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## Social and Recreational Carrying Capacity Assessment of Daland Forest Park, Golestan, Iran

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### Abstract

For a natural destination to have a wide appeal, it should have sufficient capacity to cater for the needs of different types of users. This paper presents an assessment of the social carrying capacity of tourists visiting Daland Forest Park (DFP), Golestan, Iran. Social factors such as visitors' perception about the Park's safety, security and facilities were investigated to determine the level of social capacity and satisfaction. The Mann Whitney U test was used to investigate the likely differences between men and women regarding their social capacity. To do this, 168 questionnaires were filled out by the visitors of the Park during summer and fall 2012. The results showed that about 60% of the visitors preferred moderately crowded environments while the rest preferred low-crowded environments. The results also showed that the Park, in its current condition, does not provide the maximum level of the visitor's satisfaction; therefore, some changes are needed in the area such as raising health care, welfare services and park's safety. The results of this study reflect the status and expectations of the Park's visitors which can be useful to improve the level of visitor's satisfaction. A number of recommendations were provided to upgrade the quality of the recreation services of the Park. Furthermore, a general list of criteria was proposed to estimate social carrying capacity and visitors' satisfaction that can be considered for other similar natural parks.

**Keywords:** Forest parks, Tourism, Visitor's perception, Satisfaction, Safety

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## 1. Introduction

Tourism refers to activities through which people rest, travel and reside for recreation (Zand Moghaddam and Ranjbary, 2010). Since 1945, tourism has grown rapidly to become one of the world's foremost economic phenomena (Deng *et al.*, 2002). It is one of the world's fastest growing industries with huge global impacts. Tourism particularly in national parks, nature parks, forest parks and other natural areas, is one of the fastest growing sectors of the tourism industry and is relatively a recently emerged phenomenon which offers more employment opportunities for local communities (Rajan *et al.*, 2011). Therefore, parks and natural areas are becoming increasingly important in the contemporary society (Manning, 2014) as they provide an important source of income (Ruzic and Sutic, 2014).

Human life depends on healthy ecosystems (Trakolis, 2003). Among the natural systems, forest parks are vital to people in many ways: they offer open and green spaces, protect wildlife as well as historical and cultural resources. In this regard, tourism in forest parks is offering healthy and useful leisure activities, intimate contact with the outdoors, opportunities to build family solidarity, enjoyment and appreciation of the natural environment and cultural heritage (Manning, 2014). However, forest parks and recreation managers are increasingly challenged to deal with the growing number of outdoor visitors (Lime, 1995). The increasing number of visitors is one aspect of the recreation management and; protecting the natural quality is another. A higher visitor numbers results in increased environmental impacts and decreases the quality of the visitor's experience (Candrea and Ispas, 2009; Stein and Clark, 2001). Managers of such areas are increasingly looking for suitable policies, strategies and actions that would protect the resource while providing a high-quality experience to visitors (Ung *et al.*, 2003). Ultimately, the question is how much recreational use is suitable for a natural area? This is usually addressed through the concept of carrying capacity (Candrea and Ispas, 2009; Sayan and Atik, 2011). The idea of carrying capacity was first borrowed from wildlife and range managements (Lime, 1995; Brunson, 1999 and Ung *et al.*, 2003), where the term refers to the number of animals that can be sustainably maintained in a given habitat. The first suggestion for developing the carrying capacity concept in park managements was made about 80 years ago (Summer, 1936) but, the first attempts to apply the concept occurred as a response to the huge growth in outdoor recreation that happened in about 40 years ago (Brunson, 1999). The term "visitor carrying capacity" may be defined as the amount and types of the visitors' use that can be sustained without compromising the integrity of the resource or the quality of visitor's experiences (Ung *et al.*, 2003; Eker, 2008 and Reigner *et al.*, 2012). How much is enough is an important management decision (Reigner *et al.*, 2012). The World Tourism Organization defines the carrying capacity as: "the maximum number of people that may visit a tourist destination at the same time, without causing destruction of the physical, economic and socio-

cultural environment and an unacceptable decrease in the quality of visitors' satisfaction" (Sayan and Atik, 2011). Shelby and Heberlein (1986) defined outdoor recreation carrying capacity as "the level of use beyond which impacts exceed acceptable levels specified by evaluative standards" (Brunson, 1999, p. 13). Beyond that point, it is assumed that the quality of that recreation destination will be degraded (Brunson, 1999 and Salerno *et al.*, 2013). Shelby and Heberlein (1986) distinguish four major dimensions of recreation carrying capacity including ecological, design, managerial and social (Ung *et al.*, 2003). Among them, social carrying capacity refers to impacts arising from the interaction with other visitors that may alter human experiences. Social carrying capacity is to identify visitors' evaluations of their recreation experiences as the basis for management decisions (Manning, 2014).

Generally, based on most of the existing research work, the basic aim of social carrying capacity is to establish a limit on tourist activity (Salerno *et al.*, 2013) and to determine the effect of crowding on the level of recreation satisfaction in a natural recreation destination (Trakolis, 2003). Crowding dimensions were based on the hypothesis that increasing numbers of people causes greater social impacts (measured by indicators like crowding or number of users' conflicts) (Eker, 2008). Crowding is important to understanding social carrying capacity and intra-group conflicts and typically perceived as a negative phenomenon. However, the negative aspect of crowding may vary depending upon experiences, motivations, and expectations. Conflict is a concept that could be arisen from disagreement between two or more persons. Crowding and conflict are important to be studied since they can influence people decisions to participate in physical activities (Godbey *et al.*, 2005).

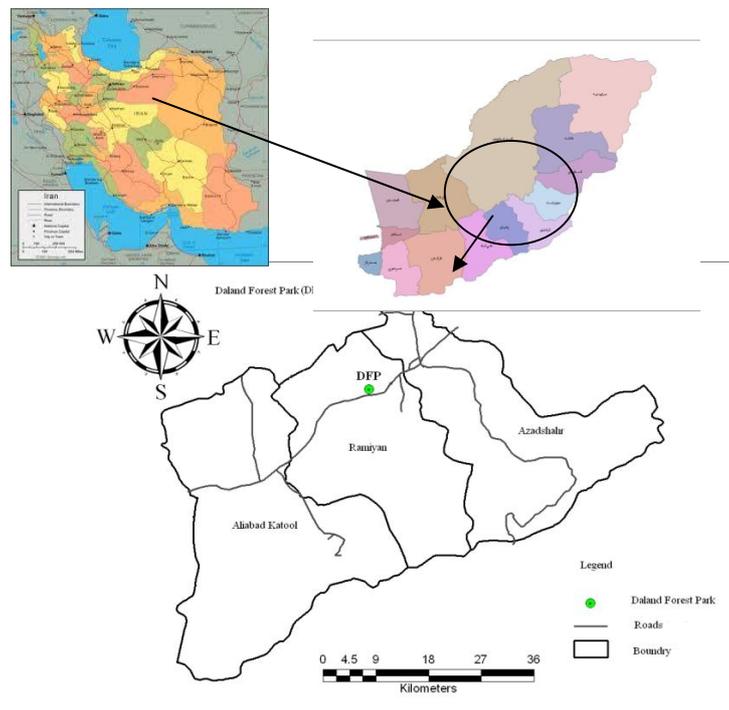
From the park management perspective, carrying capacity analysis is a planning concept, a framework or a way for thinking about how to plan and manage a particular recreation resource (Lime, 1995). More specifically, a social capacity analysis is a great tool to achieve visitors' satisfaction and their good experience. We used the carrying capacity concept to propose a general list of criteria to estimate social carrying capacity and visitors' satisfaction that can eventually be considered for forest parks and other similar natural parks in Iran.

## **2. Materials and method**

### **2.1. Study area**

Daland Forest Park (DFP) was chosen as the study area. This park is situated in the eastern part of Daland city and northwest side of Tehran – Mashhad highway between 55° 40' 44" E longitude and 37° 03' 13" N latitude in Golestan, Iran (Figure 1). With an area of about 541ha, DFP was established in 1975. The elevation ranges between 80 and 120 m and the slope is very gentle and plane between 0.5- to 1%. The vegetation contains *Quercus* sp., *Zelkova carpinifolia*,

*Carpinus betulus* and *Parrotia persica* and rarely *Populus* sp., *Acer* sp., and *Ulmus minor*. Golestan Province in Iran is a place with lots of attractive natural areas for tourists. DFP is one of the most beautiful natural destinations for tourism in Golestan. DFP is located near Tehran-Mashhad highway with a number of daily visitors. The existing facilities in the Park include drinking water, lighting, playground, toilets, camping and picnic sites, tables and benches, parking lots, paved roads, shops and wooden band shelters.



**Figure 1.** Location of the Study area

## 2.2. Survey method

The presence of many visitors at one time in one place could cause problems for people with different socio-economic backgrounds in the Park. Therefore, the main focus was to assess the social carrying capacity and visitors' satisfaction level of the study area. In doing so, a questionnaire survey was used to investigate the social carrying capacity and visitors' satisfaction. The questionnaires were filled out by the visitors to the Park during summer and fall 2012.

Generally, survey questions can be divided into three categories: 1) Questions related to the age, gender, education level and marital status of individuals, 2) a set of general questions related to the respondent's opinion about the research object and, 3) questions not only related to the second category of the questions above,

but also to the respondent's views about the case study (Goshtasb meigui *et al.*, 2008). In order to examine social carrying capacity and visitors' satisfaction, questions were designed within the three mentioned categories that pointed to the visitors' needs and preferences. Therefore, the first category of the questions in this study was about gender, age, education, etc. The second group of the questions was about why visitors would like to use a recreation area to spend their leisure time; what motivations they have for visiting a park; what is the acceptable crowded rate; what is the best way to have a secure recreation setting; what is the acceptable distance from other groups of visitors, etc. Last but not least, the third category of questions was related to the visitors' ideas and opinions about a particular park's characteristics such as facilities, safety, security and managerial priority.

The validity of the questionnaire was confirmed by the judgment of a panel of 10 environmental and recreational planning experts and the questionnaire's reliability level was measured using Cronbach's alpha coefficient which was 0.7257. The collected data were analyzed using SPSS software. The responses to the first and second categories of the questions were analyzed using Mann Whitney U test. The Mann Whitney U test was applied to measure the relationship between gender and the parameters associated with the social properties. The results helped us to present some recommendations for improving the park's conditions, protecting the area for a longer term use, as well as increasing the visitor's satisfaction.

### 3. Results

The study area is located in the northwest side of Tehran – Mashhad highway and therefore, witnesses high numbers of visitors every day. The average number of daily visitors of the Park was estimated about 3300 people over the peak visitor seasons (summer and fall). Accordingly, a sample size with 160 persons gave us a confidence level of 95% with a 5% margin of error. To secure this, 168 questionnaires were eventually filled out at the peak time of visiting during the study seasons, summer and fall 2012. Table 1 shows gender frequency of the respondents and their personal characteristics.

**Table 1.** Respondent's gender frequency and percentage

Gender	Marital status	Frequency	Percentage
Male	Single	11	6.5
	Married	90	53.6
Female	Single	10	5.9
	Married	57	34.0
Total	-	168	100

As the table shows, almost 60% of the respondents were men and the rest were women. With regard to marital status, 12% of the visitors were single while the

majority of the respondents (88%) were married among which married men had a higher percent (about 54%). The results also revealed that 75% of the questionnaires were filled out by employed people whereas only 25% were filled out by unemployed who were mostly housewives or female students.

Table 2 shows the visitors' general preferences about variables including recreational goal and recreation destinations' priority, crowding, distance from other visitors, security, and willingness to pay. According to the table, about 58% of the respondents use a recreation area to experience mental relaxation and spiritual silence. Around 67% of the visitors preferred to spend their leisure time in natural and forest parks. The results also show that 61% of the visitors preferred to spend their leisure time in a moderately crowded area and 46% preferred 25-50 meters distance away from other visitors. In addition, 72% of the respondents believed that more security should be provided by the Park's guards as well as the national police force. We found most people were happy to pay to use a good recreation destination.

**Table 2.** Visitor's preferences about the study variables

Variable	Visitor's preferences	Percentage	Men (%)	Women (%)
Recreation goal	For recreation	12	10	14
	For mental relaxation	58.5	58	59
	Using facilities in the Park	17	22	12
	Others	12.5	10	15
Recreation destinations' priority	Urban parks	3	1	5
	Seaside	13	13	13
	Natural forest parks	67	68	66
	No difference	17	18	16
Crowding	Highly Crowded	3	4	2
	Moderately crowded	61	55	67
	Lonely place	28	31	25
	No answer	8	10	6
Distance from other picnic units	10 meter distance	15	20	10
	25- 50 meter distance	46	49	43
	100 meter distance	18	18	18
	No difference	21	13	29
Security responsible	Police forces	12	17	7
	Park guards	10	11	9
	Police forces & park guards	72	66	78
	No difference	6	6	6
Willingness to pay	Low	38	37	39
	Medium	16	16	16
	High	46	47	45

Table 3 shows visitors' opinion about the Park status in terms of the three main factors including facilities, safety and security. According to the table, most respondents perceived a very low and low quality of the existing facilities and therefore, the Park is in less than the medium level in this respect. As the table shows, compared with men, women are less happy with the lighting in the Park. They also feel less safe in the walking trails. In contrast, men are less satisfied with the Park's security compared with women.

**Table 3.** Visitor's satisfaction about the Park's status

Factors	Variables (in good and very good condition)	Percentage	Men (%)	Women (%)
Facilities	Sanitation status	14	21	17
Safety	Walking trails safety	29	33	25
	Lighting	44	46	42
Security	Feeling secure	44	38	48
Managerial priority	Facility	92	93	91
	Safety	42	36	48
	Security	47	42	52
	Nature conservation	26	30	22

These results reflect the Park's status and the expectations of the visitors from the management authorities. As shown in the table, facility is perceived as the most important managerial weakness by almost all visitors of the Park (92%). Then, respectively security, safety and nature conservation were determined as the Park managerial priority. Some revisions in the Park such for facilities, safety, security and nature conservation are necessary to achieve desirable conditions and more satisfaction level for the Park's visitors.

The Mann Whitney U test was employed to examine the relationship between gender and some main parameters of the study and to investigate differences between female and male respondents about the criteria including acceptable crowding level, acceptable distance from other visitors, people motivation to go to the Park and the Park's security which were the main objectives of this research. Table 4 shows the results of the Mann Whitney U analysis.

In the Mann Whitney U test, the significant level higher than 0.05 shows the significant difference between groups whereas values less than this amount show no significant difference. Thus, according to the results the two groups showed a significant difference for the variables except "acceptable distance from other groups".

**Table 4.** Relationship between gender and a couple of certain parameters

Parameters	Mann Whitney U value	Asymp. Sig. (2- tailed)	Meaningful interpretation
Acceptable crowding level	3140.5	0.365	Significant
The Park security	2990.0	0.106	Significant
Acceptable distance from other visitors	2579.5	0.008	Non - significant
Motivation to go to the Park	3110.5	0.313	Significant

#### 4. Discussion and conclusion

Recently, people have become more interested in privacy and relaxation in natural areas (Sarvazad, *et al.*, 2013) and that is why tourism has turned into one of the world's largest industries and fastest growing sectors (Chin *et al.*, 2014; Lin and Yeh, 2013; Daffa *et al.*, 2003; Nara *et al.*, 2014). However, Bunruamkaew and Murayama (2012) argued that tourism needs tools and useful approaches such as carrying capacity to be a successful activity. Carrying capacity has been a central research for leisure and recreation in the last forty years (Pereira and Silva, 2002). Carrying capacity can be used to study issues like crowding and recreation satisfaction in a recreation destination (Rajan *et al.*, 2011). A carrying capacity study can establish a framework for suitable decision making and provide a basis for regulatory actions towards a better tourism management (Coccosis *et al.*, 2002).

Natural forest parks are one of the most popular tourism destinations which provide a wide range of human's outdoor recreation opportunities. To be a good natural destination, a forest park should provide enough capacity including social and recreational features for different types of users in a natural environment. This study investigated the social and recreational carrying capacity of Daland Forest Park in Iran.

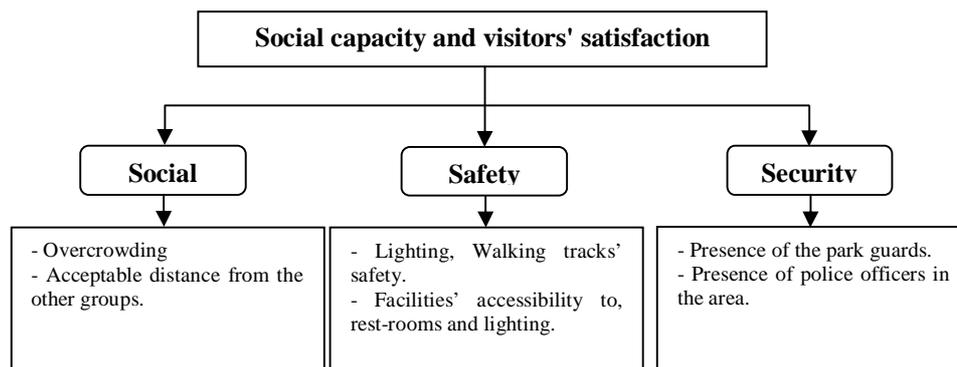
As the case area located near a main road, it has numerous visitors, especially in the peak travelling seasons which is normal for similar recreational destinations. Reigner *et al.* (2012) also argued that availability of transportation networks is one of the main reasons to visit a park. Generally, more access to a park will result in more visitors and then, more visitors could result in more pressures on a park.

To better know the situation of the study area, 168 questionnaires were distributed among the visitors of the Park during summer and fall 2012. The results of this survey showed that most visitors visit this area for mental relaxation and recreation goals. In addition, the majority of the respondents stated that both police forces and the Park's guards are needed to collaborate for improving the Park's security. The results also revealed that this park is not in a suitable condition in terms of social capacity and some changes such as more rest-room services, welfare services and safety are required for more visitor satisfaction. Mann Whitney U test was applied to examine the association between the two independent variables containing women and men with some important parameters.

The results showed significant difference between males and females' motivation and their view about the acceptable level of crowding in a recreation area and also about the best way to ensure the Park's security. Muderrisoglu *et al.*, (2012) also proved that gender affects the perception of crowding. Our results show that compared with men, women are more interested in a moderate crowded area but, men are more interested in a less crowded area. In contrast, Muderrisoglu *et al.*, (2012) showed that female users found rural areas with low user density levels more suitable for walking than male in Abant Natural Park, Turkey. However, they called their finding as an "unexpectedly" and they added that many studies have noted that women do not want to walk alone in outdoor areas such as Bialeschki (2005) and Shaw (1999).

Compared with men, females participate in rural recreation activities with more awareness and a concern for their personal safety (Johnson *et al.*, 2001). This could be the reason why women ask for more security in outdoor recreation area. Our results show that compared with men, women feel more secure in the study area however; it shows, security is more important for women than for men and women will feel more secure if the Park is guarded with both police forces and the park guards and. During this study, a general list of criteria was used. Parks are not in the same situations; they have different capacities for different people. The list can be used to assist in estimation of the social carrying capacity in three main categories including social, safety and security (Figure 2). This is a general list and therefore, can be considered for other similar natural parks.

In a natural recreational destination management, although natural resources' protection is vital, providing suitable facilities for meeting visitors' needs is also necessary. In this research, social carrying capacity of the case area was estimated. Generally, the results of this study can reflect the status and expectations of the park's visitors from its managers and it can also be useful for better management of the Park and improving visitors' satisfaction.



**Figure 2.** Criteria to estimate social carrying capacity and visitors' satisfaction in natural parks (Source: Authors)

The study showed that recreation carrying capacity could be used in parks and protected areas management to estimate the quality of recreational use. However, considering other aspects of a natural park including ecological, economic, psychological and social needs can help to have better results.

## 5. Acknowledgement

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