Managing for Recreational Experience Opportunities: The Case of Hikers in Protected Areas in Catalonia, Spain

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Abstract Planning and management for recreational activities in protected areas involves an understanding of many complex factors. Segmentation of recreation demand and of the main physical or sporting activities can contribute to the design of more efficient management strategies, which may help to maintain or significantly enhance satisfaction with the recreation experience, and this in turn could improve the interest in and appreciation of the natural environment. The current study examined the motivations of hikers in three small Natura 2000 protected areas. It establishes a typology or categorization as a contribution to better management based on a survey conducted through on-site personal interviews with a representative sample of 569 hikers. Through an analysis of the principal intervening components by means of cluster analysis, we identified three groups of hikers based on three motivational dimensions: (1) nature-minded hikers, (2) sporting hikers and (3) general-purpose hikers. The most striking results were the significant differences among group variables related to visit behaviour (frequency and duration of visits and number of people per group), previous knowledge (protection status of the areas) and recreational frequentation (trail categories and protected areas visited). A positive correlation between the degree of sympathy for nature and the degree of satisfaction with the recreational experience (including positive evaluation of the public facilities, signposting and services offered) was also observed. The results are discussed in terms of their applicability and implications in hiking management in protected natural areas such as those of Natura 2000.

Keywords Outdoor recreation · Hiking · Motivation · Visitor typology · Protected natural areas · Environmental management · Natura 2000

Introduction

Natura 2000 is an ecological network of protected areas located within the European Union. In May 1992, governments of the European Union adopted legislation designed to protect the most seriously threatened habitats and species across Europe. The ecological network represented by Natura 2000 contributes to the conservation of natural landscape for future generations, and provides opportunities for many sustainable sports and nature recreation activities. It is therefore not a system of nature reserves subject to strict protection in which all human activity is prohibited. Although the network includes such reserves, most of the land included in it is private property, which makes its management more complex: conservation versus recreation, sport and tourism (Bell and others 2007; Pröbstl 2004). In Spain, reserves occupy 21% of the land area (9% more than before the network was created).

According to data published in the latest Europarc-Spain yearbook (Europarc-España 2008), in 2006 all protected natural areas in Spain together received more than 36 million visitors, which is about 4.5% more than in the previous year. The Autonomous Community of Catalonia was the region with most visitors: 8 million people visited

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one of the 17 Catalan natural parks belonging to Natura 2000.

According to studies carried out in Spain by Múgica (1993), Farias (2000) and Muñoz (2008), more than 60% of the visitors to these areas do some kind of physical or sporting activity during their visit, and hiking is the most popular pastime (45%).

Many studies warn of the practical implications of the increase in demand for these activities in the natural environment, and on their management and planning in the Natura 2000 network (Europarc-España 2002; Bell and others 2007; Pröbstl 2003; Pröbstl and Prutsch 2010). Achieving and maintaining an appropriate balance between conservation and use of these areas for recreation, sport and tourism is not an easy task, and all the information that can be obtained is necessary and welcome.

Many studies have considered visitor characteristics and patterns of use of protected natural areas (Hammitt and Patterson 1993; Yoshioka and others 1993; Pierskalla and others 2000; Rauhala and others 2002; Pouta and others 2004; Petrosillo and others 2007). Other studies have considered particular preferences of visitors: landscape (De Lucio and Múbica 1994, Atauri and others 2000; Chhetri and others 2004; Schmitz and others 2007), environment (Virden and Schreyer 1988; Gomez-Limon and De Lucio 1994; Perez and others 2008, trail setting (Rollins and Rouse 1992; McColl and Reilly 1993; Wallace and Smith 1997; Chhetri and Arrowsmith 2002; Farias and others 2005; Arrowsmith and others 2005; Pierskalla and others 2007) and other preferences (Fredman and Hörnsten 2001; Shrestha and others 2002). Maning (1999) points out that typological analysis of recreational use or visitors can contribute to the development of management strategies. Elands and Lengkeek (2000) consider this analysis to be particularly important in the case of the main activities. However, few studies have focused on the analysis of the main sporting activities in protected natural areas.

The subject of hiking has been considered by Ramthum (1995), Heer and others (2003), Cessford (2002), Chhetri and Arrowsmith (2002), Chhetri and others (2004) and Mann and Absher (2007). Furthermore, Ramthum (1995), Cessford (2002), Heer and others (2003) and Mann and Absher (2007) make a comparison of hikers and mountain bikers. However, only Chhetri constructed a model for identifying the underlying dimensions influencing visitors' hiking experiences in natural settings.

In summary, most researchers have only scratched the surface of knowledge about hikers. It is therefore interesting to identify the different segments and their key differentiating aspects, and above all to translate this knowledge into the planning and management of a zone or network of natural areas. This is particularly important when similarities are found between areas located in the same area or network.

The main aims of the current study were: (1) to characterize the generic profile of hikers in relation to their motivations, preferences and uses; (2) to identify a typology of hikers based on the reasons for their visit; and (3) to obtain feasible practical applications from the results that can be applied to the management of this activity or to future research in this field.

Method

Study Areas

The present study was carried out in three small protected natural areas of Lleida province, Catalonia, located 100 to 150 km from the provincial capital (Lleida). The main reasons for choosing the three areas were: (1) they all have an identical protection status (they all belong to Natura 2000); (2) they all offer similar hiking opportunities in terms of physical, social and managerial setting suggested by the recreation opportunity spectrum (Manning 1985); (3) they all have a historic tradition, deeply-rooted in hiking; and (4) they are all managed by the same private organization, Fundació Territori i Paisatge of Caixa de Catalunya.

Figure 1 shows the geographical location of the three protected natural areas (the Congost de Mont-Rebei, Port d'Arnes and Montserrat–Coll de Can Maçana Reserves) and Table 1 shows some of their characteristics and facilities. The main physical characteristics are the narrow mountain passes and narrow gorges with varying depth in the Congost de Mont-rebei and Port d'Arnes Reserves, and a geological formation which is unique in the world in the Montserrat–Coll de Can Maçana Reserve (Fig. 2).

According to a classification proposed by Brown and others (1978) in relation to the Recreation Opportunity Spectrum, the three natural areas considered herein belong to the category semi-primitive, non-motorized (SPNM):

> "Area is characterized by a predominantly unmodified natural environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but are subtle. Facilities are primarily provided for the protection of resource values and safety of users. On-site materials are used where possible. Spacing of groups may be formalized to disperse use and provide low-to-moderate contacts with other groups or individuals. Motorized use is not permitted."
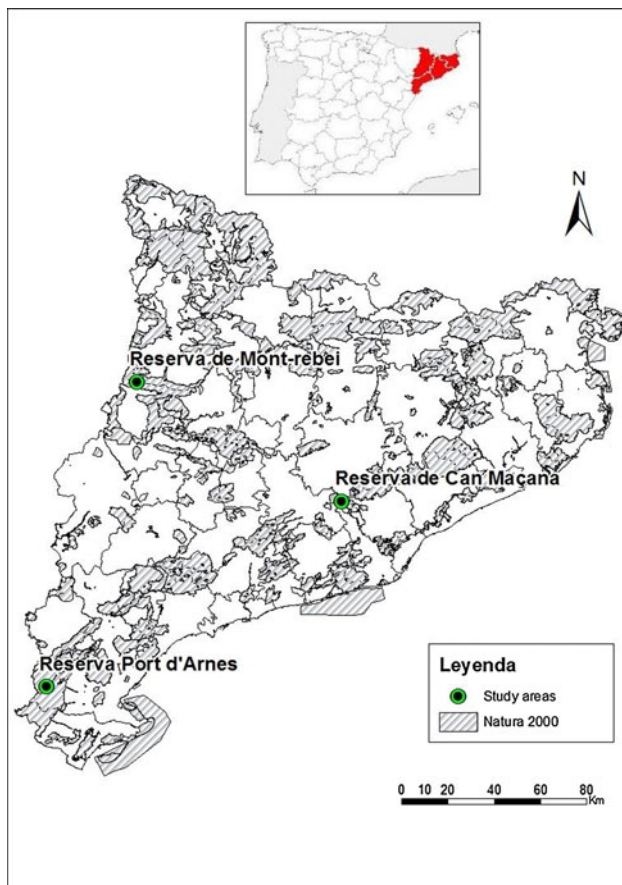
Fig. 1 Location of the protected natural areas studied: Mont-Rebei Reserve, Port d'Arnes Reserve and Can Maçana Reserve

These areas may offer some opportunities for isolation from other people, but not as many as in primitive areas. They also allow a high degree of interaction with the natural environment, a moderate level of challenge and risk, and the opportunity to use outdoor skills (Maning 1999, p. 183).

The three areas selected for this survey were not strictly limited to the areas belonging to the Fundació Territori i Paisatge, but corresponded more closely to the areas of Natura 2000 (see study area in Table 1).

Procedures and Methodology

The data used in the present study are based on a total of 569 on-site structured interviews distributed proportionally among the three protected areas according to their number of visitors at the time when the fieldwork was carried out. The interviews were held between 10 a.m. and 6 p.m. The respondents were contacted on their way out of the reserves through the main entrances because most of the questions included in the questionnaires referred to the experience

they had had (place visited, length of the visit, etc.). The interviews were held on 12 public holidays and 12 working days for each area, one per month randomly distributed during the fieldwork period (Table 2). The survey was conducted with the assistance of staff trained in field survey techniques. A random sample selection system was used and all the persons selected responded correctly. The field work was carried out during a calendar year to maximize the representativeness of the sample. Peak visiting periods, when the greatest number of interviews were held, were recorded. No more than two people per group were interviewed, and the average time spent on the interview was 5 min.

The 23 questions were based on publications by Telama (1991), Yoshioka and others (1993) and De Lucio and Múbica (1994), and on the experience I have acquired in several previous studies related to this subject conducted by myself and co-authors (Farias 2000, 2002; Farias and Tolosa 2004 and Farias and others 2005). The questions dealt with aspects such as age, gender, type of job, level of education, number of visitors per group and type of group, as well as the frequency, duration and reason for the visit, level of satisfaction, knowledge of the protection status and the number of visits to trails or areas (see Appendix).

In order to facilitate a comparison of the number of visits to the trails or areas in each of the areas studied, the different trail and area options of each protected area were categorized. Two trail-area categories were defined according to level of popularity and accessibility: classical trails (trails considered as "icons" in each area, and therefore better signposted and maintained than the other itineraries) and other trails (trails not included in the first category).

The 13 items included in the question regarding the reasons for the visit (see Appendix, question XVI) were based on research papers by Mccoll and Reilly (1993), Rollins and Rouse (1992), Wallace and Smith (1997), Maning (1999) and Chhetri and Arrowsmith (2002). The respondents scored the items from 1 (lowest) to 5 (highest).

Data Analysis

The visitors were classified using principal component analysis (PCA) and cluster analysis. Of the 914 responses obtained, only the 569 ones stating that the respondents had practised hiking during their visit were used (Table 3). In our case hiking is defined as all kinds of sporting or tourist activities that involve walking in the countryside, the forest or the mountains along trails or paths. Hiking (walking long distances for more than 30 min) should be distinguished from recreational hiking (*excursionismo*), an

Table 1 Main geographical, territorial and recreational characteristics of the three protected natural areas

	Mont-Rebei Reserve	Port d'Arnes Reserve	Can Maçana Reserve
Generic characteristics			
Protection organization	PEIN	PEIN	PEIN
	Natura 2000	Natura 2000	Natura 2000
Location	Noguera Ribargoçana, Lleida province	La Terra Alta, Tarragona province	L'Anoia, Barcelona province
Year in which FTiP acquired the area	1999	2000 and 2006	2004
Study area	1,000 ha	1,200 ha	1,000 ha
Size of the FTiP property	598 ha	524.9 ha	176.58 ha
Physical			
Distance of reserve from main road	4 km	6 km	0 km
Number of main entrances	2	2	1
Total trail distance	34 km Classical Trail 9 km	30 km Classical Trail 6 km	36 km Classical Trail 8 km
Social			
No. of visitors per year	20,000	15,000	30,000
Management			
Available public facilities and other aspects of interest	Parking areas, picnic areas, toilet facilities, Mas Carlet Private Hut	Parking areas, picnic areas, toilet facilities, Terranyes Mountain Hut	Parking areas, picnic areas, no toilet facilities, Vicenç Barbé Mountain Hut
Trail map	Yes	Yes	Yes
Recreational and sporting activities for tourists	Recreational hiking Hiking/walking Mountain biking Climbing Canoeing	Recreational hiking Hiking/walking Mountain biking Climbing Swimming	Recreational hiking Hiking/walking Mountain biking Climbing

Based on the Recreation Opportunity Spectrum: physical, social and management setting (Brown and others 1978)

PEIN Plan de Espacios de Interés Natural (Plan for Areas of Natural Interest), *FTiP* Fundació Territori i Paisatge, the management organization of the protected area

expression commonly used in studies of this type and referring to walks of less than 30 min (Farias 2000).

PCA was used first to reduce the number of reasons for the visit from 13 original items to 5 motivational dimensions. Cluster analysis was performed in a second stage using the Kaiser normalization method, a non-hierarchical algorithm, to classify the hiking visitors according to the five dimensions established with PCA (Hair and others 1995). Clusters were based on Euclidean distance measures. Selection of the number of clusters for non-hierarchical clustering procedures is normally a subjective process and, in our case, the decision was based on the number of optimal and realistic clusters. The χ^2 test and Spearman's ρ were used in the generic differentiation of the groups of hikers.

Results

Main Characteristics of Hikers

The results obtained in the current fieldwork revealed that the most frequent type of hiker was a male (61.2%), with an average age of 45 years (33.3% between 32 and 41 years old), a wage-earner (54.9%), had finished university (52%) and currently lived in the same province as the protected area visited (64.8%). He did not use any accommodation in the area during his visit (70.8%) and in many cases this was the first time he had visited the protected area (44.5%). He went with friends (39.2%; average number of people per group was 4.9), for half a day (70.1%) and in general chose trails and areas forming part of the *Classical Trails* (64.1%). Other important characteristics of the hikers interviewed were the high degree of satisfaction they expressed, their positive evaluation of some key public issues (number of visitors met during visit, signposting, public facilities at the site, etc.) and their fairly high level of knowledge of the protection status of the area visited (See *Total Sample* in Tables 6, 7, 8).

Principal Component Analysis

A principal component analysis with Varimax rotation was performed on 13 items to identify the underlying

Congost de Mont-rebei	Port d'Arnes	Montserrat–Coll de Can Maçana
Brief description	**Brief description**	**Brief description**
The Mont-Rebei gorge, created by the river Noguera Ribagorçana as it passes through the Montsec mountains, separates the Montsec d'Ares from the Montsec de l'Estall and is the only great gorge in Catalonia which has been kept more or less intact without being crossed by any road, railway or electricity line. It is only crossed by a mule track partially dug out of the rock, which allows this spot to be enjoyed in a very spectacular manner. The walls of the gorge reach heights in excess of 500 metres at points where the width of the gorge is no more than 20 metres. http://obrasocial.caixacatalunya.es	Port d'Arnes is the southernmost part of the Serralada Prelitoral Catalana (the pre-coastal mountain range): the massif of Els Ports. The massif is a large expanse of limestone that stretches parallel to the coast from north-east (bordering with the River Ebre and the Pàndols mountain range) to south-east, connecting with the mountains of El Maestrat de Castelló and Terol, following on from the Iberian System. The massif of Els Ports stretches over an area of around 350 km2 in Catalonia. Its abrupt orography consists of crags, ravines, river pools and mountain peaks, some measuring over 1,300 m in height (Mont Caro is the highest at 1,447m). http://obrasocial.caixacatalunya.es	Coll de Can Maçana is located in the western part of Montserrat, essentially in the nature reserve area of the park. It includes a sector of the famous monoliths of conglomerate rock of the Agulles region, including those commonly known as *La Foradada* ("perforated"), *La Cadireta* ("chair"), *La Portella* ("door"), *Els Pallers* ("hayloft"), etc., because of their peculiar forms. This sector has the highest concentration of *agulles* in the massif, making it one of the most famous and striking parts of the mountain http://obrasocial.caixacatalunya.es

Fig. 2 Characteristic pictures and brief description of the three protected natural areas studied

Table 2 Distribution of interviews (questionnaires) conducted in the protected areas

	Total	Mont-Rebei	Arnes	Can Maçana
Fieldwork period	2002 to 2006	August 2002 to July 2003	March 2004 to February 2005	August 2005 to July 2006
No. of visitors per year	65,000	20,000	15,000	30,000
No. of interviews	914[a]	274	150	490
No. of hikers interviewed	569[b]	205	49	315

[a] Total number of interviews performed during the field work; [b] total number of interviews corresponding to hikers

Table 3 Recreational, sporting and tourist activities for each of the protected areas studied

Activities	Total questionnaires (%)	Mont-Rebei	Arnes	Maçana
Staying close to entrance (starting point)	49 (5.4)	3	4	42
Recreational hiking (<30′ walking)	71 (7.8)	26	21	24
Hiking (>30′ walking)	569 (62.3)	205	49	315
Rock climbing	118 (12.9)	6	17	95
Water sports[a]	72 (7.9)	24	48	–
Mountain biking	13 (1.4)	1	6	6
Other activities	22 (2.4)	9	5	8

[a] Canoeing in the Congost de Mont-Rebei protected area and swimming in the Port d'Arnes protected area

Table 4 Dimensions of the visitors' motivations

Extraction method: principal component analysis explained 53.11% of the variance. Rotation method: varimax with Kaiser normalization

1 Enjoyment and appraisal of the natural environment, *2* knowledge and acquisition of new experiences, *3* practising physical or sporting activities in a natural environment, and *4* Group composition and recreation

Motivations	Dimensions			
	1	2	3	4
1. To get close to nature	0.741			
2. To relax and disconnect	0.665			
3. To enjoy the scenery	0.687			
4. To enjoy new experiences		0.705		
5. To get to know new places		0.769		
6. To learn more about the natural environment		0.554		
7. To enjoy a solitary experience		0.212		
8. To practise some kind of physical or sporting activity			0.748	
9. To practise adventure sports			0.650	
10. To enhance health or physical condition			0.618	
11. To visit a particular trail or area			0.440	
12. To spend the day with family or friends				0.637
13. Enjoyment				0.482
Explained variance	20.7%	11.2%	11.4%	9.7%

dimension of the hikers' motivations (Table 4). The dimensional structure resulted in four dimensions, accounting for 53.11% of the variance. Variables were assigned to a single domain based on the highest loading score.

The first dimension, named *Enjoyment and appraisal of the natural area*, accounted for 20.7% of the explained variance; the second dimension, named *Knowledge and acquisition of new experiences*, accounted for 11.2%; the third factor, named *Practising of physical or sporting activities in the natural area*, accounted for 11.4%; and the fourth factor, named *Group composition and entertainment*, accounted for 9.7%. All dimensions had relatively high reliability coefficients, ranging from 0.74 to 0.44 except one value of dimension two corresponding to *To enjoy a solitary experience*, which had 0.21 and was finally not included in the cluster analysis.

Table 5 Reasons for the visit; average scores obtained for each group of visitors

Reasons	Group 1 (n = 155) Nature-minded hikers	Group 2 (n = 257) Sporting hikers	Group 3 (n = 129) General-purpose hikers
To get close to nature	4.85	4.80	3.99***
To relax and disconnect	4.50	4.40	3.39***
To enjoy the scenery	4.82	4.64	4.00***
To practise some kind of physical or sporting activity	3.72***	4.27***	2.91***
To visit a particular trail or area	3.43	3.35	2.96**
To practise adventure sports	1.69	1.99*	1.45
To spend the day with family or friends	3.19***	4.05***	3.81***
To enjoy new experiences	3.01***	2.53	2.48
Enjoyment	3.80	4.42***	3.72
To get to know new places	3.28***	3.81	3.97
To enhance health or physical condition	3.55***	4.31***	2.43***
To enjoy a solitary experience	2.95***	1.17	1.13
To learn more about the natural environment	4.68***	2.90	3.00

* Significant at $P < 0.05$

** Significant at $P < 0.01$

*** Significant at $P < 0.001$

Cluster Analysis

Once the resulting factors of PCA had been ascribed to each case or subject, cluster analysis was carried out. K-means clustering, a non-hierarchical algorithm (Hair and others 1995), was used to choose the optimum solution (number of groups and number of people per group), which eventually consisted of 3 groups: nature-minded hikers (27.2%), sporting hikers (45.2%) and general-purpose hikers (27.6%). There was also a small residual group of 28 cases (4.9%). The main results obtained, regarding both the visitors' motivations and the remaining aspects, were evaluated with regard to each group (see Tables 5, 6, 7 8).

Group 1: Nature-Minded Hikers

This group consisted of a total of 155 subjects (27.2%) and their main reasons for visiting the area were related to nature: *To get closer to nature*, *To learn more about the natural environment*, *To enjoy the scenery*, *To relax and disconnect* and *To visit a particular trail or area* (Table 5). With the youngest average age (41, although there was a fairly large percentage of people aged between 52 and 61), they were also the group with the lowest average number of people (fewer than 4 people per group) and they remained longer in the protected area than the other two groups (Tables 6, 7). An important issue for this group when choosing a trail was whether it had *Good Views* (17.4%). Nearly 40% of the visitors stayed for more than half a day

in the protected area; more than 30% went with a partner and more than 16% alone (Table 7). This was the group that gave highest scores for the recreational experience, infrastructure (public facilities), signposting and available services in the protected area (Table 8). It was also the group that most often chose *Other Trails* (Fig. 4).

Group 2: Sporting Hikers

This is the largest of the three groups, with a total of 257 hikers (45.2%). Their main motivations are related to physical activities: *To practise some kind of physical or sporting activity*, *To enhance health or physical condition* and *Enjoyment* (Table 5). It had the highest average age (44 years old) and about 41% had known the area *All their Life*. This is also the group with most knowledge about the protected area visited: nearly 90% knew about the protection status of the area they visited (Table 6). These visitors were generally accompanied by friends (44.4%) and in 67.3% of the cases they had visited the area more than once. *A Previous visit* was one of the main reasons for the trail choice expressed by this group (24.9%, Table 7). More than 66.5% were regular visitors of the Montserrat–Coll de Can Maçana protected area (Fig. 3).

Group 3: General-Purpose Hikers

Finally, this group, consisting of 27.6% of the sample (129 hikers), mainly represents a class of people which can be

Variables	Group 1 (n = 155) Nature-minded hikers	Group 2 (n = 257) Sporting hikers	Group 3 (n = 129) General-purpose hikers	Total sample
Age groups*				
17 to 21 years	23.9	17.1	13.2	18.1
22 to 31 years	18.7	25.5	26.4	23.7
32 to 41 years	26.5	37.4	33.3	33.3
42 to 51 years	9.7	12.1	16.3	12.4
52 to 61 years	20.0	5.4	7.0	10.0
Over 62 years	1.3	2.7	3.9	2.6
Average age of visitors (years)	41	44	42	45
Gender				
Male	61.3	61.1	61.2	61.2
Female	38.7	38.9	38.8	38.8
Current place of residence				
Same province as protected area	63.5	65.5	64.0	64.8
Level of education				
Primary education	11.0	9.3	9.3	9.8
Vocational training	12.9	16.3	14.7	15.0
Secondary education	21.3	24.5	23.3	23.3
University and postgraduate education	54.8	49.8	52.7	52.0
Kind of job				
Student	9.0	4.7	7.8	6.7
Retired	5.8	3.5	1.6	3.7
Unemployed	1.9	2.3	3.9	2.6
Homemaker	0.6	2.7	4.7	2.6
Government employee	7.7	14.8	14.0	12.6
Independent professional	2.6	5.4	4.7	4.4
Self-employed	14.8	10.1	14.7	12.6
Wage-earner	57.4	56.4	48.8	54.9
How they found out about the area*				
Fundación Territori i Paisatge	1.3	0.0	0.8	0.6
Official organizations	2.6	0.0	6.2	2.2
Media	2.6	4.3	7.0	4.4
Other people	35.5	31.5	40.3	34.8
Maps, guide books, etc.	14.2	15.2	18.6	157
Agencies	1.9	0.8	2.3	4.3
Others	7.7	4.3	8.5	6.3
For a long time/all their life	24.5	40.9	10.9	26.2
By coincidence	9.7	3.1	5.4	5.5
Knowledge of protection status*				
Yes	85.2	89.8	73.6	84.2
No	14.7	10.1	26.4	15.8

Table 6 Variables that best define the sociological characteristics of the groups of hikers for each of the three protected natural areas (see text for more details)

Values are percentages of the number of subjects for each group

*Significant differences (χ^2 test)

defined as *general-purpose hikers*; they have no clear profile regarding the reason for their visit and the choice of area or trail: more than 42% chose the trail because of a recommendation (Tables 5, 7, respectively). A fairly high percentage compared with the other groups (40.3%) knew of the existence of the protected area from *Other people* and they expressed very little knowledge about the protection status of the area (Table 6). Moreover, for 66.7% of

Variables	Group 1 (n = 155) Nature-minded hikers	Group 2 (n = 257) Sporting hikers	Group 3 (n = 129) General-purpose hikers	Total sample
Composition of group*				
Partner	30.3	24.5	24.0	26.1
Family	22.6	23.7	24.8	23.7
Friends	27.7	44.4	42.6	39.2
Organized group	3.2	4.3	3.1	3.7
Alone	16.1	3.1	5.4	7.4
Average no. of people per group*,**				
Accommodation	3.98	5.05	5.91	4.9
No accommodation	68.4	79.4	56.6	70.8
Private house	5.2	5.4	10.9	6.7
Hotel, hostel	8.4	3.1	7.0	5.5
Country cottage/lodge	6.5	3.5	10.1	5.9
Camping	6.5	2.7	8.5	5.2
Others	5.2	5.8	7.0	5.9
Visit frequency*,**				
First time	45.8	32.7	66.7	44.5
Between 2 and 3 times	23.9	30.7	19.4	26.1
Between 4 and 6 times	14.2	17.9	7.0	14.2
More than 6 times	16.1	18.7	7.0	15.2
Duration of visit*,**				
½ day	61.5	70.8	75.2	70.1
1 day	23.9	25.7	14.0	21.4
Between 2 and 3 days	8.4	1.5	7.8	5.9
More than 3 days	6.2	1.9	3.1	2.6
Reason for trail choice*				
Recommendation	22.6	23.0	42.6	27.5
Previous visit	19.4	24.9	17.1	21.4
Easy access	18.7	15.2	12.4	15.5
Well signposted	4.5	4.3	4.7	4.4
Good views	17.4	16.3	11.6	15.5
Nature-minded aspects	1.3	1.6	0.8	1.3
Others	14.8	13.6	10.1	13.2

Table 7 Variables that best define the group and trip characteristics and motivations of the groups of hikers for each area (see text for more details)

Values are percentages of the number of subjects for each group

* Significant differences (χ^2 test)

** Significant correlation at level 0.01 (Spearman's ρ)

the respondents it was their first visit to the protected area. In 75.2% of the cases the visit was only for half a day and 43.4% used some kind of accommodation (Table 7). About 22% of the visitors of this group considered the number of other visitors on the trails to be "too many" (overcrowded). This was also the group that least felt the need to establish security and control and conservation of the natural environment (*Demand for new facilities* variable in Table 8). More than 54% regularly visited the Congost de Mont-Rebei protected area (Fig. 3) and 76.0% had chosen one of the classical trails of the particular protected area (Fig. 4).

Conclusions and Management Implications

Our analysis of the typology of the hiking visitors of three protected natural areas representing the Natura 2000 network of protected natural areas revealed that visitors' motivations can be considered as a possible reference indicator for planning and management of hiking. In our survey hikers were more than 60% all visitors.

In general, the results obtained in the current study sustain the presence of certain behaviour patterns according to the cluster with the most valued visitors' motivation, which was independent of the intrinsic

Table 8 Variables that best define other aspects related to the visit of the groups of hikers for each area (see text for more details)

Variables	Group 1 (n = 155) Nature-minded hikers	Group 2 (n = 257) Sporting hikers	Group 3 (n = 129) General-purpose hikers	Total sample
Signposting*,**				
Very good	36.2	22.6	28.7	27.4
Reasonable	52.9	60.7	50.6	57.5
Unsatisfactory	10.9	16.7	20.7	15.2
Infrastructure (public facilities)**				
Very good	37.3	31.9	24.5	31.7
Reasonable	54.2	57.6	60.2	58.5
Unsatisfactory	8.4	10.4	15.2	9.8
Cleanness**				
Very good	42.3	33.9	30.2	35.1
Reasonable	56.1	62.6	63.7	61.7
Unsatisfactory	1.6	3.5	6.2	3.4
Satisfaction with the visit*,**				
Exceeded expectations	43.2	39.5	37.5	39.4
Met expectations	55.5	57.4	54.4	58.0
Disappointing	1.3	3.1	8.1	2.6
Overcrowding*,**				
Too many people	13.5	15.2	22.2	15.9
Reasonable	78.1	77.4	67.4	75.2
Few people	8.4	7.4	10.4	8.9
Demand for new facilities				
Information stand	21.2	23.2	25.1	25.4
Guided tours	5.5	4.9	8.6	5.7
Information flyers	20.6	21.0	23.5	21.5
Interpretive trails	14.5	15.0	18.4	15.4
Safety	4.5	3.0	2.9	3.9
Control and conservation	16.2	15.1	11.4	12.8
Look-outs, etc.	6.7	9.8	3.5	7.6
Others	6.8	7.9	6.6	15.2

Values are percentages of the number of subjects for each group

* Significant differences (χ^2 test)

** Significant correlation at level 0.01 (Spearman's ρ)

characteristics of the protected areas studied: *Enjoyment and appraisal of the natural environment*, *Knowledge and acquisition of new experiences*, *Practising physical or sporting activities in a natural environment* and *Group composition and recreation*. The socio-economic characteristics of visitors seem to bear little relation to their typology, with the exception of the answers regarding valuing previous knowledge (protection status of the habitat, Table 6). On the other hand, almost all the aspects of the section *Group and visit characteristics* (*group of visitors, number of people per group, number of visits* and *duration of visit*) do show a close relation to the typology of visitors.

The tendency of hikers towards a particular behaviour or typology pattern according to the analysis of the different categories of trails and areas in each of the three protected natural areas studied is a good starting point for applying the results obtained in the current study. This is particularly true of the practical application of some of the main characteristics of the groups in relation to the recreational management of these areas: *nature-minded hikers*, with an environmental profile, good knowledge of the environment, low demands, low-impact visits in small groups, a high level of interaction with the environment and a long visit; *sporting hikers*, who know the environment, visit the area regularly, have an intermediate level of demand and have good knowledge of the protection status; and *general-purpose hikers*, who make a short visit and have little knowledge of the area, but interact with the immediate area by using accommodation, etc.
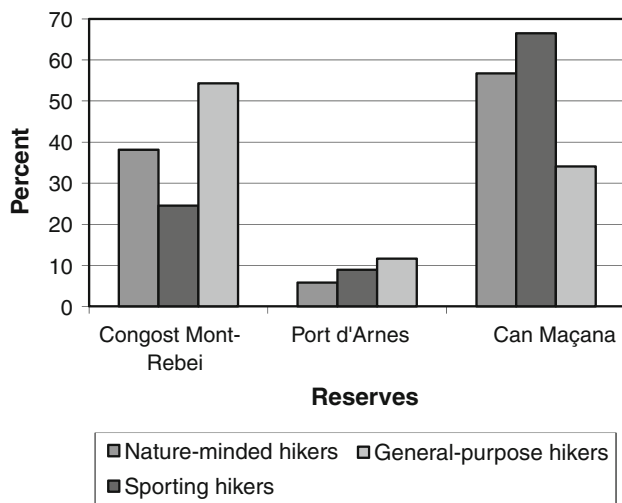
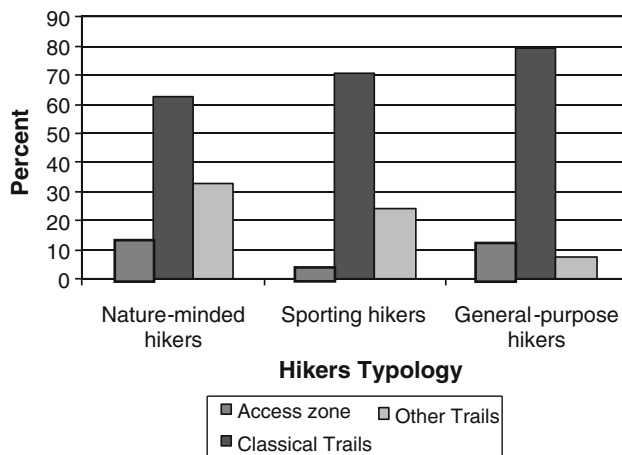Fig. 3 Distribution of visitor types among the reserves

Fig. 4 Trail distribution according to type of visitor

With regard to specific routes, *nature-minded hikers* (32.9%) and *sporting hikers* (24.4%) were the groups that most frequently visited non-classical trails, whereas more than 90% of *general-purpose hikers* visited the classical trails or remaining access zones. In general, Montserrat–Coll de Can Maçana was the protected area that most attracted *sporting hikers* (66.5%).

It has not yet been determined whether there is any explanation for the concentration of a given segment of hikers in these reserves. The reserves were selected carefully for the presence of practically identical recreational opportunities (physical and social aspects and setting). However, the hiking tradition in the Can Macana Reserve may go some way towards explaining the unexpected concentration of a given segment there.

The objectives of interpretive and educational programmes must be reformulated according to the typology of visitors (specialists or nature-minded hikers, sportspeople or general-purpose visitors). It is also important to focus on the main profile of visitors, based on the set of motivations that determine the choice of a certain area, or some of the main behaviours that are easy to observe (size and type of the group, duration of the visit, number of visits to a trail or area, etc.) and can be extrapolated, according to the data obtained in this study, to particular motivations and preferences. One could even use strategic planning to re-orient or concentrate the different segments of hikers to the corresponding reserves (those studied herein and others), as is done by market techniques and segmentation of supply and demand.

The data collected in our reserves could be used to manage hiking in areas of incipient use and growing popularity that are candidates to become new Natura 2000 areas. In this case, the specialization of supply can be a good way to optimize resources. The categorization of trails and typology of visitors proposed herein are easily transferable to any type of area.

Though the results of this study regarding the tendencies of nature-minded visitors (greater environmental sensitivity, less demanding, more satisfied with visits to less popular trails) are not conclusive, they do offer a line of work for future research, which could make a further segmentation of the typology of visitors based on the three categories of trail proposed herein or assess the compatibility of catering for the three segments in the same area.

Appendix: Questionnaire to visitors of Natura 2000 protected areas

We would to ask you some questions concerning this Natural Area. Your help will be most useful for improving the area management and the level of visitor enjoyment. Please read the questions carefully.

Day: *Time:*   *Place:*   *Interviewer:*   *Meteorological data:*

I. Where do you live?
1. Barcelona (province)
2. Barcelona (city)
3. Tarragona
4. Girona
5. Lleida
6. other provinces.......................................
7. France
8. other countries..

II. What is your occupation?
1. student
2. retired
3. unemployed
4. housekeeper
5. state worker
6. liberal profession
7. self-employed
8. wage-earner

| I |
| II |
| III |
| IV |
| V |
| VI |
| VII |
| VIII |

III. What are your studies?
1. primary education
2. vocational training
3. secondary school
4. university degree
5. postgraduate degree

IV. Sex 1. Male
                2.Female

V. Year of birth [____]

VI. Who did you come with?
1. partner
2. family (more than 2 persons)
3. friends
4. organized group
5. others.................................

VII. Frequency of visit to the Can Maçana Reserve (since 2 years ago)
1. it's the first time
2. between two and three times
3. between four and six times
4. more than six times

VIII. Type of transport used
1. private car
2. bicycle
3. on foot
4. motorcycle
5. others..

| IX |
| X |
| XI |
| XII |
| XIII |
| XIV |

IX. Where are you staying?
1. nowhere
2. private house
3. hotel
4. rural house
5. summer camp
6. campsite
7. mountain hut
8. others.......................................

X. Write down the number of people who came with you: ....

XI. How long have you been here?
1. ½ day
2. 1 day
3. 2 or 3 days
4. more than 3 days

XII. How did you first hear about the Can Maçana Reserve?
1. Fundació Territori i Paisatge
2. TV, radio, newspaper, etc.
3. other people (friends, hiking or ecologist groups, etc.). Please specify ....
4. maps, guidebooks, information brochures, etc. Please specify ....
5. because it is near my home
6. I have known this place since I was a child
7. others. Please specify ....

XIII. Among the following group of activities, please state which is the closest to the activities you have done during your visit to this natural area
1. staying at place of arrival (eating, cooking, etc)
2. walking around for a short time (less than half an hour)
3. hiking (more than half an hour)
4. mountaineering (climbing to one peak)
5. climbing
6. cycling
7. canyoning
8. other activities. Please specify ....

XIV. What trail/zone did you visit today in this natural area?
Specify:

XV. Why did you decide to visit that trail or zone?
Please, select three possible options in order of priority
1. Recommendation. State who:
2. Because I had visited and liked it
3. Because it has an easy access
4. Because it is well signposted
5. Because it has good views
6. Others. Please specify ....

| XV |
| XVII |
| XVIII |

XVI. What were your reasons for visiting the Can Maçana Reserve?
Give each reason a score using the following scale: 1. not important to 5. very important
1. To get close to nature
2. Enjoyment
3. To enjoy the scenery
4. To practise adventure sports (trekking, climbing, etc.)
5. To learn more about the natural environment
6. To visit a particular trail or area
7. To enjoy a solitary experience
8. To get to know new places
9. To spend the day with my family or friends
10. To relax and disconnect
11. To practise some kind of physical or sporting activity
12. To enjoy new experiences
13. To enhance my health or physical condition

| 1 |
| 2 |
| 3 |
| 4 |
| 5 |
| 6 |
| 7 |
| 8 |
| 9 |
| 10 |
| 11 |
| 12 |
| 13 |

XVII. What is your opinion of the signposting of Can Maçana Reserve?
1. very good (easy to follow)
2. good (sufficient)
3. poor (insufficient)

| XX |
| XXI |

XVIII. What is your opinion of the parking area, picnic area and other facilities of this natural area?
1. very good
2. reasonable
3. unsatisfactory

XIX. What is your opinion of the level of conservation and tidiness of this natural area?
1. very good
2. reasonable
3. unsatisfactory

XX. What was your opinion of the number of visitors you encountered in this area:
1. Too many people
2. An acceptable number of people
3. Too few people

| XXIII |
| XXIV |

XXI. Did you know that this is a protected natural area (Natura 2000)?
1. yes
2. no

XXII. Which of the following services could make your visit to this natural area better?
1. Information points or centres
2. Information brochures
3. Interpretive trails
4. Viewpoints
5. Bird or other animal observatories
6. Environment conservation and control services
7. Others. Please specify............................

XXIII. What is your impression after your visit to Can Maçana Reserve?
1. Better than I expected
2. As I expected
3. Worse than I expected

THANK YOU FOR YOUR COLLABORATION

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