



Review

Turkey's globally important biodiversity in crisis

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ABSTRACT

Turkey (Türkiye) lies at the nexus of Europe, the Middle East, Central Asia and Africa. Turkey's location, mountains, and its encirclement by three seas have resulted in high terrestrial, fresh water, and marine biodiversity. Most of Turkey's land area is covered by one of three biodiversity hotspots (Caucasus, Irano-Anatolian, and Mediterranean). Of over 9000 known native vascular plant species, one third are endemic. Turkey faces a significant challenge with regard to biodiversity and associated conservation challenges due to limited research and lack of translation into other languages of existing material. Addressing this gap is increasingly relevant as Turkey's biodiversity faces severe and growing threats, especially from government and business interests. Turkey ranks 140th out of 163 countries in biodiversity and habitat conservation. Millennia of human activities have dramatically changed the original land and sea ecosystems of Anatolia, one of the earliest loci of human civilization. Nevertheless, the greatest threats to biodiversity have occurred since 1950, particularly in the past decade. Although Turkey's total forest area increased by 5.9% since 1973, endemic-rich Mediterranean maquis, grasslands, coastal areas, wetlands, and rivers are disappearing, while overgrazing and rampant erosion degrade steppes and rangelands. The current "developmentalist obsession", particularly regarding water use, threatens to eliminate much of what remains, while forcing large-scale migration from rural areas to the cities. According to current plans, Turkey's rivers and streams will be dammed with almost 4000 dams, diversions, and hydroelectric power plants for power, irrigation, and drinking water by 2023. Unchecked urbanization, dam construction, draining of wetlands, poaching, and excessive irrigation are the most widespread threats to biodiversity. This paper aims to survey what is known about Turkey's biodiversity, to identify the areas where research is needed, and to identify and address the conservation challenges that Turkey faces today. Preserving Turkey's remaining biodiversity will necessitate immediate action, international attention, greater support for Turkey's developing conservation capacity, and the expansion of a nascent Turkish conservation ethic.

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Abbreviations: ha, hectare; GDF, General Directorate of Forestry; GDNCNP, General Directorate of Nature Conservation and National Parks; HEPP, hydroelectric power plant; IUCN, International Union for Conservation of Nature; MEF, Ministry of Environment and Forestry; MPA, Marine Protected Area; NGO, non-governmental organization; PA, protected area; SIT site, a strictly protected area.

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1. Introduction

Turkey is the only country covered almost entirely by three of the world's 34 biodiversity hotspots: the Caucasus, Irano-Anatolian, and Mediterranean (Mittermeier et al., 2005; Conservation International, 2005). Turkey has a diverse ecology (Fig. 1) and is estimated to host around 10,000 plant species (Adil Güner, pers. comm.) and 80,000 animal species (Demirsoy, 2002). With a current population of 75 million (1.1% of the world population), Turkey is a sizeable country¹ (783,562 km²) seated at the crossroads of civilization, with a rich cultural history and an archeological record extending to the Paleolithic era (Joukowsky and Blackburn, 1996). Although Turkey is the world's 15th largest economy (World Bank, 2011), it is still in many respects a developing country, ranking 77th out of 163 countries in the 2010 Environmental Performance Index and 140th in biodiversity and habitat conservation (Yale Center for Environmental Law and Policy, 2010).

The history of Turkey's conservation problems is as old as the history of civilization. As part of the *Fertile Crescent*, Turkey hosted some of the earliest human settlements (see Fig. 2 for all localities mentioned in the text), such as Çatalhöyük (Roberts and Rosen, 2009) and Göbeklitepe (Mann, 2011). Despite a 10,000-year history of often intense natural resource exploitation and human land use

(settlements, hunting, logging, burning, agriculture, water extraction, habitat loss, etc.), Turkey has retained an astonishing amount of biodiversity for a temperate country of its size (Kışlalıoğlu and Berkes, 1987), is a center of genetic diversity (Bilgin, 2011), and has a rich heritage of traditional knowledge of biocultural diversity. Nevertheless, Turkey lacks the biological "charisma" of many tropical countries and suffers from the international misconception that, as a European nation (though not a part of the European Union), it must have adequate funds and priorities to support conservation. These factors, combined with the Turkish public's general disinterest in conservation (Kalaycıoğlu and Çarkoğlu, 2011) and the government's unrelenting "developmentalist obsession" (Aktar, 2011a,b,c; Şenerdem, 2011a), have created a conservation crisis which began in the 1950s and has peaked in the past decade (Gibbons and Moore, 2011). Turkey is entirely covered by crisis ecoregions, most of them critically endangered (Fig. 4 in Hoekstra et al., 2005). Consequently, there is an urgent need to summarize Turkey's important but overlooked biodiversity and highlight the country's unique conservation challenges.

In this paper, we review Turkey's habitats and ecological communities, summarize the diversity of the major taxonomic groups, and highlight specific conservation issues. We conclude with an overview of Turkey's current and future conservation challenges. We reviewed the *Web of Science*TM for papers on Turkey's biodiversity and its conservation, also drawing upon the Turkish literature, including books, reports, and gray literature not accessible to the international scientific community. Due to the rapidly evolving state of environmental conservation in Turkey, some of the issues

¹ Turkey is broken into two geographic regions by the Bosphorus and Dardanelles straits. The smaller region on continental Europe is known as Thrace. The remainder (97% of the county's land area) resides in Asia Minor and is known as Anatolia. For most practical purposes "Anatolia" and "Turkey" can be used interchangeably.

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