

Conservation of wildlife and its anthropogenic responses in Himachal Pradesh

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Abstract

Himachal Pradesh a part of Indian Himalaya is one of the crucial mega-biodiversity hub. It is well known for its scenic beauty, which attracts tourists from far and wide. The region has a varied topography, climate and forest cover and it endowed with a vast variety of flora and fauna. Wild animals and birds capable of living under different climatic conditions ranging from tropical to arctic climates and from a thick forest cover to sparse tree growth are found in the region. As in other parts of the Himalaya, the terrain in the area is rugged and steep. Geologically, the mountains are young with many fault zones and are subject to seismicity, denudation, landslide hazards and soil erosion. Himachal Pradesh is a mountainous terrain with altitudes ranging from 350 to 7000 meters (1050 ft. to 21000ft) above the sea level. Himachal Pradesh is one of India's most heavily forested region with approximately 66% area under forest. The Forests of Himachal Pradesh known for their grandeur and majesty are like a green pearl in the Himalayan crown. The largest natural resource of the State is its thick forest cover. The total recorded forest area of the study area is 37,033 Sq.Km. Himachal Pradesh has brought 13.6% of its geographical area under the

protected area network, an extremely high figure when compared to the national average of hardly 4.5%. The state has 32 wildlife sanctuaries and two unique National Parks. In last few decades, Himachal Pradesh has observed progress in almost every aspect like agriculture, horticulture, floriculture, population, mining, industries and tourism. Development in different fields has certain impacts on wildlife are matter of great concern and essential for explore. Keeping in view above, the area has been selected for the study. The main objective of the present study is to analyze the anthropogenic impacts on wildlife in Himachal Pradesh, to identify the major issue affecting the wildlife conservation in Himachal Pradesh, to propose and suggest the measures for conservation of wildlife in the region. The major findings are discussed in the paper and suggestions for the conservations of wildlife are proposed.

Keywords: Conservation | Wildlife | Himachal Pradesh | Anthropogenic Activities

Introduction

Himachal Pradesh is a part of Indian Himalayas and is one of the mega-biodiversity centers of the world selected for

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biodiversity conservation. The region is highly varied in term of topography and climatic conditions. It is well known for its picturesque beauty, which attracts tourists from far and wide. Himachal is bestowed by nature with variety of vegetation, wildlife and climate un-paralleled anywhere. Himachal Pradesh has a varied topography, climate and forest cover and its endowed with a vast variety of flora and fauna. From times immemorial, this tract is known for its wilderness, landscapes, beautiful forest and diverse wild life. The fauna consists of a galaxy of magnificent animals. They all are a great attraction to the tourists, the state is thus a paradise for sportsmen and naturalists. Diverse and interesting wild life is found in Himachal Pradesh as a result of great elevation, topography, climate and forest cover. Wild animals and birds capable of living under different climatic conditions ranging from tropical to arctic climates and from a thick forest cover to sparse tree growth are found in the study area. This has enriched the state extensive and diversified varieties of wild animals and bird life.

Out of the approximately 16000 species of higher plants in the country, over 3500 occur in Himachal Pradesh. Many of these are, however, under threat because of ever expanding human and cattle populations and the consequences demand for more land for agriculture and habitation. The only means of conserving our wild heritage for prosperity is by creating refuges for them and protecting them strenuously. The preservation of wildlife in Himachal Pradesh is thus a necessity. The beautiful wild animals and birds found in the state are our nation's invaluable assets and should be preserved not only for our benefit,

but for the future generations as well. The forests of Himachal Pradesh known for their grandeur and majesty are like a green pearl in the Himalayan crown. This life supporting systems are presently under great stress due to impact of modern civilization, economic development and growth in human and cattle population.

Himachal Pradesh has brought 13.6% of its geographical area under the protected area network, an extremely high figure when compared to the national average of hardly 4.5%. This percentage is the one of the highest in the country. The state was a pioneer in initiating wildlife conservation by establishing wildlife sanctuaries as early as fifty years ago. The state has 32 wildlife sanctuaries and two unique National Parks, which contains vast multitude of plant species and few remaining habitats for the snow leopard, Ibex, Blue Sheep, Tibetan wolf and Markhor, all highly endangered species. The Great Himalayan National Park and the Pin Valley National Park together constitute 1380 km² with rich biodiversity.

Selection of the study Area

Himachal Pradesh is located in North West in India in the lap of the Great Himalayas and bordered by Jammu and Kashmir in the North, Punjab in the West, Haryana and Uttaranchal in the South and Tibet in the East. This beautiful state is divided into two parts Southern and Northern Himachal. The southern Himachal also known as lower Himachal is as hot as plain areas, where as upper is Northern Himachal less hot in summer and extreme cold and heavy snow in winter. Himachal Pradesh is located between 30° 22' and 33°12' north latitude and between

75°47' and 79°4' east longitude. It is a mountainous state with altitudes ranging from 350 to 7000 meters (1050 ft. to 21000 ft.) above the sea level. Mountains are the spectacular creation of crustal deformation of the planet earth. The Himalayan range furnishes an outstanding example of this mode of formation. There is great diversification in the climatic conditions of Himachal due to variation in elevation (450-6500mtrs). It varies from hot and sub-humid tropical (450-900mtrs) in the southern low tracts, warm and temperate (900-1800mtrs), cool and temperate (1900-2400mtrs) and cold alpine and glacial (2400-4800mtrs) in the northern and eastern high mountain ranges. And Himachal has five major perennial rivers – the Beas, the Chenab, the Rave, the Satluj and the Yamuna that form its drainage system.

The climate of Himachal Pradesh, depending on the altitude, varies at different places from semi tropical to semi arctic. Tours in Himachal Pradesh during winters (October to February) can be very severely cold, with heavy snowfall recorded during this season.

Himachal Pradesh is selected to carry out this study for a number of reasons. Firstly, it is one of India's most heavily forested states with approximately 66% area under forest. Himachal Pradesh contains large areas, which covered in moist temperate forest habitat. Which is rich in wildlife and substantial areas of forest are disturbing by developmental activities. The human population and therefore pressure on natural resources are both rising very rapidly. All these above conditions in the state are favorable to wildlife. But, in last few decades, Himachal Pradesh has observed progress in almost every

aspect like agriculture, population, mining, industries and tourism. Development in different fields has certain impacts on wildlife are matters of great concern an essential investigate. Keeping in view of all these reasons, the area has been selected for the study.

Objectives

The present study will be undertaken with the following objectives:

1. To analyze the anthropogenic impacts on wildlife in Himachal Pradesh.
2. To identify the major issues affecting the wildlife conservation in Himachal Pradesh.
3. To propose and suggest the measures for conservation of wildlife in Himachal Pradesh.

Methodology

The present study aims to analyze anthropogenic impacts on wildlife. First step of the study is to collect the secondary data on different issues from various published and unpublished sources of different governmental and non-governmental agencies. Then the reconnaissance survey was made to the study area.

Environmental conditions for the conservation of wildlife

The Himalayan mountain system represents one of the richest natural heritage sites in the world. It has a remarkable assemblage of biodiversity – both plants and animals. The rich diversity of Himalaya is now severely threatened and many species have become endangered on account of a variety of physical, biotic and strategic factors to the

region. The loss in biodiversity has been largely on account of habitat losses, which in turn have happened due to anthropogenic factors, like deforestation, overexploitation of natural resources, human settlements/encroachments and population growth. The rich endemic flora and fauna of the Himalayan region faces the threat of extinction due to human interference, degradation of forests and natural habitats for expansion of agriculture, industrial and urban development's.

Across the world, wildlife habitats continue to be degraded and lost by human activities. In general, such degradation and loss is accompanied by a decline in the region's biodiversity. However, as landscapes are increasingly modified by humans, not all species are affected similarly. While some species quickly go to be extinct, others are able to persist initially, but eventually become extinct if the human pressures on the habitat keep on increasing. There are still others that continue to persist, and even benefit from increased human presence and habitat modification.

The Himalayas present a storehouse of biodiversity, where flora and fauna vary extensively with climate diversity from one region to the other. Poaching and illegal trade in wildlife are other major threats to species survival in the Himalayas. The region provides many transit routes for illegal wildlife trade. Of the various Himalayan species, plants and plant products are among the most heavily traded. Among fauna, Musk Deer, Himalayan Black bear, butterflies and Tibetan antelopes are sought for their high value in the international market. As a result

of the above processes, many endemic species of the study area such as Snow leopard, Leopard, Himalayan black bear, Himalayan brown bear, Himalayan red fox, civets, jackals, Serow, Himalayan Tahr, Musk Deer, Gora, blue sheep, Monal, Koklass, Kaleej and western Tragopan are now endangered. Approximately 10% of known species in the Himalayas were listed as threatened in 1995, and the number of species on the verge of extinction has increased since then (IPCC, 2001).

Habitat destruction is the main cause for wildlife extinction in India. The rapid deterioration of the environment due to human interference is aiding the disappearance of wildlife from the biosphere. Habitat loss is due to deforestation for extended cultivation, construction of dams, mining operations and road lying. When the natural habitat of animals is destroyed, it leads to a decline in their primary food supply and breeding and nesting grounds. Hence their numbers get drastically reduced. In the case of plants, if their natural habitat is destroyed and the species that controls the pests that attack them are lost, then their survival is at risk.

Human activities by the local people is causing serious disturbance to wildlife reserves. Their dependence on protected areas for fuel, fodder, grazing, etc. is having great impact on the fragile ecosystems of wildlife reserves.

The National Parks and wildlife sanctuaries have very delicate and fragile ecosystems, which are very highly susceptible to anthropogenic interferences. The human factors affecting the delicate ecosystems and bio- diversity of the Natural Reserve of the

area under study are associated mainly with rising human population and increased resource use pressure on the forests of the protected area, gaining popularity of wildlife tourism and its changing concept, expanding urbanization and industrialization and expansion of development activities and projects in and around the protected area.

The resource use pressures, which adversely affect the forest ecosystems, threaten wildlife population and its habitat and ultimately lead to loss of biodiversity, are all related to human beings and their various activities.

Poaching and commercial exploitation constitute yet another category of population related- threats to the conservation and protection of wildlife in natural reserves. This large human population around the National parks is totally dependent on the forests of the PAs for cattle grazing and for collecting fuel wood, fodder and thatching grasses. The collection of fuel wood is not only for domestic use but it is also sold in the nearby markets as a mean of livelihood. Tourism has

capacity to damage the environment directly and indirectly; indirectly in the misuse of environment through building of tourism infrastructure, industries and directly through the concentration of visitors and tourism support of manpower, equipment's and facilities in areas of natural beauty, and in and around the natural reserves.

An attempt has been made to assess the environmental impact of various human activities with the application of Leopold matrix of environmental Impact Assessment (EIA). This matrix was used here in a slightly modified and simplified form. In this matrix, the impact of grazing, resource dependence of people living inside and adjacent to parks and sanctuaries on the protected areas, transport, tourism, development projects and industrialization, on the environmental components of land, water, fauna and flora was analyzed with the help of range numbers. The range numbers, indicating the magnitude of impact, rang between of 1 (least) and 3 (maximum) in Table 1.

Activities	Environmental Component			
	Land	Flora	Fauna	Water
Human Activities	1	2	2	1
Agriculture	3	2	2	1
Deforestation	2	3	3	2
Tourism	2	2	3	1
Transport System	2	2	3	1
Hydrological Projects	2	2	2	2
Grazing	1	3	2	1
Poaching	1	1	3	1
Forest Fire	1	3	3	1

Table 1: Different Activities Affecting the Different Environmental Component in the Protected Areas of Himachal Pradesh

The relative assessment of the magnitude of impact of a particular activity on different environmental components, in all natural reserves and allotment of respective range

number was done subjectively through the field surveys and the intensity and pressure of various human activities considered, on different national parks and sanctuaries. In this exercise the relative

environmental impact assessment, both direct and Indirect impacts of activity system have been considered.

1. Population

Demographic and social changes place more people in direct contact with wildlife: as human populations grow, settlements expand into and around protected areas (IUCN, World Park Congress 2003), as well as in urban and sub-urban areas. In the study area, human population growth has led to encroachment into wildlife habitats, restriction of species into marginal habitat patches and direct competition with local communities, as:

- ❖ Degradation and alteration of the ecosystem due to grazing.
- ❖ Destruction of habitats due to forest fires – both accidental and intentional – started by people collecting NTFP and by trains.
- ❖ Air and noise pollution due to traffic in protected areas.
- ❖ Disturbance to animals due to the large number of pilgrims and tourists within the protected area.
- ❖ Accumulation of solid waste around religious places and settlement in forest areas.
- ❖ Degradation of forest due to collection of fodder and small timber.
- ❖ Over grazing of sheep and goats in the protected areas and in high-altitude thatches (meadows) is degrading the habitat and disturbing the animals.
- ❖ Collection of medicinal, aromatic and edible herbs and plants is degrading the habitat, disturbing the animals, and threatening many species with local extinction.

- ❖ Collection of fuel wood and fodder is degrading the habitat.
- ❖ Commercial extraction of timber is deforesting the area.
- ❖ Poaching of animals, especially the Musk deer (*Moschus moschiferus*), is threatening the species with local extinction.

2. Agriculture

Agricultural lands play a critical role in conserving biodiversity. Agriculture, horticulture, animal husbandry and many other economic activities depend simultaneously on both the exploitation and conservation of natural resources. In most of the hilly regions, agricultural expansion threatened the biodiversity. One of the major ecological influences of man has been to simplify the ecosystems. Thus man plows the grassland, eliminating a hundred species of native herbs and grasses, which he replaces with pure stands of maize, wheat, or barley. This increases efficiency, productivity and yield, but it also increases ecologic vulnerability and instability. The landscape diversity is reduced.

Because anthropogenic contaminants have become ubiquitous in the environment and influence the ecology of wild species, wildlife managers and scientists are increasingly required to consider chemical disturbances as an essential component of habitat destruction. This is a new and powerful human threat to species diversity with rising levels of toxic pesticides used in agriculture, which many pollute waters and soils, has a devastating effect on wildlife and biodiversity of the area. Large-scale use of pesticides and fertilizers has polluted the land and river ecosystems also.

Years	1950-51	1955-56	1960-61	1965-66	1970-71	1975-76	1980-81	1985-86	1990-91	1995-96	2000-01
Total area under cultivation	406.3	423.3	428.7	487.7	911.7	927.3	946.4	983.6	971.6	949.8	947.5

Total Area under cultivation

Grasslands are an important breeding habitat for many species of birds and mammals. The area under pasture in Himachal Pradesh is declining, which fell to 36% by 1991. The reduction was due to conversion of pastures for horticulture and food crops cultivation and some areas became barren due to overgrazing and neglect. The area under pastures was decreasing and the number of grazing animals was increasing, thus the pressure on natural resources increases day by day. During this period 1970-90 the population of cattle, buffaloes, sheep and goats increased at the annual rate of 0.2%, 1.8% and 0.6% respectively.

The study reveals that large and growing population, extensive nature of agriculture, soil erosion and land destruction, overgrazing of pastures, shifting cultivation and increased stress on forest resources are creating loss of biological diversity in the study area. On the basis of above identified factors which are affecting biodiversity, there is a sharp need to preserve the biodiversity.

3. Deforestation

Massive deforestation in the Himalayan region is the important factor in ecological degradation. Non-availability of certain species, decline of fodder and wood resources, loss of the habitat of wildlife, soil erosion, recurrent floods and drying-up springs and seasonal streams and climatic changes are the consequences of man's activity.

Deforestation has been caused by commercial logging; commercial exploitation of trees for timber, resin, medicinal herbs, clearing of forestland for settlements and agriculture; excessive exploitation of forests for fuel wood and food; and overgrazing by animals, the coming up of new habitation and the building of roads. Deforestation is posing a serious threat to both flora and fauna in the study area. It is not uncommon to hear the sound of an axe striking a tree in the forests. The past decade has seen a large amount of deforestation, which definitely is a cause of concern.

One of the most serious consequences of deforestation is the loss of habitat for wildlife. Deforestation severely impacts forest ecosystems, causes soil erosion in catchments areas, a decline in soil fertility, landslides and siltation of reservoirs, water sources and canals. The most important direct cause of biodiversity loss is habitat destruction from clearing and burning.

4. Tourism

Tourism and the environment have a very complex and interdependent relationship. The Himalayan region is considered to be abundantly suited for tourism since it offers all kinds of attractions to tourists. The lush green valleys, emerald meadows, vast ice fields have now started showing abrasion due to increasing human activity. Tourism brings a large number of people together, which leads to marked

changes that are detrimental to the ecosystem as a whole. Tourism is found in the form of pilgrim tourism and for pleasure and adventure. To accommodate the large tourist influx, hundreds of new buildings and mean of transportation are being constructed every year. Unplanned development in the Himalayas is causing irreparable damage. The problems of litter, noise, erosion, destruction of fauna and flora have become acute.

5. Transport Systems

The developmental activities of man such as the construction of high dams, roads, exploration for minerals and mining activity and the quest for arable land are some of the common reasons for the loss of biodiversity. Human inference in natural environmental conditions often gives these dynamic processes catastrophic proportions, leading to disasters and irreparable damage to the natural balance of the ecosystem. Road building activities, railway lines, air links and electronic communication, together with spread of market economy and policy interventions, have not merely impacted the socio-economic dynamics but also the rate of exploitation of natural resources in the region. These affects wildlife, habitat, and ecosystems in numerous in various ways. The threat to the country's national parks and sanctuaries continues unabated.

6. Hydrological Projects

There is a realization that hydroelectric power projects are not as clean as they were normally considered to be world over. They cause many adverse environmental and social impacts. A major conflict arises between development and biodiversity conservation when projects are located in the protected areas because such

projects impact upon prevailing patterns of allocation of land and resources to people and interface with various forestry and wildlife conservation objectives.

Hydel projects of the study area increasing sedimentation, indiscriminate mining, pollution, rapid construction of roads, dumping into rivers and deforestation have destroyed the habitat of the fish in many rivers and streams. Study also pointed out that the environmental changes were affecting the watersheds. Pesticides and insecticides have also worsened the situation. Study area has a cumulative stream length of about 3000 fishable waters, including the Beas, Tirthan, Parvathi, Uhl, Pabbar and Ravi. According to the draft biodiversity Action Plan prepared for Himachal Pradesh, "Avowedly, the dams, weirs and barrages act as physical barriers to migration, tending to prevent access of the fish, their usual breeding regions and feeding grounds. Fishes dying due to large-scale abstraction of river waters and dams and embankments altering the flow, fisher folk are being fast pushed into oblivion".

Today Himachal Pradesh has a very rich and varied fauna with a land mass of 7572.55 km² (13.6%) of its geographical area of 55673 Sq. Km under the protected area network, an extremely high figure when compared to the national average of hardly 4.70%. As a result, there has been an increase in the number of wild animals, not only within the protected areas, but more so outside the protected area network. The state has 32 wildlife sanctuaries and two unique national parks namely great Himalayan National Park and Pin Valley National Park, which contains the highly endangered species. There are recorded 77 species of mammals, 463 species of birds, 44 species of reptiles, 80 species of

fishes, 436 aquatic plants and more than 3500 species of higher plants (seed bearing) in the state and India has 21 Wetlands, of these 21, three,

namely, Renuka, Pongdam and Chandertal are in the State of Himachal Pradesh.

Project Activities	Impacts
Tunnel Development by blasting and other project activities during construction phase.	Affects wild life through air & noise pollution.
Transportation	Adverse effect due to air and noise pollution due to vehicular traffic.
During operation phase the project component areas will be lit with lights.	Poses potential of disturbance to mammals and birds at nights.
Operation phase- Development of Reservoir.	Beneficial impacts to avifauna.
Forestland diversion for establishing project components.	Loss of forest land and removal of trees and other vegetation.
Fuel requirement of workers during construction phase.	Pressure on forest produce for fuel use.
Transportation – Vehicular movements.	Adverse impact of dust and air emissions.

Impacts of Hydrological Project Activities on Flora and Fauna

There is an urgent need to understand such impacts, and to avoid interference in the most critical wildlife habitats. There is need for creating awareness and raising information levels on ecological and conservation issues. There should be frequent wildlife survival discussions with locals. Educational programs that promote awareness and changes in attitude towards wildlife through the medium of television, slide shows, street plays and pamphlets will go a long way in creating awareness in the locals. Alternative employment opportunities should be created for communities depending on wildlife for economic interests. It's often a case of too little too late. The government usually will not react until a species is severely threatened. The government has to be proactive in terms of conserving the flora and fauna of the state. The biodiversity of the state has suffered immediately due to lack of interest shown by the government. The government gives preference to development activities at the cost of wildlife. It

should give wildlife its due share of respect and further help in conserving them by providing advance training and latest techniques to the forest department.

Increasing man-animal conflict is an outcome of shrinkage, fragmentation and deterioration of habitats, it has caused destruction of wildlife and generated animosity against wild animals and protected areas. This is a crucial management issue, which needs to be addressed through innovative approaches. The government should have to take decision to shift the local villagers like guzars and others, dwelling inside the protected areas to control over the conflict between men and animals and should be strict implementation of laws to avoid entrance inside the protected areas for different resources. Thus the destruction to wildlife and fragmentation of habitats can be reduced. Overgrazing by domestic stock is another factor, which contributes in destruction of wildlife in study area. Grazing pressure should be control by the

construction and careful maintaining fences around small, critical areas and more importantly, by the enforcement of the existing grazing permits regulations. An effort should be made to freeze the present livestock population. There should be restricting entry in the protected areas and need to construct barriers such as walls and fences. The government needs to make policies for controlling the shifting agriculture, which is highly responsible for deforestation. Spray of pesticides and insecticides in and around the protected areas should be stopped. This the factor, which is also responsible for the extinction of wildlife species. Forest cover is reduced rapidly by local peoples for collection of fuel wood and fodder. Less forest cover is the major cause of the wildlife extinction. So there is a demand of conservation of forests and huge plantation to control over the wildlife destruction.

Tourism is also playing a major role behind the destruction of wildlife habitat and caused serious impacts on ecosystem of the study area. To reduce its impacts on protected areas there should be less numbers of tourists, allowed inside the protected area. The tourist should be aware about the rule and regulations of the protected areas and should be eco-friendly. Tourists need to be educated on how to behave in order to minimize disturbance kept to a minimum and the hunting totally prohibited, thus there is a strong possibility that the wildlife will become tame and more easily observed, thus enhancing the attractiveness of the area to tourists. It should be responsibility the attractiveness of the area to tourists. It should be responsibility of every tourist to avoid the use of polythene and other non-biodegradable garbage. Thus we can reduce

the wildlife destruction in protected area. The construction of large-scale road network and hydrological projects should not be allowed inside the sanctuaries and national parks. Roads are a major contributor to habitat fragmentation because they divide large landscapes into smaller patches and convert interior habitat into edge habitat. The hydel projects also increase the destruction of wildlife by noise pollution, deforestation, blasting, transportation and the conflict arises between development and biodiversity conservation when projects are located in the protected areas. So government needs to make policies to avoid the construction of roads and hydrological projects inside the Sanctuaries and National parks.

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