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# Habitat suitability modeling for wild goat (*Capra aegagrus*) in a mountainous arid area, central Iran

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## ABSTRACT

Wild goat (*Capra aegagrus*) is one of the most prominent mountain mammals dispersed in many habitats in Iran. However, few studies on the relationship between this species and its habitat have been conducted. This species is recognized as one of the main food source for highly endangered species such as cheetah and leopard. In this study which lasted from fall 2009 through summer 2011, seasonal habitat suitability models of wild goat in the protected area of Kouh-e-Bafgh were created. The binary logistic regression analysis comparing ecological characteristics of presence and absence points with ecological characteristics of the region have been applied. Wild goat habitat use was influenced by steep slopes, rocky substrates, and distance to water sources, vegetation, aspects and human resources (roads). Applied models could predict at least 94.7% of the model evaluation points, indicating high accuracy of the models. Suitable habitats for wild goat in protected area of Kouh-e-Bafgh were classified in different seasons based on the estimated optimal cut-off value for each model. It comprised 29.5% to 41.3% of the protected area. There was a substantial overlap between seasonal suitable habitats in different seasons, with the highest overlap between spring and summer. The overlap between suitable habitats was at least 71.6% in all seasons. The most suitable habitats of wild goat and its predator were in the core zones of the study area.

**Keywords**: *wild goat (Capra aegagrus), habitat suitability model, binary logistic regression, Kouh-e-Bafgh.*

## INTRODUCTION

Mercury Populations of wild goat have been decreasing at national and international levels over the last few decades (Shams et al. 2010; Ziaie 2008; Weinberg *et al*. 2008; IUCN 2010). Therefore, it is listed as vulnerable species by IUCN (IUCN Red list 2009). This demonstrates the necessity for decision-making management to improve and preserve populations of the species and also its predator (cheetah and leopard), especially in protected areas. Illegal hunting, road construction, agricultural and horticultural land, manpower and equipment shortages and natural disasters affecting the habitat of the species are known as the main factors threatening this species. (Sarhangzadeh et al. 2007).

Vulnerable species management, population viability analysis, analysis of conflict between humans and wildlife populations and identification of suitable habitats for protection, mainly rely on modeling the relationship between habitat and species distribution (Carvalho & Gomes 2003). These models predict the probability of species presence based on environmental variables. They identify the limitations, the destructive and also attractive factors of species and help managers to save time and money in habitat management (Guisan & Zimmermann 2000). Considering the situation of mammals in the study area such as cheetah (critically endangered), leopard (endangered) and wild goat (vulnerable) as their prey, habitat

suitability assessment of wild goat is significant and knowledge on its habitat use is a prerequisite in wildlife management decisions. (Sarhangzadeh et al. 2007).

The major objectives of the current study were to determine the relationship between environmental variables and presence of species to develop habitat suitability models in different seasons for the wild goat in protected area of Kouh-e-Bafgh.

## MATERIALS AND METHODS

### Study area

Kouh-e-Bafgh protected area covers an area of 88528 ha plains and is located in the south west of Yazd province (55°28′E to 55°25′E and 31°18′N to 31°45′N; Fig. 1).Its altitude ranges from 1,054 to 2,841 m above sea level. Surface water and river resources are limited and all waterways in the area are seasonal. Natural springs with natural troughs and cisterns are main places that supply the water requirements of wildlife (Sarhangzadeh *et al*. 2007).

Temperature falls to 4.2 °C in winter at the height of 2841 m and rises to 40°C in summer at the height of 1054 m above sea level.

Within the protected area, there are 25 villages, 19 of which are uninhabited village (farm or garden). There are also two active mines in the area (Sarhangzadeh *et al*. 2007).

Various physical and ecological factors have led to significant biological diversity and dense vegetation cover. *Artemisia aucheri* and *Zygophyllum eurypterum* are the main vegetation cover and make relative uniformity in the area; however, there are at least 191 plant species of 15 different types. About 10% of area is bare lands. Different types of shrubs such as *Amygdalus eburnea*, *Amygdalus lycioides* , *Amygdalus scoparia, Pistacia khinjuk، Pistacia vera, Ficus johannis Pteropyrum Aucheri Hammada salicornica*; different plants such as *Scariola orientalis*, *Scabiosa olivieri*, *Artemisia sieberi* and different herbs such as *Dorema ammoniacum*; are consumed by wild goat.

Large herbivores such as Wild sheep (*Ovis Orientalis*), wild goat (*Capra aegagrus*) and Jebeer Gazelle (*Gazella bennetti*) occur in Kouh-e-Bafgh protected area. Cheetah (*Acinonyx jubatus venaticus*), leopard (*Panthera pardus*) and wolf (*Canis lupus*) are the most prominent predators of the area (Sarhangzadeh *et al*. 2007; Sarhangzadeh & Goshtasb 2010).

### Methodology

### Sampling

From fall 2009 through fall 2011, the presence and absence points of species through random sampling were recorded and mapped. Seven sampling routes were determined by one group for sighting. Observers recorded the location of goats as goat presence points using GPS. In each survey route, if there was no observation of wild goat after passing 500m of the route, the observers stopped and fully scanned the surrounding area with binoculars to assure that no goat was around. The location of observer was recorded as goat absence point, using GPS (Shams *et al*. 2010).

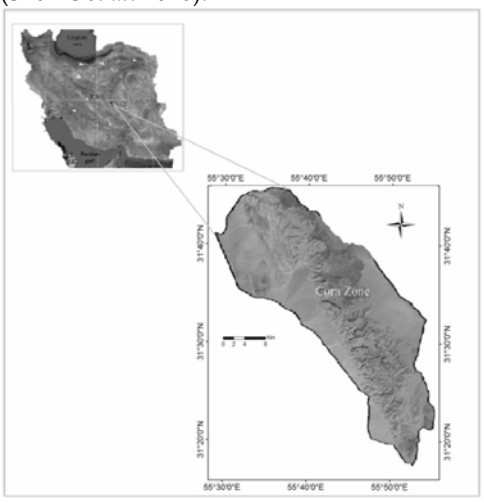


**Fig. 1**. Kouh-e-Bafgh Protected area in Iran

### Statistical models Development

The studies on behavior, habitat use and ecology of different wild goat species to determine environmental variables affecting habitat requirements were reviewed (e.g. Mostafavi *et al*. 2010; Shams *et al*. 2010; Ziaie 2008 and Gross *et al*. 2002). Layers of digital information of all the environmental variables (30×30m) were converted to raster maps using Arc G.I.S 9.3 software (Senjeri, 2010). Quantitative variables (elevation, slope, aspect and isothermal lines) used directly in analyzing; and qualitative variables (vegetation, water resource, rocky areas

and human development) converted to distance variables. Variables including slope, aspect, elevation, rocky areas, mean seasonal and annual temperature, vegetation, water resource, human development, roads and active mines were selected for species distribution modeling in the studied area.

Location of rocky substrates was extracted from geomorphology maps of the study area (Jameh Iran 2007).

The synoptic and climatology stations data of Rafsanjan, Bafgh, Anar, Robat-e-Poshtebadam, Saghand, Yazd and Ashkezar were used to develop isothermal maps of the area.

SPSS software (version16) was used to analyze environmental layers made by Arc G.I.S 9.3.

**Analysis**

All qualitative environmental variables in all seasons in binary logistic regression analysis were used. So, distance map for each class was prepared considering the classified maps. For each vegetation type, map of distance to the nearest vegetation type was developed. We used only points of permanent water resource to map water sources and then the distance map to the nearest water resource was prepared. Maps of distance to the nearest village with residents, distance to the nearest uninhabited village, distance to the nearest active mine, distance to the nearest asphalt road, distance to graveled road and dirt road were prepared using map of human resources location (Shams *et al.* 2010).

To select the best model, the Backward Logistic Regression method was applied. Finally, a model by removing non-significant independent variables for every year and season was created and then coefficients were assigned to the independent variables.

The criterion for selecting the best variable is the level of contribution in the final model. So, Nagelkerke coefficient of determination (1991), and Hosmer and Lemeshow fitness test were used to validate the models. Statistical analysis was performed using SPSS software (version 16). The variables used in different seasons for selecting habitat suitability models are given in Table1.

**Table 1** : used variables for selecting habitat suitability model in different seasons in the protected area of Kouh-e-Bafgh

| Variable | Description |
|---|---|
| Elevation | Elevation (m) above sea level for each 30-m pixel of used or unused sites |
| Slope | Slope (percent) for each 30-m pixel of used or unused sites measured on digital elevation map of the study area |
| Cosine of aspect | Aspect cosine transformed increasing from south (−1) to north (+1) for each pixel of used or unused sites |
| Sine of aspect | Aspect sine transformed increasing from west (−1) to east (+1) for each pixel of used or unused sites |
| Distance to types of Vegetation | Distance to nearest type for each 30-m pixel of used or unused sites |
| Distance to rocky substrate | Distance to nearest rocky substrate (metre) for each 30-m pixel of used or unused sites |
| Distance to water sources | Distance to nearest sources of water (springs, water reservoir and stone troughs) (m) for each 30-m pixel of used or unused sites |
| Distance to active mines | Distance to nearest active mine for each 30-m pixel of used or unused sites |
| Distance to inhabited villages | Distance to nearest inhabited village for each 30-m pixel of used or unused sites |
| Distance to uninhabited villages | Distance to nearest uninhabited village for each 30-m pixel of used or unused sites |
| Distance to asphalt road | Distance to nearest asphalt road for each 30-m pixel of used or unused sites |
| Distance to gravel road | Distance to nearest gravel road for each 30-m pixel of used or unused sites |
| Distance to dirt road | Distance to nearest dirt road for each 30-m pixel of used or unused sites |

**Binary logistic regression**

Logistic regression has been used to investigate the relationship of animal distribution and environment in many studies (e.g. Franco *et al*. 2000; Pearce *et al*. 2000; Glenz *et al*. 2001; Gross *et al*. 2002; Carvalho & Gomes 2003; Gavashelishvili, 2004; Bahadori *et al*. 2010; Shams *et al*. 2010; Varasteh and Moradi, 2010).Logistic regression can predict probability of presence or absence of species based on a set of dependent variables using the equation:

$$y = \frac{exp(\beta_0 + \beta_1 x_1 + \cdots + \beta_n x_n)}{1 + exp(\beta_0 + \beta_1 x_1 + \cdots + \beta_n x_n)}$$

where $x_1$, $x_2$,…, $x_n$ are independent predictor variables, and $\beta_0$,…,$\beta_n$ are logistic coefficients (Hosmer and Lemeshow,2000).

To achieve the optimal regression coefficients in this study, species presence was selected as the response variable (Y). The Number one was assigned to species presence and the zero to species absent. Other extracted layers presented in Table1 were considered as independent predictor variables. Created models described probability of presence (and or absence) which ranges from 0 to 1 (Kinear & Gray 2000).

**Suitability habitat map**

Using results of binary logistic regression (environmental variables equation) and cut off values of each model, habitat suitability map in different seasons was classified into suitable and unsuitable habitats (Shams *et al*. 2010; Gross *et al*. 2002).

**Model validation**

Wald Statistics and Hosmer and Lemeshow test (2000) were used to determine significance of coefficients for the independent variables and good fitness for models. Accuracy for predictions of created models evaluated by Nagelkerke and Cox and Snell coefficients of determination were used to verify model (Hosmer and Lemeshow, 2000).

To evaluate model accuracy, 25% of presence and absence data in each season was considered as evaluating data and the separated randomized residue dataset (75%) were used in model development. The overall accuracy and area under the curve based on sensitivity and specificity for both groups of datasets (evaluation and development datasets) was calculated for different seasons. The overall accuracy (percentage of all of corrected predicted cases; Area under the curve based on sensitivity: percentage of true positive, correctly predicted; specificity: percentage of true negatives, correctly predicted) was calculated for different seasons.

**RESULTS**

Habitat suitability of wild goat was positively associated with elevation, slope and distance to road, whereas coefficients for distance to rocky substrate and distance to water source were negative (Table 2). Distribution of suitable habitats throughout the study area was changed by season (Fig.2).

Wild goat tends to use southern slopes in spring, summer and winter and prefer northern ones in fall. In spring, the species is distributed more frequently in the slopes covered with *Artemisia sieberi-Amygdalus scoparia*. The main variables affecting suitability of habitat for wild goat are related to topographical condition of habitat as well as water sources and human resources (Table 2).

For all of the designed models, Hosmer and Lemeshow test, Nagelkerke and Cox and Snell coefficient of determination were calculated (*P*> 0.64, 0.902 and 0.676, respectively) (Table 3), indicating high validation of models in predicting habitat suitability in different seasons. Variables used for model creation were separated correctly by more than 94.7%, indicating high accuracy of the models. Therefore, all models are able to well predict at least 94.7% points. In addition, all models indicated very low errors for predicting active and inactive sites (Table 4).

Habitat suitability threshold was determined by Receiver Operating Characteristic (ROC) and Area Under the Curve (AUC) (Jiménez-Valverde *et al*.2008; Shams *et al*. 2010; Gross *et al*. 2002). Optimal cut-off value was used to classify the habitat suitability of wild goat into suitable and unsuitable habitats in different seasons (Fig. 2; Table 4). The extent of suitable habitat of wild goat is presented in Table 5. Among different seasons, suitable habitats encompassed 29.5% to 41.3% of the area. In addition, areas classified as suitable were overlapped in different seasons ranging from 76.1% to 84.3% (Table 5).

Table 2: Results of binary logistic regression analysis of wild goats in different seasons in the protected area of Kouh-e-Bafgh.

| season | Habitat variables | β | S.E. | Wald | P-value | Exp(β)Odd Ratios |
|---|---|---|---|---|---|---|
| Fall | Elevation | 0.013 | 0.005 | 5.710 | 0.017 | 1.013 |
| | slope | 0.772 | 0.236 | 10.728 | 0.001 | 2.163 |
| | Cosine of aspect | 1.809 | 0.913 | 3.924 | 0.048 | 6.102 |
| | Distance to water | -0.006 | 0.002 | 9.631 | 0.002 | 0.994 |
| | Distance to dirt road | 0.003 | 0.001 | 7.712 | 0.005 | 1.003 |
| | Distance to rocky | -0.016 | 0.005 | 9.839 | 0.002 | 0.984 |
| | Constant | -23.468 | 9.553 | 6.036 | 0.014 | 0.000 |
| winter | Elevation | 0.004 | 0.001 | 7.074 | 0.008 | 1.004 |
| | slope | 0.156 | 0.028 | 30.442 | 0.000 | 1.169 |
| | Cosine of aspect | -1.063 | 0.461 | 5.318 | 0.021 | 0.345 |
| | Distance to water | -0.002 | 0.0004 | 17.167 | 0.000 | 0.998 |
| | Distance to rocky | -0.006 | 0.002 | 10.210 | 0.001 | 0.994 |
| | Constant | -6.330 | 2.506 | 6.379 | 0.012 | .002 |
| Spring | slope | 0.3705 | 0.05626 | 43.372 | 0.000 | 1.449 |
| | Cosine of aspect | -1.3966 | 0.53318 | 6.862 | 0.009 | 0.247 |
| | Distance to water | -0.0015 | 0.00035 | 18.267 | 0.000 | 0.999 |
| | Distance to dirt road | 0.0005 | 0.00026 | 4.359 | 0.037 | 1.001 |
| | Distance to *Artemisia sieberi-Amygdalus scoparia type* | -0.0001 | 0.00003 | 9.274 | 0.002 | 1.000 |
| | Constant | -2.4932 | 0.97676 | 6.516 | 0.011 | 0.083 |
| Summer | Elevation | 0.007 | 0.0016 | 17.226 | 0.000 | 1.007 |
| | slope | 0.149 | 0.0265 | 31.462 | 0.000 | 1.161 |
| | Cosine of aspect | -2.844 | 0.6248 | 20.714 | 0.000 | 0.058 |
| | Distance to water | -0.003 | 0.0005 | 26.760 | 0.000 | 0.997 |
| | Distance to dirt road | 0.001 | 0.0003 | 9.584 | 0.002 | 1.001 |
| | Distance to rocky | -0.006 | 0.0018 | 11.464 | 0.001 | 0.994 |
| | Constant | -12.229 | 2.8890 | 17.918 | 0.000 | 0.000 |
| Annual | Elevation | 0.0042 | 0.0006 | 45.664 | 0.000 | 1.004 |
| | slope | 0.1913 | 0.0138 | 191.685 | 0.000 | 1.211 |
| | Cosine of aspect | -1.2105 | 0.2352 | 26.495 | 0.000 | 0.298 |
| | Distance to water | -0.0018 | 0.0002 | 102.079 | 0.000 | 0.998 |
| | Distance to dirt road | 0.0006 | 0.0001 | 25.585 | 0.000 | 1.001 |
| | Distance to rocky | -0.0005 | 0.0001 | 10.229 | 0.001 | 1.000 |
| | Constant | -8.8453 | 1.0847 | 66.497 | 0.000 | 0.000 |

Table 3: goodness of fit (Hosmer and Lemeshow) for binary logistic regression model for wild goat in Kouh-e-Bafgh protected area

| season | Hosmer and Lemeshow test | | | Nagelkerke | Cox and Snell |
|---|---|---|---|---|---|
| | Chi-square | df | P-value | R Square | R Square |
| Fall | 0.133 | 8 | 0.999 | 0.976 | 0.732 |
| Winter | 1.051 | 8 | 0.998 | 0.912 | 0.684 |
| Spring | 1.063 | 8 | 0.998 | 0.929 | 0.697 |
| Summer | 6.058 | 8 | 0.641 | 0.924 | 0.690 |
| Annual | 2.496 | 8 | 0.962 | 0.902 | 0.676 |

Table 4: Binary logistic model validation using overall accuracy index for wild goat in Kouh-e-Bafgh protected area

| Model | Optimal cut-off value | | Model development dataset | | | Model evaluation dataset | | |
|---|---|---|---|---|---|---|---|---|
| | | | Predicted | | | Predicted | | |
| | | Topic | Unsuitable | Suitable | Observed | Unsuitable | Suitable | Observed |
| Fall | 0.548 | Unused | 219 | 3 | 222 | 74 | 1 | 75 |
| | | Used | 2 | 217 | 219 | 2 | 71 | 73 |
| | | Specificity (%) | | | 98.6 | | | 98.7 |
| | | Sensitivity (%) | | | 99.1 | | | 97.3 |
| | | Overall (%) | | | 98.9 | | | 98.0 |
| Winter | 0.466 | Unused | 197 | 9 | 206 | 65 | 2 | 67 |
| | | Used | 7 | 185 | 192 | 5 | 61 | 66 |
| | | Specificity (%) | | | 95.6 | | | 97.0 |
| | | Sensitivity (%) | | | 96.4 | | | 92.4 |
| | | overall (%) | | | 96.0 | | | 94.7 |
| Spring | 0.490 | Unused | 208 | 5 | 213 | 66 | 4 | 70 |
| | | Used | 9 | 192 | 201 | 3 | 65 | 68 |
| | | Specificity (%) | | | 97.7 | | | 94.3 |
| | | Sensitivity (%) | | | 95.5 | | | 95.6 |
| | | overall (%) | | | 96.6 | | | 94.9 |
| Summer | 0.429 | Unused | 225 | 9 | 234 | 74 | 5 | 79 |
| | | Used | 6 | 183 | 189 | 1 | 61 | 62 |
| | | Specificity (%) | | | 96.2 | | | 93.7 |
| | | Sensitivity (%) | | | 96.8 | | | 98.4 |
| | | overall (%) | | | 96.5 | | | 95.7 |
| Annual | 0. 505 | Unused | 839 | 36 | 875 | 283 | 8 | 291 |
| | | Used | 53 | 748 | 801 | 15 | 254 | 269 |
| | | Sensitivity (%) | | | 95.9 | | | 97.3 |
| | | Sensitivity (%) | | | 93.4 | | | 94.4 |
| | | overall (%) | | | 94.7 | | | 95.9 |

Table 5: the extend and overlapped percent of seasonal suitable habitats in Kouh-e-Bafgh protected area

| season | Suitable habitat Area | | Overlap | | |
|---|---|---|---|---|---|
| | | | Summer (Percent ) | Spring(Percent) | Winter(Percent) |
| | Hectare | Percent | | | |
| Fall | 28376 | 32.05 | 71.6 | 75.1 | 81.7 |
| Winter | 28656 | 32.37 | 83 | 74.7 | - |
| Spring | 36517 | 41.25 | 84.3 | - | - |
| Summer | 26139 | 29.53 | - | - | - |
| Annual | 31717 | 35.83 | - | - | - |

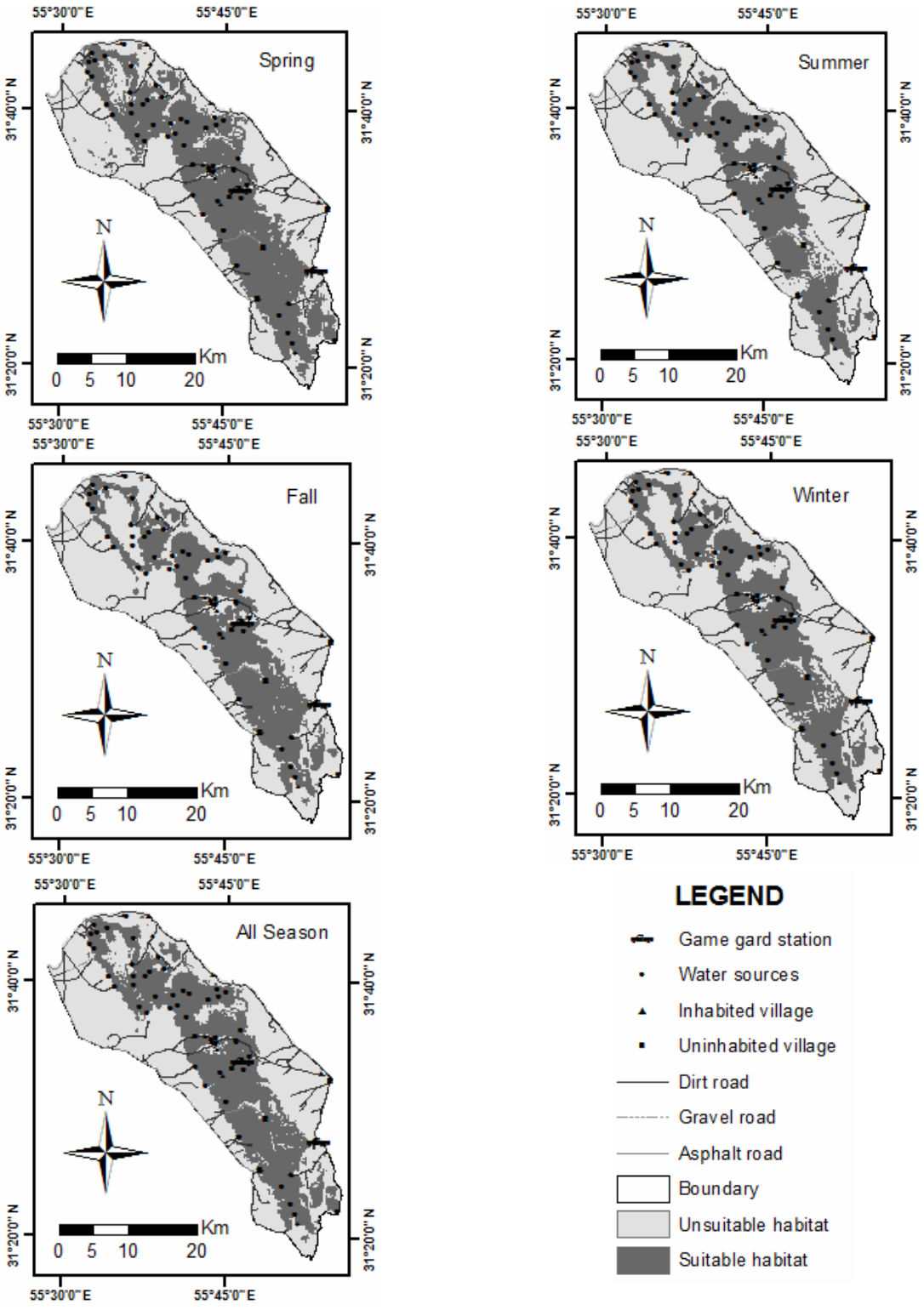


Fig.2. Distribution of suitable habitat for wild goat in the protected area of Kouh-e-Bafgh identified by logistic regression models

**DISCUSSION**

The distribution of wild goats in the study area for different seasons could be very well predicted by our models and interpretation of provided habitat maps by these models is easy to use for managers in the protected area.

Based on the developed models, wild goats were sensitive to changing conditions and resources in their habitat. Therefore, further changes in habitat affect the survival of the species. The results of regression models showed severe dependence of wild goat on rocky substrates and steep slopes and significantly correlated with them. The effects of distance to rocky substrates were presented by negative coefficient, whereas coefficients for slopes were positive. These findings are compatible with behavior and habitat selection of wild goat (Fox *et al*. 1992; Weinberg *et al.* 2008). Wild goat is very dependent on rocky substrates and steep slopes to avoid its predators (leopard, cheetah and wolf). The reason is that almost no other animal can move like wild goats on the rocks (Ziaie 2008). Thus, these areas provide high security for this species. The positive relationship of habitat suitability for wild goat with higher elevation increases species density in high elevations. We observed wild goat presence from the height of 1400m to 2800m above sea level. Species use lower elevations in places that are close to covers. Some ranges of high elevation even with appropriate elevation (2000m) was not suitable for wild goat because of other variables such as slope. Indeed, the suitability of habitat for species depends on the existence of a set of conditions; therefore unsuitability of even one variable may make a site unsuitable for it.

Road density and traffic in the study area compared with other management areas was low, so that the length of asphalt, graveled and dirt roads in the area is 59, 19 and 262 km, respectively. The paved and gravel roads are located outside of the wild goat habitat, and could not significantly influence the models. While, there was little traffic on dirt roads, wild goat avoid these roads and the effects of distance to road on habitat suitability were positive (Sarhangzadeh *et al*. 2007).

Results of this study indicated that species population increased with reduction in distance to water sources in all seasons. Considering the fact that study area is arid and there is shortage of water resources, the negative relationship of habitat suitability with distance to water source is justified. Changes in patterns of suitable habitat distribution across the study area by seasons could be related to both the changes in physiological functions of wild goat and environmental conditions of the study area. The overlap between suitable habitats was at least 23.4% of whole area in all seasons. The highest overlap was between suitable habitats in summer and spring (84.3% of suitable area). Parturition and care of lambs occurs in these seasons (Sarhangzadeh *et al.* 2007). The lowest overlap was between suitable habitats in summer and fall (71.6). Because mating season of wild goat starts in the middle of fall (Sarhangzadeh *et al.* 2007) and due to polygamy mating system the dominant males maintain their dominance and prevent the females to be dispersed. The overlap between suitable habitats in fall and spring was 75.1%. In fall wild goat use the areas which aren't suitable in other seasons.Not-overlapping habitats in these seasons was 24.9%, Because some vegetation only grows in spring after rainfall and gradual warming (Sarhangzadeh *et al*. 2007). Moreover, some vegetation could be used by wildlife only in fall.

Winter and spring suitable habitats showed higher overlap (83%). The difference was due to preference for higher elevation in summer to avoid excessive heat and use of food sources in contrast with preferring lower elevations in winter to deal with cold temperature (Sarhangzadeh *et al*. 2007; Ziaie 2008).

The study indicated that wild goats are present from 1400 m to higher elevations (2800 m above sea level) as was referenced in previous studies. Mostafavi *et al*. (2010) reported wild goat presence at elevations above 3040m in Lar National park. It was also shown that with increase in elevation, habitat suitability was increased (Shams *et al*. 2010).

Results of the study revealed that variable slopes affect habitat suitability positively,

indicating that wild goats prefer rocky substrates and steep slopes. Our findings were in agreement with Mostafavi *et al*. (2010) in Lar national park, Shams *et al*. (2010) in Haftad Gholleh Protected Area and habitat suitability of analysis of East Caucasian tur (Gavashelishvili 2004).

According to our observations in this research, despite changes in environmental conditions of study area (environmental and anthropogenic variables), wild goats prefer rocky substrates, steep slopes with available water sources and far from the roads, as were suggested in previous studies (Mostafavi *et al*. 2010; Shams *et al*. 2010).

Based on habitat suitability maps created in our study, the most suitable habitats of wild goat were in core zones of the study area. Destruction factors (road making) negatively affect species presence in the area and the augmentation of edges increases the accessibility of the area for local people which could lead to endangering of valuable species such as cheetah and leopard in this region. Because the area is dry and water availability is a critical factor (sensitive region), road construction results in habitat fragmentation and consequently makes parts of suitable habitats insecure for wild goat and other wildlife. Considering the difference between home range of males and females, habitats of males and females is different. , It is therefore suggested to study habitat suitability in this area for males and females and to compare the findings with this study.

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# مدل‌سازی مطلوبیت زیستگاه بز وحشی (*Capra aegagrus*) در مناطق خشک کوهستانی مرکز ایران

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**چکیده:**

بز وحشی (*Capra aegagrus*) به عنوان یکی از شاخص‌ترین پستاندار مناطق کوهستانی در بسیاری از زیستگاه-های ایران پراکنش دارد. با وجود این، مطالعات چندانی در زمینه روابط متقابل این گونه و زیستگاه آن صورت نگرفته است. ازطرفی در منطقه حفاظت شده کوه بافق این گونه یکی از منابع غذائی اصلی برای گونه شدیداً در خطر انقراض یوزپلنگ ایرانی و پلنگ (در خطر انقراض) محسوب می‌شود. در این پژوهش با استفاده از رویکرد تحلیل رگرسیون لجستیک دوتائی و جمع‌آوری داده‌های میدانی از پائیز۱۳۸۸ تا پایان تابستان ۱۳۹۰ و مقایسه ویژگی‌های اکولوژیکی نقاط حضور و عدم حضور گونه با ویژگی‌های اکولوژیکی منطقه، مدل مطلوبیت زیستگاه بز وحشی در منطقه حفاظت شده کوه بافق تهیه شد. نتایج نشان می‌دهد که در فصول مختلف سال متغیرهای مستقل منابع آب، شیب، مناطق صخره‌ای، پوشش گیاهی، جهت جغرافیایی و عوامل انسانی (جاده‌ها) نقش بسیار مهمی در تعیین مطلوبیت زیستگاه بز وحشی دارند. نتایج ارزیابی صحت مدل‌های تهیه شده در فصول مختلف سال میزان موفقیت کلی مدل‌ها را بیش از ۹۴/۷درصد محاسبه نمود. با استفاده از آستانه مطلوبیت بدست آمده، نقشه مطلوبیت زیستگاه بز وحشی در فصول مختلف طبقه بندی شد که در فصول مختلف سال بین۲۹/۵ تا ۴۱/۳ درصد وسعت منطقه بر اساس مدل‌های طراحی شده مطلوب ارزیابی شده است. همپوشانی زیادی در فصول مختلف سال در زیستگاه مطلوب وجود دارد، بطوریکه حداقل ۷۱/۶ درصد از زیستگاه‌های مطلوب منطقه مورد مطالعه که در هر چهار فصل سال همپوشانی دارند. بیشترین همپوشانی مربوط به فصول بهار و تابستان (۸۴/۳ درصد زیستگاه مطلوب) است. بر اساس نتایج پژوهش زیستگاه‌های قسمت مرکزی منطقه مورد مطالعه مطلوبترین زیستگاه گونه و طعمه خواران وابسته به آن(یوزپلنگ و پلنگ) در طول سال محسوب می‌شود.

*مولف مسئول