

EOV works on two-time scales: Short-Term Monitoring (STM) and Long-Term Monitoring (LTM).

STM is conducted annually during the growing season and assesses qualitative aboveground indicators like bare ground and biodiversity. The sum of the scores for each indicator gives the Ecological Health Index (EHI) for a given land base, which is the main indicator of regenerating land.

LTM is conducted at baseline and every five years and assesses lagging indicators of ecosystem function such as soil carbon, plant diversity metrics, water infiltration.

Table 3. Number of LTM and STM sites in the offset sites

Offset Site	Number of LTM sites	Number of STM sites
Acıkır	6	34
Bursa-Kütahya	5	30
Hafik-Zara	6	31

The 2023 monitoring results show the progress of the offset plans at each offset site:

**Integrated range management areas:**

Offset Plan Target:		2023 Results
25-50% of the target habitats in the grazing areas		
Target:	Acıkır: 1,928 – 3,857 ha Bursa-Kütahya: 411– 822 ha Hafik-Zara: 1,156 – 2,313 ha	Acıkır: 9,308 ha Bursa-Kütahya: 1,659 ha Hafik-Zara: 5,545 ha

**Rehabilitation Areas & Species Conservation Areas:**

Offset Plan Target:		2023 Results
0.2-0.5% of the target habitats in the grazing areas		
Target:	Acıkır: 15-38 ha	Acıkır: 29.17 ha

	Bursa-Kütahya: 3 - 8 ha Hafik-Zara: 9 - 24 ha	Bursa-Kütahya: 39.34 ha Hafik-Zara: 12.57 ha
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### **Grazing plan & implementation satisfaction by villagers in the offset sites:**

Average: 4.18 / 5 (satisfied)

### **3. Forest Biodiversity Conservation Offset Project**

The main objective of the Forest Biodiversity Conservation Offset Project is to enhance sustainable forest management and biodiversity conservation in three Forest Management Directorates (FMD) of the Erzurum Regional Directorate of Forestry (Figure 3):

- the Ardahan FMD;
- the Erzurum FMD;
- the Sarıkamış FMD;

These FMDs include a total of 16 Forest Management Units with 1,812,415 ha of natural habitats, of which 221,762 ha are forest ecosystem.

Specific objectives of the project include:

1. Enhancing forest biodiversity conservation by integrating biodiversity values into forest management.
2. Improving biodiversity monitoring in forest ecosystems.
3. Conducting capacity building activities for sustainable management, conservation, and monitoring of forest ecosystems.



Figure 3. Forest Biodiversity Conservation Offset Project Sites

To enhance sustainable forest management and biodiversity conservation in the offset sites, ecological surveys, species distribution modelling and the definition of forest conservation zones were carried out at the three sites. Forest Conservation Zones include two different categories with different levels of biodiversity protection: Strict Conservation Zones and Limited Implementation Zones. The integration of conservation zones into forest management plans was based on ecological criteria described in the national guideline published by the Nature Conservation Centre (Zeydanlı and Özüt, 2019) (Table 4).

The forest conservation zones were identified in collaboration with the FMDs' staff based on extensive field studies and following these principles and criteria:

- The responsibility to formally define Forest Conservation Zones limits belongs to FMDs;
- Forest Conservation Zones aim to maximize the protection of target forest habitats and species identified in the BOMP.

- Strict Conservation Zones are located exclusively in forest natural habitats. No forestry activities are allowed in these zones. The target for the strict conservation zones is 3-5 % of each FMD target forest habitats;
- Limited Implementation Zones include natural forest and non-forest habitats where the FMD can implement measure such as exclusion of grazing, avoidance of afforestation and avoidance of any agricultural activities. Guidelines are provided regarding the periods when silvicultural and other forestry practices should be made, and the restrictions and precautions to be followed. The target for the limited implementation zones is 5-8% of each FMD target forest habitats.

Table 4. Forest Conservation Zones integrated into forest management plans of offset sites.

Offset Site (FMD)	Natural Habitats (ha)	Strict Conservation (ha)	Limited Implementation (ha)	Total Zones (ha)	Percentage for the natural habitats
<b>Ardahan (5 FMU)</b>	314,737	3,404	18,888	22,292	7.08%
<b>Sarıkamış (5 FMU)</b>	108,895	3,029	17,269	20,298	18.64%
<b>Erzurum (6 FMU)</b>	1,388,783	6,395	76,198	82,593	5.95%

The forest conservation zones are integrated and legalized through the approval of the Ecosystem Based Functional Forest Management Plans for each Forest Management Unit (FMU) by the General Directorate of Forestry and are implemented and monitored for a period of 20 years (2022 – 2041).

### 3.1. Monitoring and Results

Monitoring guidelines and protocols were prepared for each offset site, describing the site characteristics, monitoring methodologies and indicators for:

- target forest habitats (principal indicators);
- focal species for national forest conservation system (secondary indicators);



- ecological and evolutionary processes (secondary indicators).

The monitoring guidelines and protocols were implemented following the training of local FMD staff. 2023 monitoring results show the progress of the offset plans at each site.

**Areas effectively managed and protected.**

<b>Key Performance Indicators</b>	<b>Target Metrics</b>	<b>Results - 2023 Monitoring</b>
Hectares (ha) of strict conservation zones effectively managed and protected from forestry	No decrease in the surface of Strict Conservation Zones in 3 FMDs: <ul style="list-style-type: none"> <li>• 6,707.89 ha in Erzurum FMD;</li> <li>• 3,028.61 ha in Sarıkamış FMD;</li> <li>• 3,403.81 ha in Ardahan FMD.</li> </ul>	No decrease.
Hectares (ha) of limited implementation zones sustainably managed	No decrease in the surface of natural habitat in Limited Implementation Zones in 3 FMDs: <ul style="list-style-type: none"> <li>• 76,198.40 ha in Erzurum FMD;</li> <li>• 17,269.38 ha in Sarıkamış FMD;</li> <li>• 19,213.53 ha in Ardahan FMD.</li> </ul>	No decrease.

**Effective conservation of indicator focal species:**

<b>Key Performance Indicators</b>	<b>Target Metrics</b>	<b>Results - 2023 Monitoring</b>
Effective protection of target species from forestry activities which are not biodiversity friendly	Effective protection from any forestry activities in FMUs per year in Strict Conservation Zones.  Effective (more than 75%) implementation of the forestry	Strict Conservation Zones: No forestry activity was conducted.

	guidelines in FMUs per year in Limited implementation Zones.	Limited Implementation Zones:  Erzurum FMD : 100%  Sarıkamış FMD : 93.33%  Ardahan FMD : 88.54%
Maintenance of suitable habitats for focal large mammal and bird species (ha)	No change in the suitable habitats for focal large mammal and bird species (compared to 2021 Suitability Model).	No change.
Number of Cinereous Vulture nests (actively used)	No change / decrease in the number of Cinereous Vulture ( <i>Aegypius monachus</i> ) nests (3 active nests used).	The number increased from 3 to 4 four active nests.

**Areas effectively managed and protected for ecological and evolutionary processes:**

<b>Key Performance Indicators</b>	<b>Target Metrics</b>	<b>Results - 2023 Monitoring</b>
Hectares of areas effectively managed and protected (ha) for ecological and evolutionary processes	No decrease in the forest areas of ecological and evolutionary processes in 3 offset sites. - 6 sites covering 1,713.60 ha in Erzurum - 9 sites covering 2,799.66 ha in Sarıkamış - 8 sites covering 1,489.04 ha in Ardahan	No change.

#### 4. Multiplier Effects

Collaborative implementation of the offset projects with local government authorities has created a multiplier effect in the conservation and sustainable management of steppe and forest ecosystems in Türkiye.

The increased cooperation between central and local bodies of the Ministry of Agriculture and Forestry, regional development agencies, and municipalities, created new opportunities for supporting local communities in sustainable natural resource management in steppe ecosystems.

The General Directorate of Nature Conservation and National Parks initiated a collaboration with DKM (one of the partners of the project) on preparing species action plans for target plant species in the steppe offset sites.

Biodiversity integration into forest management plans experience in Erzurum was a key performance indicator in General Directorate of Forestry's Biodiversity Road Map. Under this road map Erzurum experience has been replicated in different regions of Türkiye since 2021 (Table 5).

Table 5. Replication of Erzurum experience in different FMDs of Türkiye since 2021.

<b>Year</b>	<b>FMD with biodiversity integrated forest management plans</b>	<b>Natural habitats (ha)</b>
2021	1 FMD	58,865
2022	3 FMD	204,966
2023	3 FMD	410,107
2024	10 FMD	1,621,783

Forest biodiversity monitoring guidelines and protocols during the project will be adopted at the national level by the General Directorate of Forestry.

## References

Savory Institute. 2021. EOVS VERSION 3.0 MARCH 2021. Website: <https://savory.global/eov/> Accessed on 17.04.2024

Zeydanlı, U. and Özüt, D. (editors). 2019. Integrating Biodiversity into Forestry - Planner's Guide. Ankara, Doğa Koruma Merkezi, 173 pages.