Sustainable tourism and visitor satisfaction: social carrying capacity in ‘Sierra de Grazalema’ Natural Park (Spain)

J. Navarrete\textsuperscript{1}, A. Lora\textsuperscript{2} & J. González-Arenas\textsuperscript{3}
\textsuperscript{1}EGMASA, División Planes y Servicios, Seville, Spain
\textsuperscript{2}ETSIAM, University of Cordoba, Spain
\textsuperscript{3}IFAPA, CIFA “Alameda del Obispo”, Spain

Abstract

The increasing recreational use of protected areas regarding leisure activities usually involves negative impacts, both in natural resources and visitor experience, which are to be identified and monitored in order to achieve a sustainable tourism system. A number of planning and management decision-making frameworks have been developed to cope with the challenge of balancing recreation use and preservation. Carrying Capacity, one of them, mainly includes ecological and social parameters, such as environmental quality and visitor experience, respectively. The present research focuses on Social Carrying Capacity, defined as the level of use beyond which the recreational experience is negatively perceived. A survey on 400 visitors has been carried out during two years in ‘Sierra de Grazalema’ Natural Park, one of the most emblematic sites in Andalusia. This area was declared as Biosphere Reserve by UNESCO in 1977. The results show deep visitor satisfaction and high environmental quality assessment. In addition, other interesting information has been obtained from the questionnaire such as visit profile, optimal interval between groups along pathways, valuation of existing visitor facilities, influence of encounters on recreational experience, etc. These data will allow a better understanding on user’s perception and will provide a helpful tool for planning and management.

Keywords: social carrying capacity, sustainable tourism, visitor satisfaction, Grazalema.
1 Introduction

At the dawn of the 21st century, the environment is conceived in a global, integrated way, which intends to approach natural resources management under the flag of sustainable development. The recent world summit conference in Johannesburg, ten years after Rio, proved so. The main goal of sustainable development consists of taking from natural resources as much profit as possible without impairing future generations.

‘Sierra de Grazalema’ Natural Park withstands one of the highest levels of tourist pressure compared to other wilderness sites in the south of Spain, because of its unique landscape and cultural appeals, along with fine access roads that connect it with nearby, big cities such as Seville. Consequently, a number of negative impacts take place throughout the Park, especially when carrying capacity is exceeded. Through a social carrying capacity assessment approach we try to identify those factors determining recreation experience and their influence on visitor satisfaction, as well as to evaluate how adequate visitor daily quotas existing for certain pathways actually are.

2 Site description

‘Sierra de Grazalema’ Natural Park covers an area of 51.695 hectares and is located in the south of Spain, in the western part of the Baetic Mountains. As a frontier land between Grenade Muslims and Castilian Catholics, a number of battles took place on this strategic site during the 13th and 14th centuries. As a result, a populated landscape gradually developed, where small scattered villages spread up the hills getting thoroughly integrated in the environment. This unique cultural framework still remains nowadays keeping its own identity despite modern times. Thirteen villages with approximately 76,000 inhabitants are either completely or partly within the protection limits of the park. The highest rainfall level of the Iberian Peninsula caused by moisture loaded clouds coming from the sea and condensing while moving over the hills (Foehn effect), has created over the years a magnificent karst landscape with hundreds of caverns and underground streams. In spite of human presence from ancient times, this natural site still maintains important native Mediterranean forests mainly composed by Holm oaks (Quercus rotundifolia), Cork oaks (Quercus suber) and Andalusian oaks (Quercus faginea), among others. However, the real jewel of vegetation is the Spanish fir forest (Abies pinsapo), a relictic conifer from Tertiary Era, which shelters in the shady, wet side of the mountains, and represents the best preserved stand of this endangered, endemic tree in the world.

3 Recreational use

The main tourist facilities in the park are visitor centres, information points, ecomuseums, viewpoints, botanic garden, camp-sites, picnic areas, youth hostels, hotels and rural accommodation. Moreover, a well developed footpath network across the park ensures a concentrated use of certain points in order to avoid
negative impacts over sensitive ecosystems. There are two types of signed, hiking paths:

a) Restricted access footpaths: Only four paths run across the Reserve Area, the core of the park holding the most valuable natural resources. A special permit from the park’s office is required to enter this zone.

b) Free access footpaths: They are situated outside the Reserve Area and no permit is necessary.

![Figure 1: Seasonality of visitor flow in pathways of Reserve Area in 2001.](image-url)

Tourist development has not yet reached its maximum, according to the potential capacity of the park. Distribution, quality and capacity of tourist facilities must be improved within the coming years. One of the major constraints tourist management has to cope with is seasonality of visitor flow (figure 1).

### 3.1 Visitor profile

The typical visitor of this Natural Park, according to data obtained from the present research, is between 20 and 39 years old, educated to university level and with a family income of between 1,500 and 2,000 € per month. He comes from large cities like Seville, Jerez or Cadiz, 100 km away from the park, with his own car, accompanied by up to four people and usually without children. Recreation predominately occurs during weekends and holiday times, with stays of more than one day and the visitors spend approximately 73€ during the visit.

### 3.2 Quota system

The high ecological value sheltered in the Reserve Area along with its extreme fragility made the managers establish, from the beginning of the Natural Park’s life, access restrictions to four pathways going across that sensitive area: El Pinsapar, Llanos del Ravel, El Torreón and Garganta Verde. Thus, limited numbers of visitors’ Daily Quota Permits, varying from 30 to 60 people, were set
for each trail. Quota system regulates how many groups can enter the Reserve Area each day. The assumption of such a polemic measure was mainly based on preservation criteria, although no scientific research was ever made to support it, and hence, those numbers may no longer be appropriate at present. In fact, visitor flow has notably increased over the last years exceeding the number of quota permits available (figure 2). In other words, the demand is now much bigger than the offer. In consequence, a number of visitors get frustrated every year for not being able to acquire the necessary permit to enter the Reserve Area. A question then arises: Could daily quota be increased without impairing visitor satisfaction?

![Figure 2: Number of permits delivered in 2000 and 2001 for each pathway of Reserve Area.](image)

### 3.3 Recreational carrying capacity

Recreational Carrying Capacity is defined as the maximum use level a specified area can support without negatively impacting natural resources or visitor experience (Countryside Commission [1]). Another definition is the level of use that can be supported over a specified time by an area without causing excessive damage to either the physical environment or the experience of the visitor (Stankey and Manning [2]). Four dimensions can be considered:

a) Physical Carrying Capacity: the amount of recreational use that can physically occur in a defined space. It mainly depends on facilities, infrastructure and topology conditions (canyons, shorelines, marshes, swamps...)

b) Ecological Carrying Capacity: the amount of recreational use that can occur without producing unacceptable impacts on the ecosystem (Limit of Acceptable Change). This is difficult to measure and monitor but is of utmost importance especially if the ecosystem is sensitive.

c) Economic Carrying Capacity: this dimension deals with the ability to cope with new economic activities related to tourism without marginalizing traditional economic activities of the community.
d) Social Carrying Capacity: the level of use beyond which the recreational experience is negatively perceived. Psychological aspects as well as the level of subjectivity implicit in this concept make it the most difficult parameter to determine (Manning et al. [3]). Furthermore there is little research on this topic, especially in Spain. In fact, Social Carrying Capacity is not a property of the site, but a property of the visitor, and so, it is more related to the type and the behaviour of users encountered during the visit than by the level of use itself.

The two principal dimensions of Recreational Carrying Capacity are ecological and social. Recently, negative impacts on soil conditions and vegetation derived from hikers’ trampling have been evaluated through a research carried out by University of Cordoba in ‘Sierra de Grazalema’ Natural Park (Castro [4] and Almagro [5]). This is why we have decided to focus on Social Carrying Capacity assessment at the same time in order to complement the existing information and provide a helpful tool for planning and management decision-making in this particular natural site.

As a matter of fact, one of the conclusions of the recent study by Gonzalez-Capitel [6] about the Pinsapar pathway, which goes along the unique Spanish fir forest in the Reserve Area, affirms that, as physical environment does not seem to be close to its maximum (Physical Carrying Capacity), visitor satisfaction (Social Carrying Capacity) might become the limiting factor for the capacity of the pathway. Recreational experience monitoring and assessment is therefore suggested.

4 Methodology

A survey on 400 tourists was carried out by means of personal in situ interviews in order to determine visitor experience. To achieve the defined objectives a questionnaire was designed according to brevity and comprehension criteria. This design is of utmost importance in order to minimize bias and optimize data analysis (Navarrete [7]). Most interviews took place in high intensity, recreational spots, such as the visitor centre, information points, footpath network (especially the four ones within the Reserve Area), viewpoints, picnic areas and villages, under fine weather conditions (Navarrete and González-Arenas [8]).

5 Results

It is important to emphasize once again the fact that the subject of the present research are visitors’ personal opinions regarding their own experience, and hence the subjectivity of such issues. Results are shown in the same order as the questionnaire was made.

5.1 Environment quality

Question: If you had to evaluate the general quality of this Natural Park’s environment, which mark would you give it from 0 to 10?
The average mark reached 8.17 over 10, which indicates firstly a fairly high opinion of the park’s environment, and secondly, a high level of conservation of its resources. Therefore, tourists are sensitive enough to appreciate the values of the place they are visiting. Only 8 out of 400 of them assigned a mark below 5, whereas 167 (42%) gave 9 or 10.

5.2 Tolerance to other visitors

Question: What do you think about the amount of people currently visiting the park?

Figure 3: Tolerance to other visitors.

As figure 3 shows, for over 60% it was acceptable and only 6% said it was too high, identifying the most crowded places as the villages and the Reserve Area.

These results can be explained in two different ways:

a) Visitors have a high level of tolerance to the presence of others, since most interviews were made on holidays and at weekends (high season).

b) The particular conditions of park’s topography allow for a large number of tourists without their disturbing one another.

We must remark that we are always considering instantaneous carrying capacity, that is, the number of people at a certain moment.

5.3 Tourist facilities

Question: How well do you think this park is provided with reception facilities?

Half of the interviewees considered that the park provided an acceptable number of public use infrastructure such as carparks, accommodation, viewpoints, pathways, etc. Some 27% agreed that it was very well endowed, whereas 18% thought it was insufficient. The recent effort made over the last years to implement new services and facilities, as well as to improve the ones already existing is therefore appreciated by the visitor. As a matter of fact, this
park holds some of the fullest facilities on offer in the Andalusian Network of Protected Natural Areas (RENPA).

5.4 Visit purpose

Question: Choose the main purposes of your visit from the suggested list and order them according to your preference (assign 1, 2, 3 and so on)

‘Contacting with nature’ and ‘visiting villages and meeting their people’ occupy first places. Although the first reason was expected, the second one really constitutes a peculiarity of this site. The outstanding beauty of those small, bright white, typical villages has made them worthy of being included in the so called “White Villages Route”, which represents a major tourist attraction. Practising sport and walking through the magnificent Spanish fir forest were other relevant reasons. However, both activities need certain requirements from users, such as fitness and youth, so not everyone can enjoy them. In addition, the required permit to enter the Reserve Area, where the Spanish fir grows, is often difficult to obtain. This is why these two purposes are placed lower in the ranking than the first ones. Getting rid of stress is placed at 5th position, since the standard visitor comes from large, populated cities, where this problem is increasingly common.

5.5 Encounters with other groups

Question: How is your recreational experience affected by encounters with other groups?

![Figure 4: Influence of encounters with others.](image)

About 45% of surveyed people found it a positive experience to encounter other visitors, whereas some 23% perceived it as something undesirable and negative. The total group of users then may be divided into two psychologically
different groups: those preferring to meet other people during their visit and those preferring few or none. In the middle of them, though, there is still a significant 30% who does not care about this issue (figure 4).

People considering the encounters as something positive were unexpectedly predominant in contrast to the common idea of going to the countryside so as to avoid the city worries. In this case, this is actually not an accurate assumption since the typical visitor is apparently used to living in large towns and so prefers a certain level of socialisation even in the wilderness. Furthermore, they are mainly southern young people accustomed to populated, noisy ambience and often gregarious behaviour, what definitely makes them especially tolerant to overcrowding. Coming to the park in groups instead of alone as well as perceiving the use level as bearable or scarce even in high season also explain this result.

5.6 Optimal timing between groups

Question: While hiking along a pathway, how often would you like to encounter other group so as your satisfaction is optimal?

![Chart showing optimal interval between groups.]

Figure 5: Optimal interval between groups.

The number of encounters a person has while recreating is the basic social recreation component for this carrying capacity assessment. This issue was thought indifferent by nearly 30% of surveyed people, which means they did not find any link between encounter frequency and satisfaction level, whereas for 57% such a relation did exist (figure 5). In order to provide a helpful tool for planning and management, the optimal interval between groups should be every 40 minutes approximately. Subsequently, two major goals could be achieved:

a) Regarding Ecological Carrying Capacity, negative impacts such as noise or trampling would be reduced along certain pathways by regulating the groups entrance, which is especially interesting in high sensitive areas. Tourist pressure on the environment would become more uniform and less intense.

b) Regarding Social Carrying Capacity, visitor satisfaction would increase (except for the minority preferring not to meet anyone along a pathway).
Those who answered indifferent would not notice any change in their experience, neither positive nor negative.

5.7 Quota system

Question: To enter the four pathways of the Reserve Area Daily Quota Permits have been established going from 30 to 60 people. What is your opinion about them?

As shown in figure 6, over 60% agreed they are adequate. Most of interviews took place along those paths, and hence to visitors that succeeded in getting the required permit. Different results would certainly have been obtained with people whose permit was denied. To summarize, several conclusions can be extracted:

a) Visitors are aware of the necessity to put certain limits to enter high ecological value areas, although it is possible that the existing quotas are not the optimum.

b) People thinking that the existing quotas are too restrictive and more people should therefore be allowed to get in are much more than people considering them too permissive. Thus, increasing those limited quotas would eventually satisfy more people than reducing them.

![Pie chart showing opinion about visitors’ daily quota.](image)

Figure 6: Opinion about visitors’ daily quota.

5.8 Satisfaction level after the visit

Question: How much satisfied are you leaving the park after your visit?

Most of surveyed people (68%) affirmed they felt very satisfied and 29% moderately satisfied. No-one answered they were not satisfied at all and just 1.5% little satisfied mainly due to heat or frustration for not having a chance to get the permit for the Reserve Area. In other words, this park widely satisfies visitor expectations and so becomes an extraordinary recreation site.
5.9 Tourist management

Question: What would you improve in this park?

This multiple choice question intends to identify those management issues needing improvement from the visitor’s opinion. Directional and interpretative signs occupy the first steps. Cleanliness goes next. Unexpectedly, over 60 people answered that nothing should be changed, which is probably due to tiredness making them tick off the first box of the list proposed in the questionnaire.

5.10 Distinctive features

Question: In your opinion which features of this park are different from other nature sites you visited before?

Local villages are regarded as the principal issue that differentiate this park from the rest of the sites belonging to the RENPA. Therefore, the unique cultural heritage provides a complementing offer to the natural resources of the park, enhancing the visitor satisfaction. As expected, Abies pinsapo, the real park’s emblem, is seen as the second distinctive feature.

6 Conclusion

Social Carrying Capacity at ‘Sierra de Grazalema’ Natural Park is still far away from its limit. Thus, increasing the number of people allowed in the Reserve Area could be possible from the visitors’ point of view without impairing their satisfaction. However, from a preservation perspective, the visitors’ flow should be diversified both in time and space so as to reduce tourist impact on sensitive areas and achieve a sustainable tourism model. Consequently, in order to cope with the challenge of balancing visitor experience and resource preservation we strongly recommend the implementation of a measure consisting of regulating the time interval between groups so that encounters along pathways take place every 40 minutes approximately, as the majority of users would eventually get a benefit.

References


