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Assessment of Climate Change Impacts on Wild Animals in Afghanistan

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ABSTRACT
Climate change is an important worldwide environmental issue facing our planet today. Total of (920) vertebrate wild species are living in Afghanistan out of them (764) known species while (160) species are uncertain unknown, almostly protected and proposed protect area in different (9) provinces of Afghanistan were identified by Technology Needs Assessments – Mitigation Report, 2020. Climate change is predicted to be the biggest cause of wildlife habitat change, displacement, and losses of wild animal species in Afghanistan. Reducing the loss of habitats and preventing their collapse by creating protected habitats, constructing forests to stabilize slopes, strengthening soil and regulating water flow, improving agroforestry systems, and sustainable management and restoration of watersheds can decrease climate change effects on wildlife.

Keywords: Climate change, Biodiversity, Wildlife, wild animals

INTRODUCTION
Afghanistan has an arid and semi-arid continental climate with cold winters and hot summers. The climate varies substantially from one region to another due to dramatic changes in topography. The wet season generally runs from winter through early spring, but the country on the whole is dry, falling within the Desert or Desert Steppe climate classification (UNFCCC, 2017). Temperature and precipitation change dramatically with elevation differences, resulting in a variety of habitats and differing suites of species adapted to them. Afghanistan's mountains also act as a barrier to precipitation, resulting in higher moisture in the eastern part of the country, considerable snow at higher elevations, and a rain shadow to the north and west. The result is a variety of species adapted to the entire gamut of moisture regimes, ranging from desert to monsoon forest. The number of species in an ecosystem tends to be greatest at moderate levels of productivity, with fewer species in areas of very high or very low productivity. (National biodiversity strategy & action plan, 2014).

Afghanistan is home to more than 700 species of mammals, reptiles, amphibians, fish, butterflies, and 3,500 to 4,000 diverse native plant species, but according to new studies, biodiversity has accelerated throughout the country (National Biodiversity Strategy & action plan, 2017). 2.9 percent of land in Afghanistan was covered with forests but because of that time war, illegal exploitation, and the need for firewood, 90 percent of forest cover has gone. Today the forest cover in Afghanistan accounts for only approximately 1.5-2% of the total land cover. Most of the mountains in Afghanistan are barren rather than covered with forests. (NEPA TECHNOLOGY NEEDS ASSESSMENT REPORT MITIGATION, 2020).

Climate change is the most significant and far-reaching environmental threat facing humanity today. Scientists, policymakers, and governments from around the world are seeking to understand the nature of the changes that are likely to occur in the 21st Century and beyond, and the effects these could have on human populations and the socio-economic systems that underpin those (Green et al., 2007). Climate change has become one of the biggest causes of loss of biodiversity in Afghanistan, and it is expected that by the end of this century, this problem will be the biggest cause of loss of biodiversity in the world (Hoban et al., 2020). Wildlife from the poles to the tropics is being affected by climate change. Species migrations, extinctions, and changes in populations, range, and seasonal and reproductive behavior are among a plethora of responses that have been recorded, and these are likely to continue apace as the climate continues to change in decades to come (Green et al., 2007). Prevention of degradation and restoration of ecosystems and biodiversity will support the climate change adaptation of land use, improve the water storage capacity of the landscape, reduce erosion and flooding, and ensure the availability of ecosystem services for the society within the program region and beyond. Ecosystem-based adaptation, which includes the use of biodiversity and the provision of ecosystem services for

adaptation to climate change conditions, can provide an economical approach to maintaining biodiversity and reducing the negative effects of climate change (NEPA TECHNOLOGY NEEDS ASSESSMENT REPORT MITIG ATION, 2020). This review study has been performed by utilizing various concern research articles, National Environmental Protection Agency-related reports, and magazines. Brief tables are presented to show the number of animal species, protected and proposed protected areas, and the climate change negative effects on Biodiversity and wild animals.

SPECIES ASSESSMENTS

The Convention on the International Trade in Endangered Species (CITES) lists species on Appendices if they are threatened by international trade. Satellite image analysis and assessment of commercial wood volumes show that forests, both closed forest and open woodlands, are rapidly disappearing. Overgrazing and shrub collection for fuel is markedly reducing wildlife communities. The ubiquity of weapons following years of war is leading to the loss of large mammals throughout much of the country.

Table 1, Shows the numbers of known animals' species present in Afghanistan .

Animals group	Known species	Uncertain species
Mammals	137	13
Birds	428	87
Reptiles	92	20
Amphibians	6	2
Fish	101	38
Total	764	160

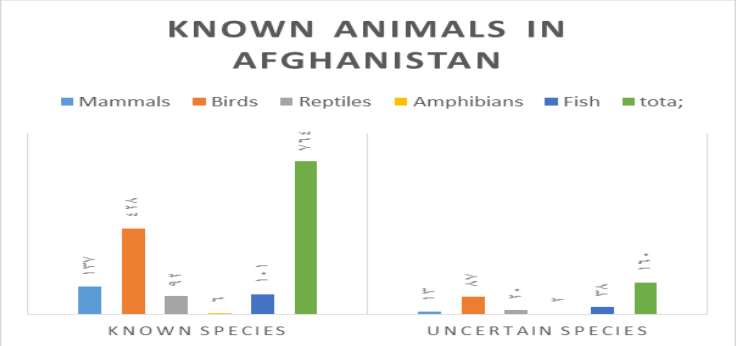

Figure1. National biodiversity strategy & action plan, 2014-2017.

Mammals

A total of 137 species are known to occur in Afghanistan, with another 13 species having uncertain status. There are no mammal species known to be endemic to Afghanistan. Sixteen of Afghanistan's mammal species are listed on the IUCN Red List as being globally threatened with extinction. Most of these species are carnivores and artiodactyls. Twelve Afghan mammal species are on CITES Appendix I, and 13 are on Appendix II. Many more Afghan species are threatened at the national scale, but no formal process has assessed the status of Afghan species. Two species (cheetah and tiger) are known to be extirpated in Afghanistan, but a detailed assessment would probably extend this list. The expectation is that current ranges have been much reduced for many species. Carnivores and large herbivores have been the species most affected (NEPA, 2017).

Birds

The list of Afghan species estimates the number of known Afghan bird species at 428, with another 87 classed as uncertain. The majority of the 87 species listed as uncertain may in the future be demonstrated to occur in Afghanistan. Evans (1994) suggests that as many as 235 species may breed in Afghanistan. Five species are on the IUCN Red List as globally Critically Endangered, two are listed as Endangered and 14 as Vulnerable. Nine Afghan bird species are listed on CITES Appendix I and 55 on Appendix II. There has been no examination of risk status at the national level. There are also six "near-endemics" (Columba eversmanni, Phyllosopus neglectus, P. subviridis, Oenanthe picata and Passer moabiticus) meaning that Afghanistan represents a large proportion of their breeding range. Of particular significance is the Yellow-eyed Pigeon (Columba eversmanni) which is listed as "Vulnerable" by IUCN (Waliczky et al, 2019).

Reptiles

There are 92 reptile species currently known from Afghanistan. A further 20 species are considered as "Uncertain". One of these 112 species is a tortoise, 75 are lizards and 36 are snakes. Only one Afghan reptile species, the Afghan Tortoise (Testudo horsefeldii), is on the IUCN Red List as being globally at risk. Two species are listed by CITES as Appendix I and nine are listed on Appendix II It is unknown how many species are nationally at risk. Based on the distributions provided by the EMBL database.

Fish

There are 101 species of known Afghan fish species, with another 38 species suspected to occur in the country. The list is dominated by the Cyprinidae (minnows and carps - 54% of species) and the Balitoridae (loaches - 25% of species). UNEP (2003a p. 26 The greatest fish diversity is found in the Kabul River where species are mostly derived from the Indus River and therefore are Indo-Malayan in origin (Coad 1981, Habibi 2002). The Amu Darya is the second most diverse watershed and is characterized by affinities with the Caspian Basin and by a largely Palaearctic fauna (Habibi, 2002).

Table 2. Shows Protected Area in Afghanistan

Protected Area	Province	District	Area with square KM	% of the country's area	Height above sea level
Band Amir National Park	Bamiyan	Yakavlang	613.3	0.094064417	2900
Wakhan District National Park	Badakhshan	Wakhan	10950	1.68	unspecified
The natural landscape of Shah Fuladi	Bamiyan	Center of Bamiyan	2700	0.042	unspecified
The valuable natural landscape of Bamiyan Plateau	Bamiyan	Yakavlang, Kohmard, Sifan	4200	0.65	unspecified
Kool Hashmat Khan's Migratory Bird Sanctuary Area	Kabul	The eighth and first Phase	9267	0.00029	1792
Nuristan Province National Park	Noristan	Noristan	1200	1.43	1100
Darqad District Wildlife Reserve	Takhar	Darqad	600	0.019	unspecified
Imam Sahib District Wildlife Reserve	Kunduz	Imam Sahib	9267	0.01	400-500
Navarre Desert Migratory Bird Sanctuary	Ghazni	Navarre	75	0.002	unspecified

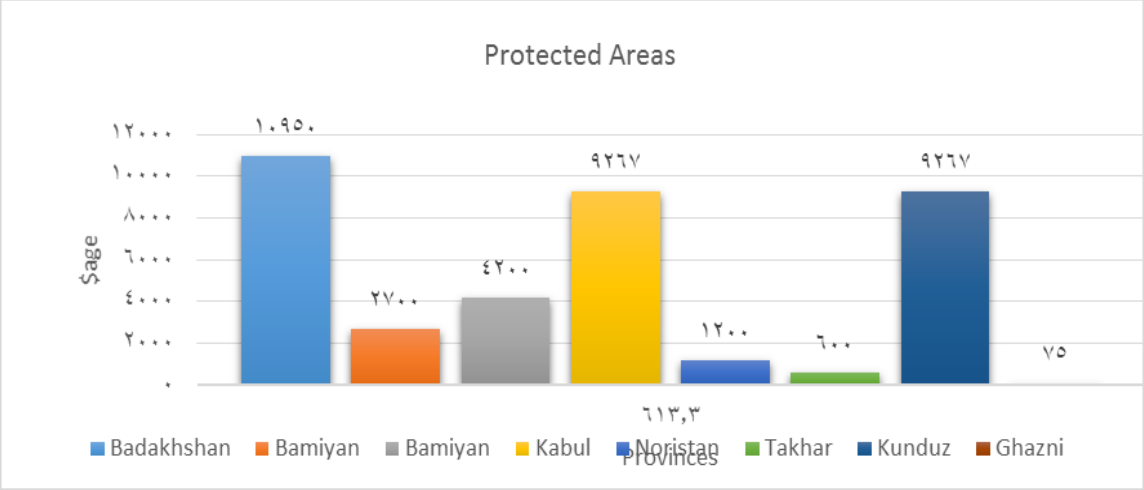

Figure 2. Shows Protected Area in Afghanistan (NEPA, 2023).

Diversity of life and ecosystems

Human activities, especially the wide spread of biodiversity areas, are one of the main reasons for the loss of biodiversity in the country, although climate change is predicted to be the biggest cause of biodiversity loss in the world until the end of the century. In Afghanistan, the increase in temperature due to climate change has inversely reduced the availability of water and has brought unfavorable pressure on the ecosystems in the country. Natural adaptation can be seen in the change of habitats or the change of life cycles of organisms. During the last five decades, climate change posed different threats to biodiversity and led to its decline. The

five permanent and seasonal river basins of Afghanistan are home to a variety of animal and plant species. But, they have lost nearly 24% of their biodiversity in the past 30 years (Omar & Jamil, 2013).

Table 3. shows proposed protected area in Afghanistan

Province	District	Area	Catogery
Logar	Azra	Forests	Local Park
Nangarhar	Darah-e-noor	Forests	Local Park
Laghman	Dowlatshah	Forests	Local Park
Kunar	Center	Shmundk	Local Park
Samangan	Royaedobe	Kolrahmat	Local Park
Kapisa	Center	Kolboost	Local Park
Maidanwrg	Behsood	Shahfouladi	Local Park
Paktia	Zaziaryob	Mandhir	Local Park
Khost	Tani	Admamd	Local Park

Threats to Afghanistan's Biodiversity

Biodiversity in Afghanistan faces a bleak future. The absence of underlying conditions required for effective resource management in Afghanistan has been a significant driver of the country's biodiversity loss. Exacerbated by war and conflict, a lack of social security has led to a lack of policy and suitable legal instruments, and where they do exist there is poor law enforcement or implementation. Financial constraints and other national concerns have led to a lack of education and awareness regarding biodiversity and natural resources, poor transport and access for government staff, and limited coordination among government agencies (National biodiversity strategy & action plan, 2014).

Decreasing rainfall and rising temperatures in most of the northern, northeastern, and central zones of Afghanistan have caused a significant water shortage for most mammals and birds species living in these zones and led to their migration to protected areas, such as Wakhan National Park in Tajikistan and China. The future climate trends suggest that animal species, especially snow leopards and deer, will be at high risk of extinction due to climate change. Hence, the complex feedback loops between climate change and biodiversity loss are mutually reinforcing, and addressing them requires coherence in policies and actions. Anthropogenic climate change threatens the health of terrestrial and aquatic ecosystems due to disruptions in the natural feedback loops and loss of habitat for a variety of fauna and flora (IPCC, 2022).

Climatic hazards

Afghanistan is seriously exposed to natural hazards, and during the last three decades, almost every province has suffered a natural disaster. According to the Ministry of Disaster Management, the biggest natural hazard in the country is flooding, followed by earthquakes and epidemics, which threaten the country at the same time. in the past century, earthquakes have caused 50% of human casualties due to accidents, and then floods (19%) and epidemic diseases (17%) have threatened the country. droughts also have affected the largest part of the population and have had very serious and negative effects on the land and soil. floods, droughts, and rising temperatures have continued to cur and have had significant effects on the loss of life. The National Action Plan for Harmonization (NAPA) has identified key areas of the country that are highly vulnerable to climate risks: agriculture, water industries, forests and grasslands, biodiversity, health, energy, and waste. A significant impact of climatic warming is discernible in the form of long-term, large-scale alteration of animal and plant populations (Root et al., 2005).

DISCUSSION

Some databases list the number of Afghan species, but they differ from one another and are usually not explicit in their data sources. It suggests that there are 789-916 species of vertebrates in Afghanistan. Habibi (2003) provides distribution maps and collection localities for each species. It is evident, though, that the distribution maps are based on very few collection or observation sites. As well, the only data are now decades old and Habibi's distribution maps are best considered as "potential" or "historical" ranges. The expectation is that current ranges have been much reduced for many species. Carnivores and large herbivores have been the species

most affected. The World Database of Protected Areas (IUCN and UNEP 2014) lists 14 protected areas in Afghanistan, but recently we received the latest data from NEPA, which outlines 9 protected and 10 proposed protected areas in Afghanistan. As a broad generalization, biodiversity appears to be declining at an accelerating rate throughout Afghanistan. Satellite image analysis and assessment of commercial wood volumes show that forests, both closed forests and open woodlands, are rapidly disappearing. Overgrazing and shrub collection for fuel are markedly reducing wildlife communities.

CONCLUSION

The identification of rare and endangered species is widely used as a means of campaigning for their protection. However, climate change is rarely factored into considerations about the future of such species. Many modern approaches to nature conservation focus on the sustainable use of species and habitats, as most of the world's wildlife now lives close to humans and can sustain or even rely on a degree of utilization. As the climate changes, these relationships may change, perhaps allowing for increased utilization in some areas, but similarly threatening wildlife as these patterns of human use and landscape change. Further research to fill the regional and ecological gaps in our knowledge will remain a priority for many scientists. Because anticipation of changes improves the capacity to manage, it behooves us to understand as much as possible about the responses of wild animals to changing climate. This and further documentation of change may well indicate a need for action.

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CONFLICT OF INTEREST: All authors express no conflict of interest in any part of the research.

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