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## For the Future: Sustainable Wildlife Reserve Management in Turkey

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### Abstract

Wildlife management is particularly necessary in today's world. In recent years, various groups and many individuals interested in the management of wildlife resources have recognized a need for reform in wildlife resources and management. Nowadays, sustainable management of wildlife is one of the most popular topics in every country. Sustainable wildlife management is an essential tool to conserve certain biodiversity and is vital for maintaining and enhancing ecosystem services. Wildlife areas are the important biodiversity areas of Turkey, and they host many endangered plant and animal species. The fact that these important wildlife areas can't be managed properly will cause important problems not only for Turkey but also for World biodiversity. In this study, it was aimed to examine the main problems of wildlife resource management in Turkey and to provide solution suggestions. The most important problem in wildlife areas is the lack of qualified wildlife personnel; in other words, the inappropriate management of wildlife resources. Besides that, the ineffective legislation and organization, lack of qualified guarding teams, inability of preventing poaching, non-scientifically planned areas, non-scientific limitation on wildlife reserve, identification of unsuitable areas for target species, residential areas, agricultural lands, grazing activities, forestry activities, predators, stray dogs, and the lack of inventory and recording system are the other important problems of wildlife resource management.

**Keywords:** wildlife reserve area; wildlife management; management plan; Turkey.

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## **1. Introduction**

Sustainable wildlife management is the sound management of wildlife species to sustain their populations and habitat over time, taking into account the socioeconomic needs of human populations. This requires that all land-users within the wildlife habitat are aware of and consider the effects of their activities on the wildlife resources and habitat, and on other user groups [1]. The wildlife areas play significant role in sustaining the wildlife population and biodiversity, as well as minimizing the threats on endangered species [2, 3, 4, 5]. Wildlife areas have important responsibilities such as contributing to the local economies and carrying the natural sources into the next generations [5, 6, 7].

There are many great wildlife areas in the world. These great areas represent the last places on earth where the natural World remains largely intact [6]. America's Yellowstone was the world's first national park, established by the United States government in 1872 [3]. Since then, there are over 209.000 protected areas in the world that cover 11.8 to 15.4 percent (both terrestrial and sea) of the world's surface area [8]. By 2015, 17.5% of countries had completed and reported at least one management effectiveness assessment for 60% of the reserves within their protected area estate [9].

Turkey has a very rich biodiversity because of its geographical location on the world and also because of its geological and morphological structure. This diversity is also valid for game and wildlife. More than 80% of plant and animal species of the European Continent are represented in Turkey [10]. Turkey has designated many wildlife resources throughout the country that includes national parks, nature parks, nature protection areas, specially protected areas, Ramsar site, wildlife reserve areas and wildlife protection areas. Conflicts over management of wildlife resource have increased dramatically during the last decade in Turkey. Wildlife is managed in 81 Wildlife Reserve Areas (WRA) throughout the country. The preparation of management plans for wildlife areas first started in 2008. In WRA, it is of vital importance to take the unplanned use process under control via planned management measures. But this potential couldn't be efficiently used in efforts made to date. In Turkey, the wild sources are not sufficiently preserved, poaching cannot be prevented, and there are significant gaps and insufficiencies in policy and organization regarding the management and development of those sources. The issue has been addressed in particular on the basis of the WRA. This is because these sites cover parts of land that are important both ecologically and economically and where it is tried to accomplish many crucial goals from the protection of gene resources to hunting tourism. From an administrative standpoint, these sites are in a position to shed light on the planning or operation of many areas, including wildlife, such as natural protected areas and hunting grounds, if well planned. Therefore, putting a scientific, rational and feasible management plan model for these fields are considered to contribute greatly to the planning and management of our wildlife resources [11].

## **2. Material and Methods**

The study was based on primary and secondary data collected between 2011 and 2016. The primary data have been obtained from the work we did on 4 Wildlife Reserve Areas. In this study, the management plans of Kastamonu Azdavay Kartdağ WRA, Gümüşhane Şiran Yukarı Kulaca WRA, Erzurum Çat WRS and Kars

Kağızman - Sarıkamış WRA have been carried out by us, between 2011 and 2012 [12] (Figure 1). Interest group meetings have been held twice a year during the work we did on four different sites. The attention paid to the interest groups on the area and their effects have been evaluated at meetings. All the problems encountered in the preparation of the management plan have been evaluated in the study.

As secondary data, the management plans of wildlife reserve areas in different regions of Turkey have been completed and 16 wildlife reserve areas have been selected [12]. (Figure 1) and the problems in these areas have been revealed. At the same time, up-to-date topics related to wildlife management, wildlife areas in Turkey and related laws have been discussed.



**Figure 1:** Locations of study areas (WRAs) on Turkey (●)

### 3. Result and Discussion

#### 3.1. Wildlife Management and Wildlife Managers in Turkey

In recent years, Turkey has fallen far behind the world in sustainable hunting and wildlife management. Some of the main limitations to effective wildlife management are lack of organizational capacity, unclear or weak land tenure, poverty, poor governance, and lack of political will. Another reason is insufficient wildlife education given at universities.

Wildlife in Turkey is governed by management plans in the National Park, Nature Park, Ramsar Site, Special Environmental Protection Area and Wetlands, especially in Wildlife Reserve Areas and Wildlife Protection Areas. The management of wildlife in Turkey had been under the control of Forest Management Chiefs which are the rural units of Directorate General of Forestry conducting the forestry and the environmental activities from 1839 until the beginning of 1990's. Excluding urban areas such as the cities and the towns, all environmental protection actions are executed by these chiefs who are all forest engineers. The actions for the protection of environment and the wildlife were carried out in various structural arrangements after 1990's and from 2003 onwards; they have been carried out under the guidance of General Directorate of Environmental Protection and National Parks. Both the Forest Management Chiefs and the most authorized wildlife specialists in the National Parks are forest engineers [13].

As we know from some occasional examples in our country, wildlife areas can easily be destroyed if they are not planned. What is done in all over the world to protect wildlife, not being different than what is done in Turkey, is to create certain areas that the wildlife is protected. Wildlife areas in Turkey are managed by management plans.

The preparation of management plans for wildlife areas first started in 2008. While preparing the WRA Management Plans, the planning team leaders are not chosen from the specialists having knowledge about the ecology and biology of target species in Turkey. In planning teams of these plans, there is no specialist having knowledge on the target species.

The plans that have not been prepared by specialist and experienced committees or advisors are less likely to be implemented. In the plans, which we examined, the core planning teams were not supported by the specialist advisors in different phases of planning process. There is no representative of local people in the planning team to be established [14].

For instance, the target species of Çoruh Valley WRA Management Plan is Wild goat (*Capra aegagrus*), and the planning leader is aquaculture engineer, while the target species of Verçenik WRA are Wild goat and Anatolian chamois (*Rupicapra rupicapra*) and the planning leader is a landscape architect (Tables 1).

Because the main subject of management plans is the human and thus the subject has a social aspect, it is necessary to ensure the active participation of local people and relevant bodies into every phase of planning process and to better utilize these factors for area management process. But, in those meetings, the management plan prepared for the areas are explained, and the suggestions of local people and hunters are not taken into consideration in these plans.

It can be seen that it is very important to ensure the participation of interest groups into the WRA stakeholder meetings during the WRA Management Plan preparation period, to analyze the villages in and nearby the areas from cultural, social and economic aspects, and to determine the expectations of local community.

In the world, North America, Western Europe, Australia, Japan, New Zealand leads many developing countries in education. However, wildlife departments, especially in the United States and Canada, are the countries that leave their mark in the world's wildlife education and management in many continents and countries [15].

In the field of wildlife in Turkey until the 1990s, this issue has always been ignored even in the Department of Forestry Engineering, where most of the National Park Engineers currently performing this task have been educated. For many years, the wildlife issue, which is regarded as a non-essential workspace, has just begun to be noticed.

Sustainable hunting and wildlife education with a 200-year history in the world has evaded being treated as a secondary issue in our country with the establishment of the Department of Wildlife Ecology and Management in 2009.

**Table 1:** Institutions Making the Plan, Planning Team, and Contributors

Planning Team (*Planning Team Leader)	Wildlife Reserve Areas																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Wildlife expert																	√*	√*	√*	√*
Forest engineer	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Biologist		√		√									√		√*	√*				
Veterinary		√				√									√					
Landscape architect		√										√*								
Aquaculture engineer			√*														√	√	√	√
Environmental engineer		√																		
Forest industry engineer																	√	√	√	√
Agricultural engineer				√											√					
<b>Experts Contributing to the Plan</b>																				
Forest engineer	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Wildlife expert (Mammal, Bird)				√				√									√	√	√	√
Plant Expert				√					√					√			√	√	√	√
Landscape Arch., Urban and Reg. Planner															√					
Geomatics Engineering								√									√	√	√	√
Environmental engineer								√							√					
Forest industry engineer											√		√	√						
Agricultural engineer								√						√	√					
Aquaculture engineer																				
Entomologist																	√	√	√	√
Biologist			√	√	√			√					√	√	√	√	√			
Herpetologist								√												
Archaeologist					√															
Geologist								√								√		√	√	√
Sociologist				√					√					√				√	√	√
Geographer				√																
Rural Economy and Develop.Specialist					√															

(Wildlife Reserve Areas; 1: Aladağlar, 2: Cehennem Deresi, 3:Çoruh Vadisi, 4: Demirkazık, 5: Dim Çayı, 6: Hançer Deresi, 7:Karanfıldağı, 8: Sivridağ, 9: Üzümdere, 10: Köyceğiz, 11: Verçenik, 12: Şeytandağları, 13: Düzlerçamı, 14:Emremsultan, 15:Posof, 16: Yeşilöz, 17: Kartdağ, 18: Çat, 19: Şiran- Kuluca, 20: Kağızman)

### 3.2. Laws and Regulations

In Turkey, the wildlife areas are scattered to the various living spaces such as forests, forages, and wetlands and there are archeological and cultural values in those areas. In addition, different institutions have authority on those areas, and these problems cause coordinative and administrative problems between the institutions. 81 WRAs in our country consist of Wetlands, Ramsar Site, National Parks, Nature Reserve Areas, Natural Parks, Specially Preserved Environment Area, and many Natural Preserved Areas. In case that there are multiple preservation statuses in the same area, it is unclear which one will be taken into consideration while managing the area and according to which one the management plan will be prepared. Besides that, those areas may originate from different national and international legal regulations, and this causes administrative problems in practice and the different approaches between or even within the institutions prevent the concordant implementation of management plans in coordinated manner (Table 2).

**Table 2:** Different protection statutes, laws and management units in 20 Wildlife Reserve areas

Protection status	Law	Management Unit
Wildlife reserve and protected area	Law on Land Hunting (Law Nr. 4915)	General Directorate of Nature Protection and National Parks
National park, Nature park, Nature protection area	Law on National Parks (Law Nr. 2873)	General Directorate of Nature Protection and National Parks
Ramsar site	Ramsar Convention	Ministry of Forestry and Water Management
Specially preserved environment area	Law on Environment (Law Nr. 2872)	General Directorate of Protection and Natural Assets
Forest area	Law on forest (Law Nr. 6831)	General Directorate of Forestry
Archaeological and natural sites	Law of Protecting Cultural And Natural Assets (Law Nr. 5226)	Ministry of Culture and Tourism

According to Law on Land Hunting (Law Nr. 4915), the administrative responsibility of WRAs is on Directorate General for Nature Conservation and National Parks affiliated to Ministry of Forestry and Water Affairs. Majority of land ownership of WRAs belong to the government, while some of WRAs are located on the private properties.

Land use in WRA is generally managed by the Directorate General for Nature Conservation and National Parks affiliated to Ministry of Forestry and Water Affairs for the forestry purposes. For the lands, where there is no management plan, the forestry activities are performed in accordance with the Forestry Management Plan, which is prepared in accordance with functional planning approach and without considering the wildlife.

The private property zones in area are used for village accommodation, agricultural purposes, transhumance, pasturage, and etc. The area might also be used for the purposes such as mining, tourism, aquaculture, energy

investments, and etc. Directorate General for Nature Conservation and National Parks, which is responsible for the management of wildlife sources, cannot work in coordination with other institutions and companies lying claim to utilize those sources.

If other sources in the area are not considered while planning, very difficult-to-solve problems occur, especially in regard to the utilization of forest, mine, and water sources.

In WRA, where there is no management plan, it is a problem which of forestry, mining, aquaculture, energy investment, housing, pasturage, and agriculture activities will be allowed to what extent. Moreover, the activities such as mining, aquaculture, housing, and pasturage can be performed in any location of the areas until the management plan is prepared [14].

### **3.3. Stakeholders**

Wildlife management is important to balance both the needs of people as well as the needs of wildlife, and is a key component in efforts to ensure the conservation, sustainable use and access and management of associated benefits derived from biodiversity.

How participation can be realized in the planning of wildlife resources is a matter that cannot be formulated, though it is a subject mentioned many times. An understanding of the stakeholders' attitudes towards conservation and existing policies are critical in designing new policies or sustainable conservation strategies [16].

Local people's attitudes towards protected areas depended on the management category of the particular protected area. In our country, stakeholder meetings are organized in the planning studies of wildlife reserve areas in the recent period, and stakeholders are given the opportunity to express themselves in these meetings.

In our examinations in wildlife reserve areas, it is seen that there is not a well-rounded investigation about future demands of local people and hunters and their usage in the field.

For the planning of wildlife reserve areas, it is understood that the wildlife reserves are not analyzed in all aspects of the villagers' social, cultural and economic aspects, the present structure is not revealed, and the expectations of the local people are not determined.

With this study, all interest groups in wildlife reserve areas have been identified, and their attention to the area, the form of benefiting from the area and their positive and/or negative effects on the area have been determined (Table 3).

**Table 3:** Stakeholders in the Wildlife Reserve Areas, their attention to the areas and their impact on the area [12, 14].

Stakeholders	Relationship with the field	Stakeholder's		Why it affects negatively
		Affinity Level	Influence Level	
		+:Positive -: Negative		
Local Administrations	They provide administrative support	+	+	
General Directorate of Nature Protection and National Parks	They are responsible for the management of the area.	+	+	
General Directorate of Forestry	They are in charge of recovering, protecting and managing the forests.	+, -	+, -	Wood production activities during the breeding period of wild animals
Universities	Scientific research.	+	+	
Security forces	They provide support for the activities of protection and control.	+	+	
National Education Directorate	They are responsible for the education and raising awareness of the people.	+	+	
Highways Directorate	They conduct activities concerning transportation.	+	+, -	Negative effect of the road works etc. done within the area
Provincial Directorate of Agriculture	They provide technical and financial support to local communities to ensure sustainable use of agricultural lands and pastures.	+	+	
Power Administration	Visual and physical pollution caused by electricity and telephone services	+	+, -	Negative effect of telephone and electricity lines to be constructed within the area due to destruction and discomfort made over nature
State Hydraulics Works	They are authorized on the matter of management of water resources in basins.	+	+, -	Dam projects planned to be done by the institution adversely affecting the water resources of the area
General Directorate of Combating Desertification and Erosion	They are responsible for preventing all kinds of erosion with planting and afforestation works that form food and shelter for wild animals in the area.	+	+, -	Incorrect selection of species or planting of wrong areas can lead to loss of food, shelter, and habitat for wild animals
Provincial Directorate of Culture and Tourism	They conduct promotional activities for the development of tourism activities.	+	+	
Locals	Their use of natural resources due to living in and around the area	+, -	+, -	People using natural resources insensibly, destroying nature, and so on.
The locals, grazers, hunters who are not members of the	Using the field for its activities	+, -	+, -	Grazing endangering endemic species, undocumented hunters



Stakeholders	Relationship with the field	Stakeholder's		Why it affects negatively
		Affinity Level	Influence Level	
		+:Positive -: Negative		
hunters' club, beekeepers				hunting unconsciously and endangering populations of wild animals,
Collectors of plants and mushrooms etc. in the vicinity.	They are collecting non-wood forest products.	+, -	+, -	Insensible gathering of (non-sustainable) plants are endangering the genera of plant species and the nutrients of wild animals are being destroyed.
Hunting tourism companies	They make hunting tourism in a certain discipline and organization in the area.	+	+	
Hunters' Club and other Hunting Associations	They support the control of hunting in the area and raising awareness of hunters	+, -	+, -	Not enough training on hunting and low level of consciousness
National and Local NGOs	They conduct works to raise awareness of local people and to make them adopt the area	+	+	
Tourism businesses and agencies	They want to improve the ecotourism activities in the area and use it more in tourism activities	+	+	

### 3.4. Poaching

Poaching is an illegal harvesting of the wildlife species which has many ecological and social consequences on the wildlife and the management of wildlife resources. The illegal hunting can negatively impact the population of animals as it might cause local extinctions. Poaching is not a new problem in Turkey. The most important risk threatening the wild animals in Turkey is the poaching. The number of poacher in Turkey is estimated to be approximately 2 million [17]. Higher degree of human use of living spaces in wildlife reserve, poaching, and pressure of predators significantly decreased the number of wild animals. One of the most important reasons of this is the lack of sustainable preservation system. Poaching is one of the biggest problems in wildlife development. The most important reason for this is the insufficient works of protection and control. The branch directorates responsible for the management of the fields do not have enough protection staff, tools, and equipment. Protection teams don't have enough personnel educated on wildlife and equipped sufficiently and therefore inadequate inspection cause increase in illegal hunting in the areas. The results of our work in the fields show that the people of the region do not have enough knowledge about wildlife. For the wildlife to be able to survive, it is necessary to educate and raise awareness among the interest groups, especially children, and teenagers, in the field and in the affected area, on the matters of the love of nature, wildlife, biodiversity, forests and water resources. Preparation and implementation of a systematic area conservation plan that will also activate the legal entity of the village will reduce illegal hunting in the area.

### **3.5. Forestry, Agriculture and Grazing Activity**

All forestry activities in Wildlife Reserve Area are made according to functional plans. Functional forest plans do not take into account the necessities of wildlife. WRA Management Plan is made up many parts of the area are used for the purpose of forestry activities. The basis of production in forestry is based on a well-planned forest road network. Road density value forest areas in Turkey are not calculated according to the intensity with the aim of ensuring the opening of the forest. The forestry activities, which are not prioritizing to preserve the biodiversity and not considering the requirements of target species in areas, are executed even in Core Zone of WRAs [12, 14]. Until the Management Plan is prepared, these activities can be executed in any location of areas. This disintegrates the living spaces of target species. Agricultural and residential areas within the WRA decrease the living space of wild animals and create pressure on them. In management plans, it is not clear how to train the local people about sustainable use of these areas. It was observed that there are dump sites around all of the examined areas and there was no measure taken against the solid and liquid wastes. Thus, the wastes are generally left nearby the rivers and roads and lead the wild animals to feed around and infected with contagious diseases [12, 14]. In WRAs, there are limited forage/pastures, the food competition occurs due to the unauthorized pasturage of cattle in forest areas and glades, and the compression and wear of soil, the smell of pets in area, and the potentially contagious diseases pose risk for the target species [12, 14]. In management plans, it is not clearly specified when and where such activities will be allowed. Hence, the availability of the expected benefits from the areas separated as WRA depends on the introduction of a planning model that takes into account the social, economic and cultural structure of the local population. In this context, it will be understood that for wildlife management planning, the analysis of all aspects of the WRA and its neighboring villages, including social, cultural, economic, etc., and the determination of the expectations of the local people are required. Likewise, it is necessary to determine the contribution of existing forest resources and forestry practices to the development of forest villagers, i.e. the level of economic benefit of forest villagers from forest resources.

### **4. Conclusions**

In Turkey, desired level of success couldn't be achieved in wildlife management. Some of the reasons are the lack of qualified personnel in Directorate General for Nature Conservation and National Parks, insufficient wildlife education given in universities, insufficient management of participants and regulatory issues about the areas under preservation. Since various wild animals and hunting animals in WRAs, the management of those areas should be executed by wildlife biologists and ecologists, who have knowledge about the wildlife and target species. From this aspect, rather than forest engineers and other occupational groups that have managed those areas for long years, the graduates of Wildlife Ecology and Management undergraduate program should be in management of WRAs. Until today, wildlife education was considered as a secondary topic in various departments including the Department of Forestry Engineering and as a result of the rising environmental awareness in the past 20 years wildlife has found a place as an independent department in the undergraduate education in universities. Although 5 wildlife departments exist in the Turkish universities under the name of the Department of Wildlife Ecology and Management, it will take time for qualified managers to be educated and trained as well as for them to acquire positions and to succeed [13]. It can be concluded that the most important

problem of WRAs and other wildlife areas in Turkey is the poaching activities and the lack of sustainable preservation system. The local people living around WRAs were observed to have insufficient knowledge about the subjects such as wildlife, biodiversity, forest, and water and about how to make use of those sources in sustainable manner. Directorate General for Nature Conservation and National Parks, which is primarily responsible for preserving the wildlife sources, initiated the area-based preservation since year 2003 according to the Law Nr:4915, and established WRAs. But, it can be seen that the Management and Development Plans of those areas, number of which is gradually increasing, and thus those areas are being easily deteriorated and subjected to unplanned use of local people and other institutions. For this reason, the Management and Development Plans of those areas should be prepared on scientific base, and all of the relevant bodies should implement those plans. In Turkey, there are many legal and administrative regulations about the wildlife areas, and this causes complexity in sustainable preservation and use of wildlife areas and brings administrative contradictions between the institutions and companies, which are responsible for the preservation of those areas. Sustainable source management of WRAs depends on the administrative coordination between Ministry of Forestry and Water Affairs, which is primarily responsible for the management of those areas, and other stakeholders, and it is necessary to establish a management mechanism that properly works. In order to provide WRAs with scientific, rational, and applicable management plan model, relevant departments of Directorate General for Nature Conservation and National Parks, Departments of Wildlife Ecology and Management, Non-Government Organizations, and local communities should establish a common Management Plan Model.

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