

THE STUDY OF MAMMALS OF KHOSHYEYLAGH WILDLIFE REFUGE FOR PREPARING DISTRIBUTION MAPS OF INDICATOR SPECIES WITH THE AID OF GIS

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ABSTRACT

This research is from 1/2/2011 to 25/11/2011 was carried out with the aim of studying the vertebrates fauna of Khoshyeylagh Wildlife Refuge in the Semnan Province to prepare distribution map of indicator species. Khoshyeylagh Wildlife Refuge as vast as 143138ha is located between 13' 55" to 54' 55" eastern longitude and 38' 36" to 3' 37" northern latitude. This region due to its important ecological indicators has considerable part of plant and animal genetic pools, from Caspian mountainous rainforest ecosystems to arid deserts. Presence of 27 species of mammals in 14 families, 93 bird species in 25 families and 25 reptile species in 3 families in this area was confirmed during the study period. Altogether, %17.68 of mammals, %17.91 of birds and %12.5 of reptiles inhabit this refuge.

In this paper, Arc GIS was used to prepare distribution maps of indicator species living in Khoshyeylagh Wildlife Refuge. For this purpose, after literature review and field visit were finished, environmental resources including physico chemical, biological, socio-economical and cultural resources were identified. Then, fauna map of this area was prepared in the scale of 1:250000 based on classification of fragile habitats and biotic conditions of indicator or threatened species.

Key Words : *Khoshyeylagh Wildlife Refuge, Semnan, Iran and GIS*

INTRODUCTION

Rising of environment and wildlife conservation that significantly encompass the manifest and distinct species, to biodiversity faces that encompass all of the life habitats, in universal society environmental view take into account basic evolution, that human being more near to correct perception and scientific of structure, function, organic and unique temperament of nature and its components in ecosystemic context. Each of herbaceous and animal species takes into account unique genetical source. These species are such as a key in progressions way of human future and with loss of one of them decrease a choice of human facilities. Infact, species ruin is like human disarming against massive risks that in future involve with them. With progression in natural sciences basis, conservation necessity of biodiversity and management of life valuable sources, investigation of biodiversity with use of different diversity indicators for description and comparison of ecosystems ecological situation is so considered to decision making in natural resources management (Kolongo *et al.*, 2006; Barnes *et al.*, 1998). Importance of biodiversity protection and management that is stable particularly over conservation and resistant exploitation of ecologic sources. Reid *et al.*, (1993), explain particular place of protected areas in protection and preservation of habitats diversity and animal and herbaceous species. Protected areas are biodiversity reserves in biogeographical units (Dhar *et al.*, 1997; Majnoonian, 1998). Incorrect exploitation and destruction of nature is cause of biodiversity decline, destruction of biotic factors interaction connections together and complicated system decay of an ecosystem. Biotic and abiotic factors of each ecosystem are constitutive bases of a system. Life texture inside of this complicated and wonderful system provide via juncture and interaction connections. In affect of human modern activities, but many of species are fey to extinct, rather decrease and destruction of habitats also prevent from new species evolution. Because with

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destroy of species and habitats, also human cultures that are the result of special and unique adjustment evolution of human, often destroy. Nowadays biodiversity, separate of main centers destruction even in protected systems are also threatened. Habitats decompose and become insular faced with doubt long term conservation of many protected habitats.

MATERIALS AND METHODS

Khoshyeylagh wildlife refuge with the surface area of 143138 ha is situated in eastern north of Shahrood Township (semnan province) and eastern south of Aliabad township (golestan province). The geographical coordinates of it is between $55^{\circ}13'$ up to $55^{\circ}54'$ Eastern longitude and $36^{\circ}38'$ up to $37^{\circ}03'$ northern latitude. This zone is among protected zones first in iran, that announced protected since 1346 and the title of it is changed to wildlife refuge since 1351. Existing of natural different landscapes and high ecosystemic diversity, such as Caspian mountainous rain forest till arid desert. Khoshyeylagh wildlife refuge manage by environment protection administration of semnan province (See figure 1).

With consideration to animal species diversity and applied-scientific recognized methods, with purpose of receiving to near information to estimate efforted in addition to use of archives and documentary information, field studies in relation with any animal group achieved that can be useful for creation of more information. In some cases, also traditional methods accompanied by applied-scientific methods are used for achieving to more information. We should sign to this point that for well field studies achievement such as studies based on question or field studies based on species direct observations or vestiges of species individuals, at first used from library information particularly existing reports and also earned maps and information by other study group in studies collection of this zone as basic information and data. For reaching to this important thing used ocular field glasses with 10×40 magnification.

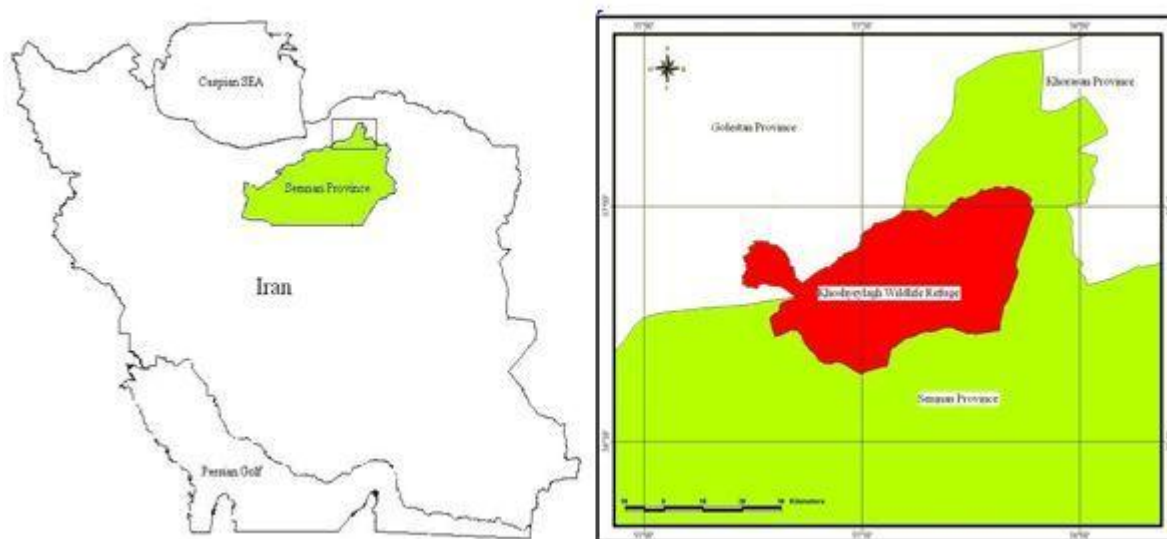


Figure 1: Location of Semnan Province and Khoshyeylagh Wildlife Refuge

During the study with purpose of decrease of mistake range used a kind of ocular field glass. Missnet is taken in to consideration for study of terrestrial pint sized body birds particularly Passeriformes family. By the way, totally birds' field studies was based on direct observation of species individuals by using of ocular field glass and telescope. Also some information earned by indirect observation (vestiges of species individual such as nests).

With consideration to collected information in context of reptiles and amphibians traits and with use of present documentation sources, use of obtaining insect net and obtaining snake special wood is considered

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for access to snakes and amphibians and some of lizards and metal cans installation with different contents around troughs, below of shrubs, next of streamlets for reptiles trapping especially lizards.

RESULTS AND DISCUSSION

Totally and after field studies supported the presence of 27 mammal species of 14 families, 93 bird species of 25 families and 25 reptile species of 3 families that in compare with biodiversity of iran wide country include the amount of 17/68% mammal, 17/91% bird and 12/5% reptile. On the basis of investigations, 93 species of birds dependent to 11 phylums, 30 families and 33 tribes of native and emigrant birds kinds (wintry, summery, passable) identified during field investigations. The species abundantest statistics is dependent to Passeriformes (18 tribe & 60 species) and relative density between species is dependent to *Oenanthe isabellina*. Investigations showed, according to CITES international rules 11 species place in II appendix and 3 species place in I appendix. According to IUCN international rules 2 species are in LR/nt¹ class and 1 species is in Vu² class. National conservation situation of 4 species is endangered, 15 species is protected, 68 species is unprotected (usual) and 6 species is harmful. With a view to habitat kind, birds species classified in 5 group including plain, mountain, forest and planted lands with trees, basins and wetlands and border of basin. It's necessary to say that some species are common in several habitat. Figure number 2 shows percentage of species relative abundant in habitat.

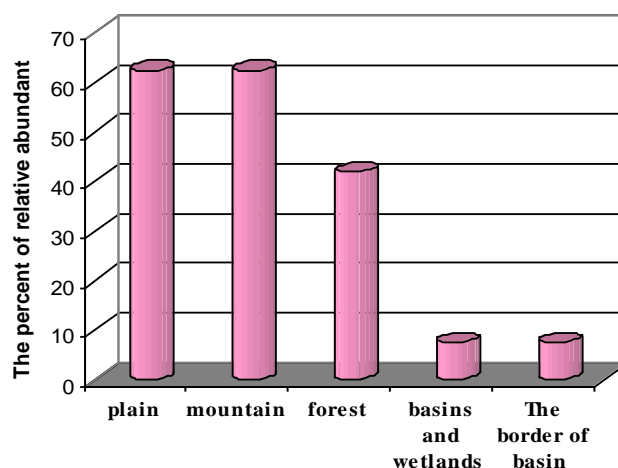


Figure 2: The percentage of species relative abundant of identified species in habitat

Between identified birds in Khoshyeylagh wildlife refuge *Chlamydotis undulate*, *Alectoris chukar* and *Gyps fulvus* and between identified mammals *Cervus elaphus*, *Ursus arctos*, *Panthera pardus* and *Capra aegagrus* introduced as indicator species in zone. Investigations showed, between 27 identified mammal species, according to CITES³ international rules, 2 species place in I appendix and 7 species place in II appendix. According to IUCN⁴ classification, the situation of 2 species are vulnerable, 5 species are near threatened (LR/nt), 2 species are endangered, 1 species is critical, 1 species is in LR/lc⁵ class and 1 species is in DD⁶ class. Also according to national rules, 16 species are unprotected, 8 species are protected and 3 species are endangered. Figure number 2 and 3 show alimentary regime and national conservation situation of identified mammals.

¹ Lower Risk (LR), near threatened

² Vulnerable

³ Convention on International Trade in Endangered Species of Wild Fauna and Flora

⁴ The World Conservation Union

⁵ Lower Risk (LR), least concern

⁶ Data Deficient

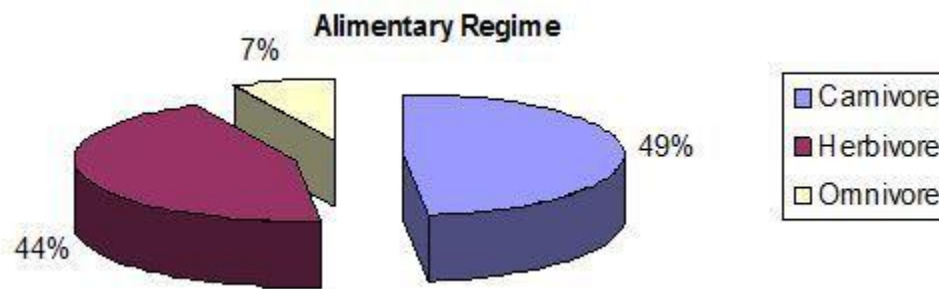


Figure 3: The percentage of species number of identified mammal with the view of alimentary regime

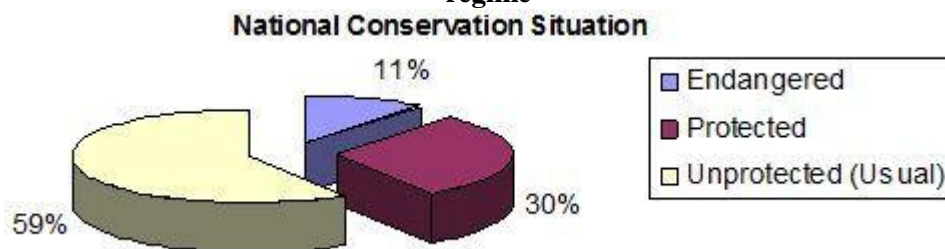


Figure 4: The percentage of species number of identified mammal with the view of national conservation situation

Investigations showed, identified reptiles during field studies are inclusive of 11 lizard species, 11 species of snakes kinds and 3 species of turtle kinds. Also 5 amphibian species of toads and frogs exist in zone. Different species dependence of mollusca and arthropoda to shrubs and alimentary use of reptiles particularly lizards of them during dry years is led to dispersal limitation of alimentary sources and consequently reptiles (lizards) abundance limitation and issuance. However snakes and turtles also because of this group of habitat limitative factors are with low amplitude issuance and low abundance, as observation of them during study was with high problems.

MAIN THREATS

Wide presence of domestic animals and destruction of pastures are as important elements in limitation of *Chlamydotis undulate* presence. This species according to national rules is endangered and its place in I appendix of CITES convention and in LR/nt class of IUCN red list.

However *Alectoris chukar* have high production power but population of it because of hunting without control, egg collecting and catch of chicks haven't high growth and survival rate. *Alectoris chukar* in the national rules is unprotected and the results of investigations showed if the process of conservation and wide presence of domestic animals continue like now, population of this species place in LR/nt class.

Biodensity of other animals and drought phenomenon influence issuance and abundance of *Gyps fulvus* population. The population of this species because of habitat cramp elements such as low number of big carnivores and consequently low amount of nutritious wastes, nutritious competition with fox and jackal that exist so high in zone and competition of dogs along with domestic animals with *Gyps fulvus* about use of animal nutritious waste is so periodic and short term. This species according to national rules of wild animal is protected and on the basis of CITES convention place in II appendix.

Wide presence of domestic animal along with drove dogs, aggression of drove dogs to animal wildlife particularly vegetarians in litter season, traffic of different kinds of motor vehicles for servicing to shepherds and also several availability ways to habitats even sensitive habitats is led to decrease of

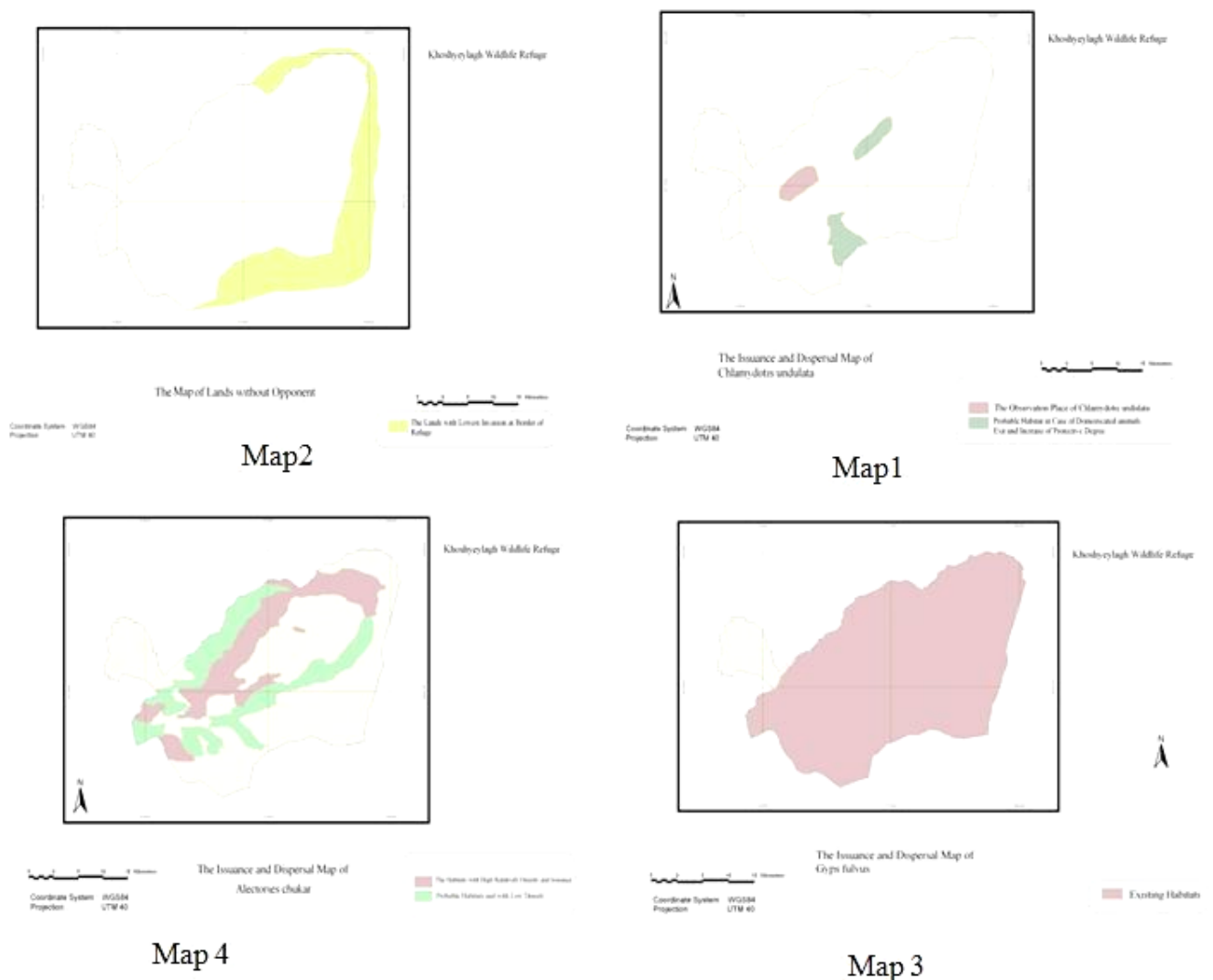
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animal populations particularly huge species such as *Gazella subgutturosa*, *Ovis orientalis* and *Cervus elaphus*.

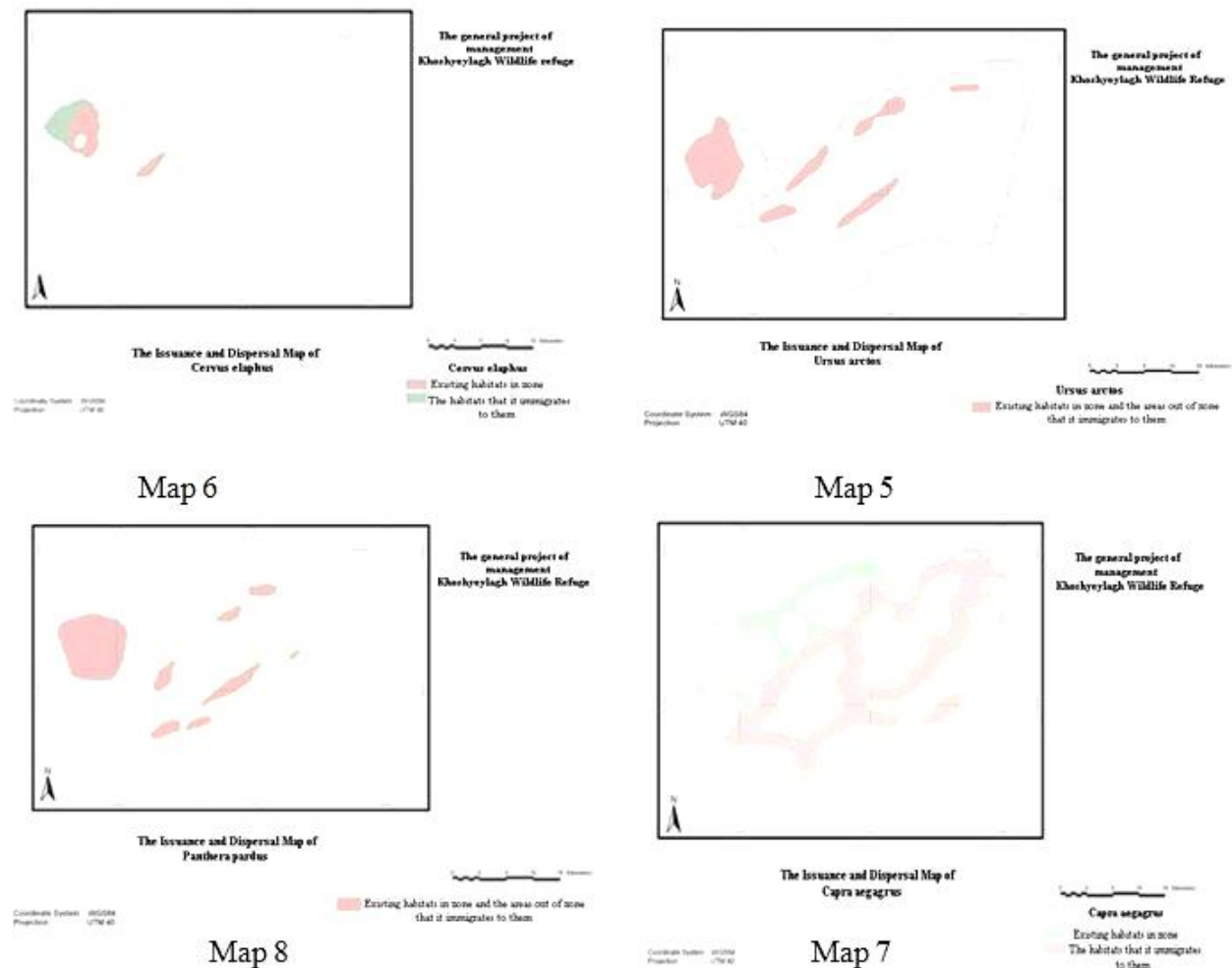
Also some of valuable species like *Acinonyx jubatus* and *Equus hemionus* from total of exist habitats in this refuge are eliminated influence of habitat limitative factors (destruction and change of lands) and illegal hunting.

According to national rules *Cervus elaphus* is protected wild animal, *Ursus arctos* and *Panthera pardus* are protected and *Capra aegagrus* is unprotected. On the basis of CITES convention *Ursus arctos* place in II appendix and *Panthera pardus* place in I appendix. Also on the basis of IUCN classification, *Panthera pardus* is in red list and endangered and *Capra aegagrus* place in vulnerable class.

Finally, distribution maps of indicator species prepared by ARC GIS system in the scale of 1:250,000 (See maps 1 till 8).



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SUGGESTIONS

The presence of indicator birds increase If below cases achieve :

- conservation
- control
- species and habitat management
- exit of domestic animals from zone

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