# Perceptions, attitudes and values of two key stakeholders on the oldest and newest Spanish national parks

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**Abstract:** Effective protected area (PA) conservation relies heavily on positive social perception, attitude and values, especially by the stakeholders most affected by PA regulations. Random samples of residents around (n = 401) and quota samples of visitors to (n = 542) two emblematic, environmentally similar National Parks (NPs) in Spain: Ordesa y Monte Perdido NP (Ordesa NP) and Sierra de Guadarrama NP (Guadarrama NP) were surveyed on their attitudes, perceptions and values using structured questionnaires. The results show similarities and differences between stakeholder groups and NPs. Most differences can be explained by the different geographic, historical and socioeconomic contexts. Residents near Guadarrama NP visited it less frequently, whereas non-residents visited the NP more frequently than Ordesa NP. Residents' and visitors' perception on the conservation state was better for Ordesa NP than for Guadarrama NP. The main perceived threats by both groups were wildfires, massive visitation and insufficient environmental awareness. Local participation in management was deemed improvable in both NPs. Stated importance on both NPs was similarly high for both stakeholder groups. Half of residents and over two-thirds of visitors to both NPs were willing to pay an entrance fee. A daily fee of 3 € per person would be acceptable to most. Willingness to pay (WTP) was negatively correlated with 'frequency of visits' in Guadarrama NP. WTP increased substantially with measures that ensure equity, transparency and accountability. These results present PA managers with updated key stakeholders' attitudes and perceptions, and provide a feasible alternative to regulate massive visitation and enhance financial sustainability of Spanish NPs.

**Keywords:** Protected area, Resident, Visitor, Perception, Mountain ecosystem, Willingness to pay.

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## 1. Introduction

Properly incorporating human concerns to conservation policies and actions largely influences their success (Blicharska, Orlikowska, Roberge and Grodzinska-Jurczak, 2016). PAs are the most widespread biodiversity conservation policy globally (Bradshaw et al, 2015; Jepson et al., 2017). They conserve natural and cultural assets which provide a wide range of ecosystem services that benefit the society as a whole (Dudley, 2008). However, they do so by imposing restrictions on resource access and/or use which affect directly people who live, work or regularly use those areas. Thus, wide socioeconomic benefits are provided at the expense of few people or groups that may see their living, working or leisure conditions worsen (Järv, Kliimask, J., Ward and Sepp, 2016). As a result, different stakeholders, chiefly landowners, have opposed PA initiatives broadly across Europe (Blicharska et al., 2016) and America (Taravella and Arnauld de Sartre, 2012). The easiness of limitations to residents with regard to visitors, creation of additional income opportunities and financial subsidies have been advocated as means of compensating local populations affected by PA regulations (Järv et al., 2016). In Spain, the municipalities whose territories are totally or partially included in NPs are allocated state subsidies by law in order to compensate for resource-use limitations in NPs and their peripheral protection zones (Spanish Government, 2014).

Spain was among the first countries to designate NPs nearly one century old, with the first two NPs, Montaña de Covadonga NP and Ordesa NP, designated in 1918 (MAGRAMA, 2012). Nowadays, NPs are the most reputed PA category in Spain by the general public as a result of high-ranked legal designation process and long-lasting communication campaigns (MAGRAMA, 2012). They are also the best-known, most visited and most generously funded and carefully managed PA category in the country (Múgica et al., 2014). Despite those positive facts, Spanish NPs are not free of pressures: excessive visitation, inadequate recreation activities such as massive outdoor sport contests, forest fires, climate change, or ecological imbalances or novelties such as alien species introductions or conflicting species' re-establishment such as wolves. Those pressures generate environmental and/or socioeconomic impacts that may result in social conflicts and hamper the achievement of conservation objectives. Visitors' impacts on PAs are numerous and well documented (Leung et al, 2015) and so is the need to monitor and assess visitors and their activities in PAs, especially at places of high concentration of visitors (Hawden et al, 2007; Rodríguez-Rodríguez, 2012a). Similarly, the fundamental role of local populations' acceptability of PA regulations and managerial practices for effective conservation is also widely acknowledged (Naughton-Treves et al., 2005; Rodríguez-Rodríguez and Martínez-Vega, 2013; Wells and McShane, 2004).

In Spain, surveys on visitors' perceptions on NPs have been regularly conducted since 2007 (MAGRAMA, 2008). Though some socio-demographic characteristics of residents around Spanish NPs are also regularly compiled, their perceptions, attitudes and values on NPs are not being systematically collected and made available to managers or decision-makers, making information for management improvable. In this study we sought to a) ascertain the perceptions, attitudes and values on two highly symbolic NPs: Ordesa NP and Guadarrama NP by two stakeholder groups crucial for effective conservation: residents and visitors; b) characterise resident's and visitor's samples which may help to explain their perceptions, attitudes and values on NPs; c) explore factors that may help to understand similarities or differences in perceptions, attitudes and values between both NPs; and d) make evidence-based recommendations aimed at better informing decision-makers and NPs' managers' and increasing social acceptability and effectiveness of managerial actions.

## 2. Methods

### 2.1 Study area

Ordesa NP is a high-mountain PA located in the Pyrenees, in the Alpine biogeographic region (EEA, 2017), in the northern Spanish province of Huesca. It was designated on faunal, floral and landscape grounds in August of 1918 (Spanish Government, 1918). It was the second PN in Spain after Montaña de Covadonga NP, designated on the same year. It was reclassified and extended to its current 15,696 ha in 1982 (Spanish Government, 1982). Six municipalities are partially included in the NP (Appendix 1). Guadarrama NP is a high-mountain Mediterranean PA situated in central Spain, between the provinces of Madrid, to the south-east, and Segovia, to the north-west (Fig. 1). It was designated as a NP in June of 2013 (Spanish Government, 2013). Its 33,960 ha partially includes 34 municipalities (MAPAMA, 2017). It also completely included one previously designated nature park (Peñalara Nature Park) and part of an existing regional park: Cuenca Alta del Manzanares Regional Park. Both were subsequently re-categorised.


**Fig. 1** Location of both National Parks and their included municipalities in the Spanish administrative and biogeographical map

### 2.2 Questionnaire design

Two questionnaires with ten questions (for residents) and nine questions (for visitors) were developed in Spanish. Eight questions were common for both groups and the remainder were

specific for each group (Appendix 2). An English version of the visitors' questionnaire was also produced for foreign visitors. Closed-ended questions were complemented with open-ended ones for clarification. Questions related to four blocks:

1. Sample characterisation
2. Knowledge and visitation
3. Conservation state, threats to conservation and local participation
4. Personal importance and WTP

The questionnaires were pre-tested on a small, ten-people sample.

## 2.3 Sampling and surveying

Visitors to Guadarrama NP in 2015 were estimated as nearly 3,000,000 whereas visits to Ordesa NP the same year were estimated as approximately 600,000 (MAGRAMA, 2015). Official residents in the thirty-five municipalities of Guadarrama NP reached 146,650 in 2015 whereas officially censused residents in the six municipalities of Ordesa NP were 1,894 in the same year (INE, 2017). Resident sampling was restricted to people living in municipalities whose territories were totally or partially included in the two NPs.

Sample size for residents and visitors was selected for a confidence level of 90% and a standard error of 5% for the whole survey. Systematic, random phone interviews were made to a stratified sample of residents of both NPs (n = 261 for Guadarrama NP and n = 111 for Ordesa NP) according to the number of residents with fixed phone lines in the phone directory (Telefónica 2016). Interviews were made in June and July of 2016 from 10 to 17 h. The number of phone surveys by municipality can be seen in Appendix 1.

Quota samples of n = 275 for Guadarrama NP and n = 244 for Ordesa NP were surveyed at the entrance of permanent (open all the year) visitors' centres (VCs) during three consecutive days (Fridays, Saturdays and Sundays) on two consecutive weeks in mid-May 2016. Four VCs were included in the sampling design in Guadarrama NP: Valsaín (Boca del Asno), Peñalara, La Pedriza, and Valle de la Fuenfría; and two VCs were included in Ordesa and Monte Perdido NP: Torla and Tella-Sin. A proportional number of interviews was shared among CVs and survey days. Interviews were made from 10- 14h each of sampling day, or until earlier, if the daily quota for that VC was reached.

## 2.4 Data and analysis

Pre-defined responses for each variable were codified according to an ordinal scale (e.g.: 'unimportant' = 1; 'not very important' = 2; 'quite important' = 3; 'very important' = 4). Open responses were also codified to a limited number of related categories for analysis. Segmented percentages for each variable by social group (residents and visitors) and NPs were computed and compared for the four resulting groups.

A conservation Perception Index (PI) and a personal Importance Index (II) were calculated following the formulae in Rodríguez-Rodríguez (2012b):

> PI = [Percentage of people responding 'very good (conservation state)' (x 2) + Percentage of people responding 'good' — Percentage of people responding 'poor' — Percentage of people responding 'very poor' (x 2)]. PI values range from —200 to +200.
>
> II = Percentage of people responding 'unimportant' + Percentage of people responding 'not very important' (x 2) + Percentage of people responding 'important'

(x 3) + Percentage of people responding 'very important' (x 4). II values range from a minimum of 100 to a maximum of 400.

Spearman correlation tests ($\alpha = 0.05$) were performed on both group samples (residents and visitors) to ascertain which variables were related to 'willingness to pay and entrance fee', after checking the non-normality of data. Kruskal-Wallis tests ($\alpha = 0.05$) were used to determine differences between NPs within groups. Even though our visitors' samples were numerous and results might actually be representative of the whole population of visitors to each NP, generalisations should not be made.

To estimate the number of resident-visitors (Nrv) visiting the NPs each year, we used our stated frequentation data:

Nrv = [(Proportion of residents visiting the NP frequently —at least once a month— x Total number of residents / 100) x (12 visits/year)] + [(Proportion of residents visiting the NP sporadically —at least once a year— x Total number of residents / 100) x 1 (visit/year)] + [(Proportion of residents visiting the NP seldom —less than once a year— x Total number of residents/100) x 1 (visit/year)].

We subtracted Nrv to the total official figures of visitors to each NP in 2015 to estimate the number of non-resident visitors according to official figures (MAGRAMA, 2015).

## 3. Results

Response rates to residents' surveys were similar for both NPs: 82.22% for Ordesa NP, and 81.60% for Guadarrama NP.

### 3.1 Sample characterization

#### *3.1.1 Residents*

Socio-demographically, both resident samples were similar (Fig. 2). Some small differences related to the more even proportion among the three age groups, greater proportion of people employed in the secondary and quaternary sectors, and less proportion of people working in the primary sector in the sample of residents near Guadarrama NP.

#### *3.1.2 Visitors*

The samples of visitors were also socio-demographically similar, although the proportion of foreign visitors and women were higher in Ordesa NP (Fig. 3).

### 3.2 Perceptions, attitudes and values

#### *3.2.1 Degree of knowledge and visitation frequency*

Ninety-seven point seven per cent and 99.10% of the residents in Guadarrama NP and Ordesa NP knew about each NP, respectively. The visitation frequency by residents near

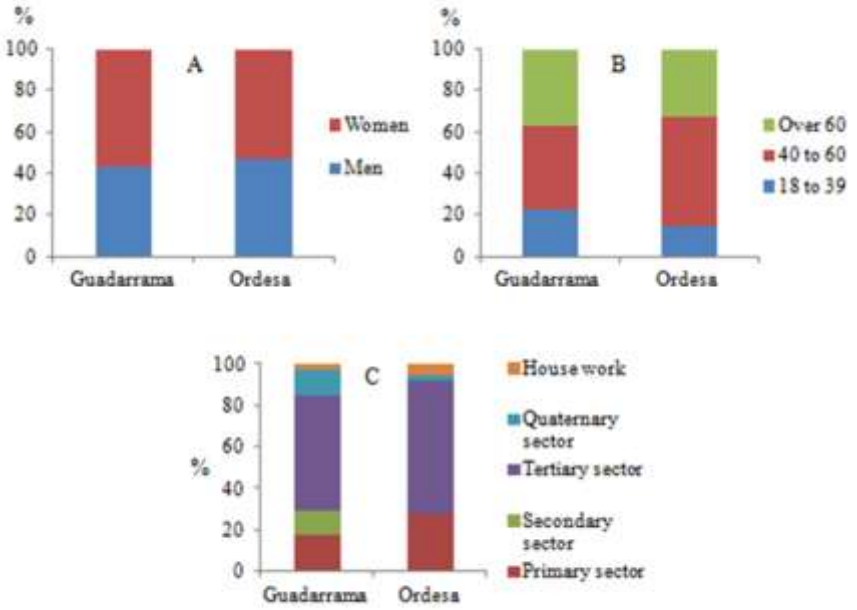


**Fig. 2** Gender (**a**), age (**b**, in years) and occupation (**c**, in percentage) of the resident samples in both National Parks

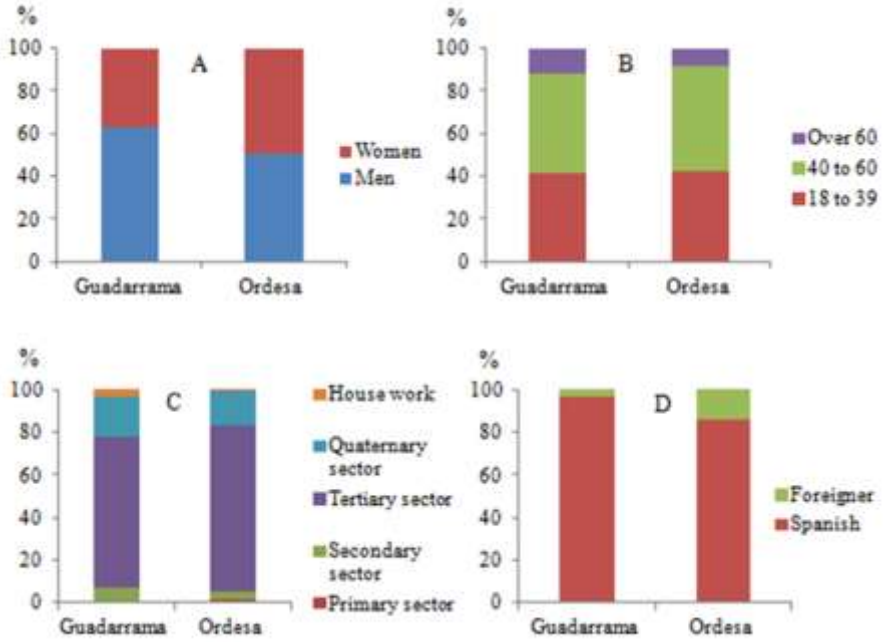


**Fig. 3** Gender (**a**), age (**b**), occupation (**c**) and nationality (**d**), in percentage, of the visitor samples in both National Parks

Guadarrama NP was very even among the four categories. In contrast, over 44% of residents near Ordesa NP visited the NP at least once a month (Fig. 4R). NP visitation trends by visitors are opposing. Most visitors to Guadarrama NP visited it at least once a month, whereas over half of the visitors to Ordesa NP had never visited it before (Fig. 4V). According to these estimates, approximately 11,022 residents visited Ordesa NP in 2015, whereas 515,284 residents visited Guadarrama NP. This makes very different visitation proportions by residents to each NP: only 1.84% of the visitors to Ordesa NP was a resident in the area whereas roughly 17.24% of the visitors to Guadarrama NP in 2015 were residents in the municipalities of the NP.

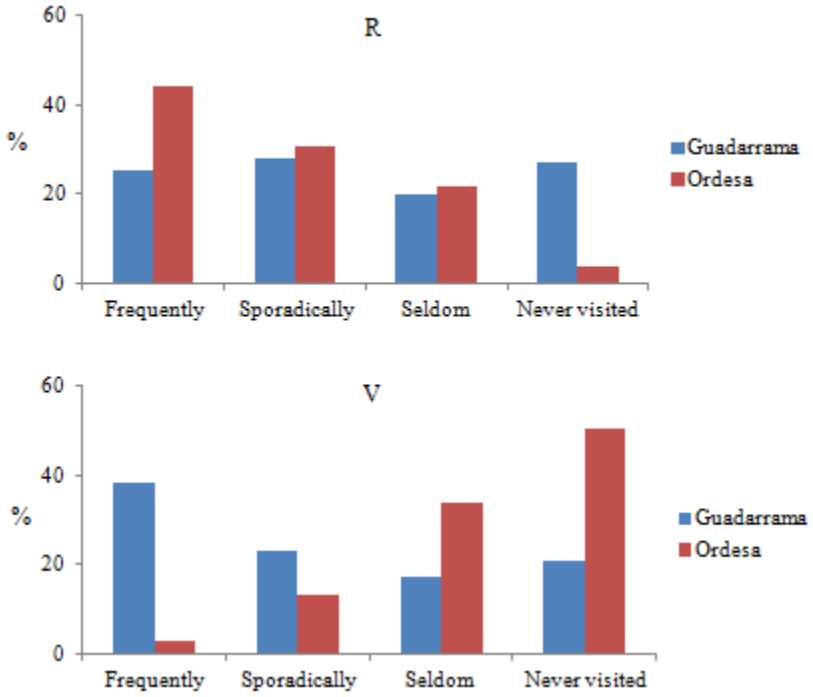


**Fig. 4** Visitation frequency (in percentage) by residents (**R**) and visitors (**V**) to both national parks

### *3.2.2 Perception on the conservation state and main threats to conservation*

Most residents perceived Guadarrama NP as 'well preserved' (Fig. 5R). The main reasons for this were that they thought that the NP was 'clean', 'well managed' and 'clearly signalled'. The residents near Ordesa NP also thought that the NP was 'well preserved', although nearly the same proportion deemed it 'very well preserved', mainly because it was 'clean' and 'well managed'. The residents' perception on the conservation state of both NPs was better for Ordesa NP than for Guadarrama NP (PIr= 131.3 vs 49.7). Also, a much greater proportion of residents could not answer this question for Guadarrama NP.

The visitors' respondents' perception on the conservation state of NPs was also better for Ordesa than for Guadarrama, although 85% of respondents could not reply to this question for Ordesa NP (Fig. 5V). 'Cleanliness', 'good management' and 'clear signalling' were the most

mentioned reasons for the good perception on the conservation status of both NPs. Visitors' perception on the conservation state of both NPs was better than residents', especially for Guadarrama NP: PIv = 103.0, for Guadarrama NP, and PIv = 156.8, for Ordesa NP.

The three main perceived threats to the conservation of both NPs by residents were: 'wildfires', 'massive visitation' and 'insufficient environmental awareness', respectively. The three main perceived threats by visitors to both NPs were 'insufficient environmental awareness', 'massive visitation' and 'wildfires', respectively. The 'DK/NO' proportions were greater among visitors than among residents for both NPs, especially for Ordesa NP, where non-respondents were 5.35 times greater among visitors than among residents.

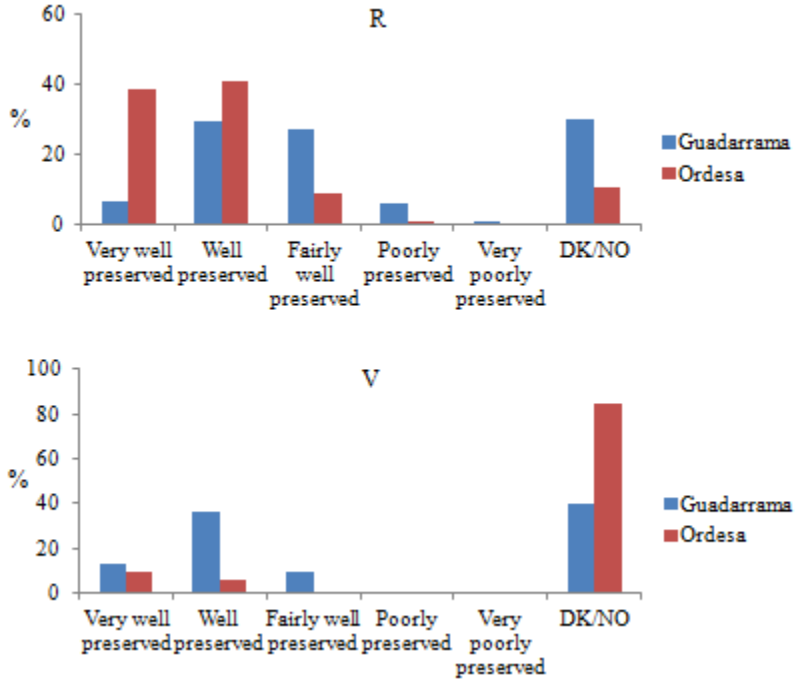


**Fig. 5** Perception on the conservation state of both national parks (in percentage) by residents (**R**) and visitors (**V**)

### *3.2.3 Local participation in management*

Residents' participation in NPs' management was deemed 'improvable' in both NPs (Table 1). The main reasons why residents' participation in Guadarrama's NP's management was deemed 'improvable' are: 'insufficient residents' awareness' and 'insufficient management and budget'. In Ordesa NP, 'insufficient residents' awareness' and 'restrictions to residents' participation in the management of the NP' were perceived as the reasons for improvement.

Table 1. Residents' opinion on local participation in national park's management (in percentage of respondents)

**Table 1.** Residents' opinion on local participation in national park's management (in percentage of respondents)

| | Guadarrama NP | Ordesa NP | Total |
|---|---|---|---|
| Appropriate | 22,6 | 24,5 | 23,2 |
| Improvable | 27,2 | 30,0 | 28,1 |
| Innapropriate | 15,2 | 20,9 | 16,9 |
| DK/NO | 35,0 | 24,5 | 31,9 |
| Total | 100 | 100 | 100 |

### *3.2.4 Personal importance and willingness to pay an entrance fee*

A large proportion of residents stated that the NP was 'very important' to them, especially in Ordesa NP: IIr = 374.3 vs 332.7 for Guadarrama NP (Fig. 6R). Visitors also stated that both NPs were mostly 'very important' to them (Fig. 6V). Ordesa NP was more important for residents than for visitants the opposite occurred (IIv = 370.8), whereas in Guadarrama NP opposite occurred (IIv = 379.6).

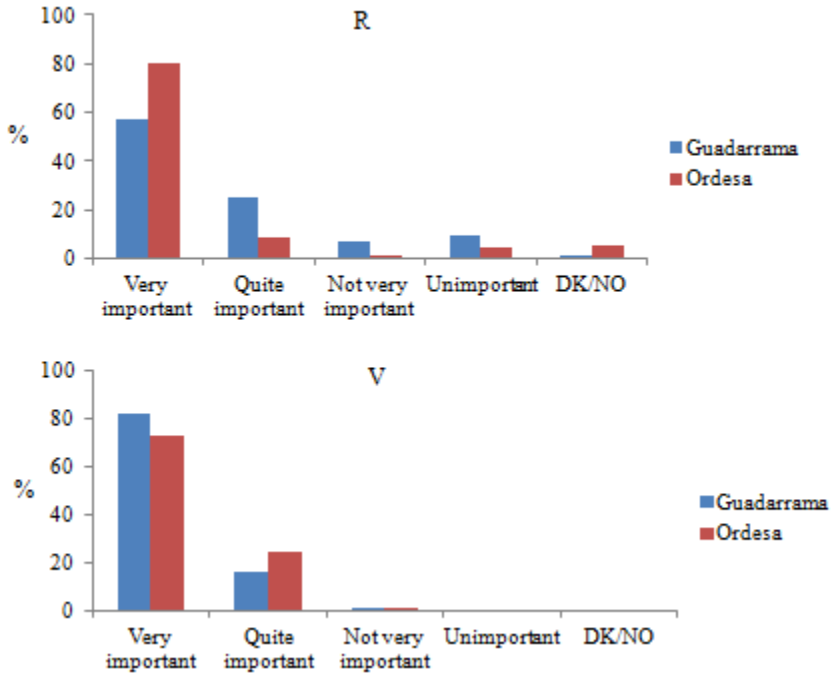


**Fig. 6** Personal importance stated by residents (**R**) and visitors (**V**) to both national parks (in percentage)

Over 48% of residents around and 68% of visitors to both NPs were willing to accept an entrance fee (Fig. 7a). Residents were slightly more willing to pay an entrance fee in Guadarrama NP than in Ordesa NP, where residents were mostly unwilling to pay. In contrast, more visitors would be willing to pay an entrance fee to Ordesa NP than to Guadarrama NP. The main reasons for not accepting an entrance fee among residents and visitors were that NPs are public goods, except residents near Ordesa NP unwilling to pay an entrance fee claimed mostly that they never paid to access the NP before (Fig. 7b). The majority of residents in both NPs who was willing to pay an entrance fee would be willing to pay up to three euros per day (Fig. 7R). The potential fee agreed to be paid was greater among visitors to Ordesa NP than for visitors to Guadarrama NP (Fig. 7V).

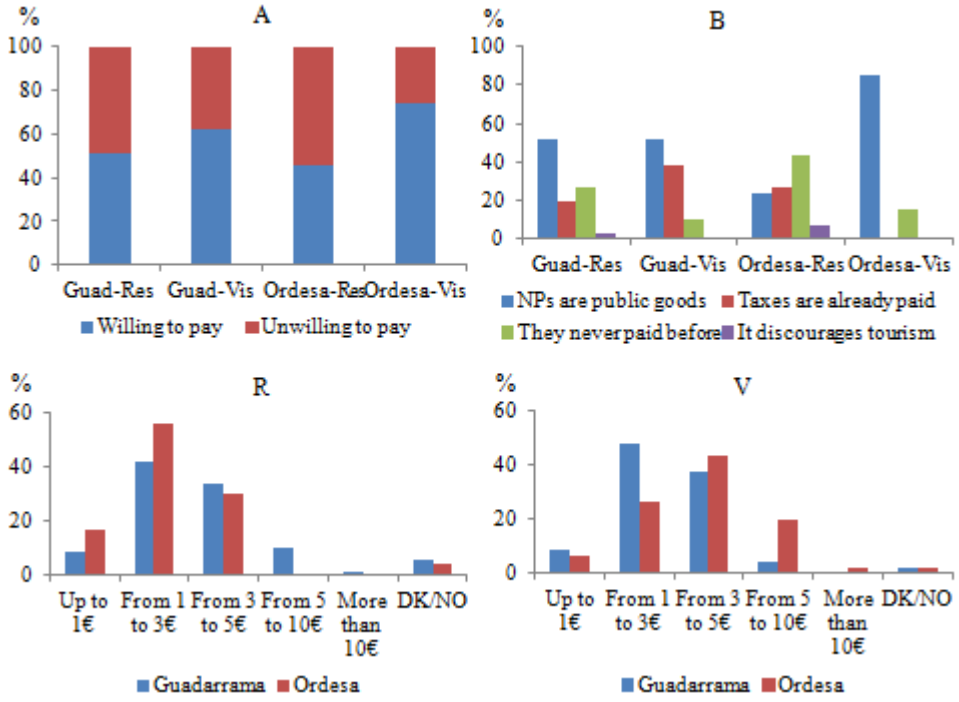


**Fig. 7** Willingness to pay an entrance fee to both national parks (**a**), main reasons for not accepting an entrance fee (**b**) and amount of money willing to pay to access both national parks by residents (**R**) and visitors (**V**), in percentage

Twenty-eight point five per cent of residents near Guadarrama NP who were initially unwilling to pay an entrance fee would accept one if the collected money would be invested in maintaining the NP (23.6%), if there would be discounts for some groups (3.3%) or if that fee would only apply to tourists (1.6%). In contrast, 20.3% of residents unwilling to pay an entrance fee would not accept it under any circumstance. 18.9% of residents near Ordesa NP who were initially unwilling to pay an entrance fee would accept one under the previously mentioned circumstances (8.6%, 1.7% and 8.6%, respectively). Forty-one point four per cent of residents unwilling to pay an entrance fee would not accept it under any circumstance. Forty-nine per cent of visitors to Guadarrama NP who were initially unwilling to pay an entrance fee would accept one if the collected money would be invested in maintaining the NP (36.3%), if

that fee would only apply to tourists (7.8%), or if there would be discounts for some groups (4.9%). Fifty-four point seven per cent of visitors to Ordesa NP who were initially unwilling to pay an entrance fee would accept one under the previously mentioned circumstances (39.1%, 6.3% and 9.4%, respectively).

'Willingness to pay an entrance fee' was positively correlated with 'occupation' ($rs_{(234)}$ = .197; $p$ = .002) and 'personal importance' ($rs_{(240)}$ = .173; $p$ = .007), and negatively correlated with 'frequency of visits' ($rs_{(240)}$ = -.283; $p$ < .000) and 'participation in managerial activities' ($rs_{(153)}$ = -.304; $p$ < .000) among residents near Guadarrama NP. Within the visitors' group, 'willingness to pay an entrance fee' was negatively correlated with 'frequency of visits' ($rs_{(267)}$ = -.292; $p$ < .000) for Guadarrama NP, whereas among visitors to Ordesa NP, 'willingness to pay an entrance fee' was negatively correlated with 'age' ($rs_{(237)}$ = -.164; $p$ = .011).

### 3.3 Differences between NPs by stakeholder group

Within the residents' group, there were statistically significant differences for some social variables between NPs: residents near Ordesa NP visited the NP more frequently ($\chi^2_{(1)}$ = 23.21; $p$ <.000), had a better perception on its conservation state ($\chi^2_{(1)}$ = 59.07; $p$ <.*000*) and stated more personal importance than residents near Guadarrama NP ($\chi^2_{(1)}$ = 20.88; $p$ <.000). In contrast, residents near Guadarrama NP were more willing to pay an entrance fee to the NP ($\chi^2_{(1)}$ = 4.13; $p$ <.042). Within the visitors' group, there were statistically significant differences for some social variables between NPs: visitors to Guadarrama NP visited the NP more frequently ($\chi^2_{(1)}$ = 112.01; $p$ <.000) and stated more personal importance ($\chi^2_{(1)}$ = 5.30; $p$ =.021) than visitors to Ordesa NP. In contrast, visitors to Ordesa NP had a better perception on its conservation state ($\chi^2_{(1)}$ = 20.86; $p$ <.000) and were more willing to pay an entrance fee to the NP ($\chi^2_{(1)}$ = 25.88; $p$ <.000).

## 4. Discussion

Nearly all residents around both NPs knew about them. The almost total degree of knowledge of Ordesa NP by residents was expected, as most residents were born and grew-up in the area, this NP is the main attraction of visitors to the Sobrarbe shire and it is the second oldest NP in Spain (MAGRAMA, 2012). The similarly high degree of knowledge of Guadarrama NP was more surprising, given the youth of this NP and the much lesser degree of knowledge of the ten PAs of the Region of Madrid by residents in 2009 (Rodríguez-Rodríguez, 2012b). However, two of the PAs that were partially or fully included in Guadarrama NP: Cuenca Alta del Manzanares Regional Park and Peñalara Nature Park, respectively, were also very highly known by residents few years ago (Rodríguez-Rodríguez, 2012b). These results suggest that regulation breaches by residents in those NPs should be minimal, as they overwhelmingly know that they are developing their activities in a highly restrictive PA.

Residents near Ordesa NP make a more frequent use of the NP than residents near Guadarrama NP, which explains why there was a much larger proportion of residents who could not value the conservation state of Guadarrama NP. The peri-urban nature of Guadarrama NP, close to big cities like Madrid, most likely determines its high visitation frequency by non-residents (Atauri et al. 2000; Caparrós and Campos 2002). Guadarrama mountains have been a popular place for recreation for a long time (Barrado 1999). Besides, more than six million people live within 1 h drive from the NP (INE 2017). In contrast, the rural nature and relative isolation of Ordesa NP likely explains that just a little proportion of visitors accesses the NP

monthly, and that half of its visitors had never visited it before. The rural geography of Ordesa NP also suggests less conservation issues and better perception on its conservation state than for Guadarrama NP by residents and visitors.

Residents and visitors attributed the good conservation state of both NPs to management, which suggests good performance by NPs' managers, whereas threats to the conservation of both NPs were mostly ascribed to visitors' numbers and behaviour, and to Perceptions, attitudes and values of two key stakeholders wildfires. Wildfires are the main factor reducing forest cover, maturity and quality in Spain (Pérez-Cabello and De la Riva 2001; Prieto 2014), and the most widespread pressure to NPs in the country (Rodríguez-Rodríguez and Martínez-Vega 2017). As a result, NPs'administrations spend nearly one-fourth of their investments on fire prevention (MAGRAMA 2012). Given their ubiquity, frequency and destructive potential, wildfires are traditionally perceived by the general public and other stakeholders as one of the main threats to natural areas in the Iberian Peninsula (Rodríguez-Rodríguez 2008; Valente et al. 2015) and other places across the world, especially in Africa and Latina America (Lykke 2000; Leverington et al. 2010). However, recent wildfire trends affecting mountainous NPs like the ones assessed here were positive in recent years, as a result of good prevention and extinction policies and reduced ignitability of mountain ecosystems (Rodríguez-Rodríguez and Martínez-Vega 2017).

Among the main perceived threats, massive visitation and insufficient environmental awareness point to socially useful management actions regarding increased visitor access limitation and enhanced environmental education to visitors. Visitor limitation measures may include broadening existing restrictions such as reducing available parking space or motor vehicle routes inside and in the periphery of the NPs, implementing daily visitor quotas or entrance fees. The main perceived threats to both NPs are similar to those stated for other PAs of the Region of Madrid in recent years (Rodríguez-Rodríguez 2008), the main exception being urbanisation, which was scarcely mentioned in our study, probably as a result of the stark deceleration of construction rates across the country since the burst of the housing bubble around 2007 (In't Veld et al. 2014; González-Vallejo et al. 2015). In contrast to recent national (Jiménez 2012) and regional trends (Rodríguez-Rodríguez 2008), urbanisation has never been a serious threat to Ordesa NP (Hewitt and Escobar 2011; Rodríguez-Rodríguez and Martínez-Vega 2017). Surprisingly, climate change was not mentioned as one of the main threats to either high-mountain NP, despite scientific evidence of warming climate and changes in community composition (García et al. 2015; Gartzia et al. 2016).

Our results suggest that managers should make a greater effort to communicate with locals and facilitate residents' engagement in managerial proposals and activities, especially in Ordesa NP, which has been implementing managerial actions for more than three decades since the NP was given its current shape and extent (Spanish Government 1982). In Guadarrama NP, broader and deeper involvement of residents in conservation and managerial activities would likely lessen existing and potential conflicts resulting from high visitation figures (MAGRAMA 2015), intensive urban development in surrounding areas (Hewitt and Escobar 2011) and ecological trends, such as the recent expansion of the Iberian wolf into the NP (MAGRAMA 2015).

Both NPs were highly valued by residents. Ordesa NP had the greatest valuation by locals, according to the II, and a higher valuation than any PA of the Region of Madrid in 2009 (Rodríguez-Rodríguez 2012b). Guadarrama NP was just above the average valuation of the ten PAs of the Region of Madrid in 2009, although below the valuation of the two existing PAs that where included in this NP (Rodríguez-Rodríguez 2012b). The fact that surveys on Guadarrama NP have taken place in many more municipalities than for both existing PAs in the 2009 study (Rodríguez-Rodríguez 2012b), some of whose inhabited areas were quite distant from the NP,

might explain the reduced personal importance of a more renowned PA. Local population valued Ordesa NP slightly higher than visitors, which suggest a historical identification of locals with this NP. This historical relationship of locals with Ordesa NP likely explains the strongest opposition to establishing an entrance fee in this NP, even when 'waivers' were included. In contrast, visitors to Guadarrama NP valued it substantially higher than residents, which confirms the very high regional recreational importance of this NP (Barrado 1999; Rodríguez-Rodríguez 2012b; MAGRAMA 2015).

There was broad support to an entrance fee among visitors to both NPs. Residents were more reluctant to paying an entrance fee, although support for that management action was relatively high in both NPs, considering closeness and potential frequent use. The main stated reasons for opposing an entrance fee aligned closely with those in other contexts (Buckley 2003). Our fee-acceptance results are within the same range as those from a previous study on the ten PAs of the Region of Madrid in 2006/2007 and 2009 (Rodríguez-Rodríguez 2012b) and show a more positive attitude towards entrance fees to Spanish NPs than those from a nation-wide survey conducted in 2007 in which 62% of interviewees was against an entrance fee to such PAs (MAGRAMA 2008). Entrance fees to NPs and other natural amenities are a common policy in many developing and developed countries (Muñoz and Benayas 2007; Nyaupane et al. 2009). In Spain, where PA management depends of each regional government, no entrance fees to such areas have ever existed, so people generally embrace the idea that PAs are public goods whose financing must be provided by the state (Muñoz and Benayas 2007; MAGRAMA 2008). Some regional PA administrations charge for the use of visitor facilities (e.g. car parks; visitor centres), information (e.g. maps), or some other recreation services in other PA categories (e.g. nature parks). However, entrance and services provided to visitors, including use of visitors' centres' facilities or guided tours, are free of charge in Spanish NPs.

Although the visitor samples cannot be considered methodologically representative, especially of highly seasonally visited NPs such as Ordesa NP (MAGRAMA 2015), this result suggests that an entrance fee of around three Euros per person and day would be acceptable to most visitors to both NPs. Caparrós and Campos (2002) reached similar conclusions on willingness to pay by visitors to two emblematic areas of Guadarrama NP: the valleys of Lozoya and Valsaín. The average accepted entrance fee to both valleys was 4.28€. Urzainqui et al. (2003) estimated a slightly higher acceptable daily entrance fee to Tablas de Daimiel NP of 5.67€. Implementing a similar fee to residents would likely result in more social conflict with NPs' managers and should, in case of interest, be tackled with care and adequate local participation. An option to favour residents over visitors and compensate them for restrictions on land use would be either excluding them from the fee or having a discount rate for their access to the NP (Walpole et al. 2001; Nyaupane et al.2009; Atmodjo et al. 2017). In some countries, only foreign visitors must pay to access PAs (Lindberg 2001). However, according to our results, excluding all nationals from the entrance fee would likely have a minimal ecological or financial impact due to small proportion of foreigner in the overall sample of visitors to both NPs. In any case, proper calculation of transaction costs should be made to make sure that this socially controversial measure would at least produce some economic benefit (Chape et al. 2008).

A substantial proportion of people initially reluctant to pay an entrance fee changed their mind if some waivers to paying were applied. Of these, visitors changed their views in higher proportions than residents. Among those 'waivers', investing the fee in conserving and managing the NPs was the preferred option by both groups. This result indicates that acceptability of entrance fees to NPs in Spain may substantially increase using some allocation schemes which are regarded as good for nature and socially fair (Del Saz and Suárez 1998; Buckley 2003; Nyaupane et al. 2009). In other countries, perceived inequity on some social

groups was stated as the main factor for opposing entrance fees to PAs and other natural amenities (More and Stevens 2000), and opposition to fees decreased as information on the allocation of fees and trust on the implementing agency increased (Nyaupane et al. 2009).

According to recent visitation figures to both NPs (MAGRAMA 2015) and our estimates excluding all residents and visitors who would be unwilling to pay an entrance fee under any circumstance, by charging an average 3€-fee to every visitor, the Spanish State could collect as much as 1,123,031 € / year from visits to Ordesa NP and 6,583,002 € / year from visits to Guadarrama NP. Even though foreseeable decreases in visitation figures to both NPs after the establishment of an entrance fee were considered (More and Stevens 2000; Walpole et al. 2001; Nyaupane et al. 2009), these figures should be regarded as somehow optimistic, as necessary equity measures such as discounts or waivers to some groups such as unemployed people, small children, students or retired people were not accounted for. In contrast, the fact that residents who were willing to pay an entrance fee (even if a smaller one) were not included in the calculation might have slightly underestimated potential income figures. In any case, these figures expand managers' options for increasing revenue for Spanish NPs whilst potentially helping to reduce conservation issues caused by massive and increasing visitation in some NPs, such as Guadarrama NP (Rodríguez-Rodríguez 2008; MAGRAMA 2015).

Even if entrance fees are not implemented, both NPs likely act as socioeconomic drivers of surrounding areas through tourism (Leung et al. 2015), especially in Ordesa NP in which the non-resident visitor figures exceed residents' by 310:1. This ratio is more than eighteen times greater than in Guadarrama NP and suggests greater revenue from tourism for the less diversified economy around Ordesa NP. These data also suggest that some compensation to residents for the legal and managerial restrictions from the NPs may be indirectly provided though tourism. However, specific studies should ascertain whether such revenues might compensate all affected stakeholders.

## 5. Conclusions

Residents and visitors stated a high personal valuation of Ordesa NP and Guadarrama NP and a positive perception on their conservation state. The high recreational value of Guadarrama NP was confirmed by the high frequentation figures by non-residents. The main perceived threats to both NPs were the same: wildfires, massive visitation and insufficient environmental awareness by visitors. They give indication for NP's managers on which pressures are socially important and provide opportunities for more effective engagement with both stakeholder groups.

Spanish NPs' administrations could at the same time reduce tourist pressure in some heavily visited NPs and benefit from increased revenues from visits by applying an entrance fee to NPs. The acceptability of an entrance fee scheme to Spanish NPs should account for equity, transparency and accountability issues. This translates into explicit management measures such as: establishing a reasonable, widely agreeable amount to pay for entrance (e.g., a fee of approximately 3€ / person and day should be acceptable for most residents and visitors); providing clear information on the use of fees; allocating revenues from fees to NP's management or conservation measures; and applying reductions (or, in some cases, exemptions) on the fee to specific groups such as residents, unemployed people, students, children or frequent users.

High visitation and visitor-to-resident ratios suggest that increased tourism may be an important source of income for some local residents as a result of the designation of both NPs,

especially in Ordesa NP. This additional source of income may compensate some residents for the legal and managerial restrictions they experience because of the existence of NPs, but this remains to be tested.

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## Appendix 1

See Table 2

**Table 2.** Distribution of surveys to residents by national park and municipality

| **Guadarrama National Park** | | | | | |
|---|---|---|---|---|---|
| Province | Municipality | Phone numbers in directory | Proportion of surveys | Number of surveys | **Number of surveys** |
| Madrid | Alameda del Valle | 74 | 0.27 | 0.74 | 1 |
| Madrid | Becerril de la Sierra | 914 | 3.39 | 9.08 | 9 |
| Madrid | El Boalo | 1,187 | 4.40 | 11.79 | 12 |
| Madrid | Canencia | 98 | 0.36 | 0.97 | 1 |
| Madrid | Cercedilla | 754 | 2.80 | 7.49 | 7 |
| Madrid | Guadarrama | 3,125 | 11.59 | 31.05 | 31 |
| Madrid | Lozoya | 190 | 0.70 | 1.89 | 2 |
| Madrid | Manzanares el Real | 1,284 | 4.76 | 12.76 | 13 |
| Madrid | Miraflores de la Sierra | 831 | 3.08 | 8.26 | 8 |
| Madrid | Los Molinos | 726 | 2.69 | 7.21 | 7 |
| Madrid | Navacerrada | 614 | 2.28 | 6.10 | 6 |

| | | | | | |
|---|---|---|---|---|---|
| Madrid | Navarredonda y San Mamés | 54 | 0.20 | 0.54 | 1 |
| Madrid | Pinilla del Valle | 66 | 0.24 | 0.66 | 1 |
| Madrid | Rascafría | 457 | 1.69 | 4.54 | 5 |
| Madrid | Soto del Real | 1,367 | 5.07 | 13.58 | 14 |
| Segovia | Aldealengua de Pedraza | | | | |
| Segovia | Basardilla | 30 | 0.11 | 0.30 | 0 |
| Segovia | Collado Hermoso | 41 | 0.15 | 0.41 | 0 |
| Segovia | El Espinar | 862 | 3.20 | 8.57 | 9 |
| Segovia | Gallegos | 30 | 0.11 | 0.30 | 0 |
| Segovia | La Losa | 131 | 0.49 | 1.30 | 1 |
| Segovia | Navafría | 127 | 0.47 | 1.26 | 1 |
| Segovia | Otero de Herreros | 212 | 0.79 | 2.11 | 2 |
| Segovia | Palazuelos de Eresma | 476 | 1.76 | 4.73 | 5 |
| Segovia | Real Sitio de San Ildefonso | 697 | 2.58 | 6.93 | 7 |
| Segovia | Santiuste de Pedraza | | | | |
| Segovia | Santo Domingo de Pirón | | | | |
| Segovia | Segovia | 12,000 | 44.49 | 119.23 | 119 |
| Segovia | Sotosalbos | 38 | 0.14 | 0.38 | 0 |
| Segovia | Torrecaballeros | 254 | 0.94 | 2.52 | 3 |
| Segovia | Torre Val de San Pedro | 41 | 0.15 | 0.41 | 0 |
| Segovia | Trescasas | 139 | 0.52 | 1.38 | 1 |
| Segovia | Ortigosa del Monte | 153 | 0.57 | 1.52 | 2 |
| Segovia | Navas de Riofrío | | | | |
| Segovia | Los Baldios | | | | |
| | ***TOTAL*** | ***26.972*** | | ***268*** | ***268*** |

| Ordesa National Park | | | | | |
|---|---|---|---|---|---|
| Province | Municipality | Phone numbers in directory | Proportion of surveys | Number of surveys | **Number of surveys** |
| Huesca | Bielsa | 93 | 36.05 | 47.94 | 48 |
| Huesca | Broto | 98 | 37.98 | 50.52 | 51 |
| Huesca | Fanlo | 8 | 3.10 | 4.12 | 4 |
| Huesca | Puértolas | 3 | 1.16 | 1.55 | 2 |
| Huesca | Tella-Sin | 10 | 3.88 | 5.16 | 5 |
| Huesca | Torla | 46 | 17.83 | 23.71 | 24 |
| | ***TOTAL*** | ***258*** | | ***133*** | ***133*** |

## Appendix 2 Questionnaires to residents and visitors

The following survey forms part of the research project called DISESGLOB. We try to ascertain the perception of visitors to Spanish national parks in order to improve their management and conservation.

This survey is anonymous and confidential. The results will be analysed by the participating institutions: Spanish National Research Council and University of Zaragoza only for research purposes and will not be shared with third parties.

We would be very grateful if you could devote 5 minutes to fill it in. Your contribution will greatly help us to know and conserve our national parks.

1. Gender:

- Man:
- Woman:

2. Age range:

- 18-39:
- 40-60:
- >60:

3. Main occupation (job; current or past):

4. Place of residence (city, country):

5. Do you know (complete name) National Park, either because you have ever visited it or because you know that it exists and can approximately locate it?

- Yes:
- No: (If this options is chosen, the survey finishes)

6. You visit (complete name) National Park:

- Often (at least once a month):
- Sporadically (at least once a year):
- Seldom (less than once a year):
- This is my first visit:

7. You think that (complete name) National Park is :

- Very well preserved:
- Well preserved:
- Not too badly preserved:
- Badly preserved:
- Very badly preserved:
- NS/NC (en todo caso, si nunca lo ha visitado):

Please, justify your response (main reason):

8. In your opinion, what is the main threat to the conservation of the National Park?

Please, justify your response (main reason):

9. You think that residents' participation in the management of (complete name) National Park is :

- Adequate:
- Improvable:
- Inadequate:
- DK/NA:

Please, justify your response (main reason):

10. To you, Sierra de Guadarrama National Park is:

- Very important:
- Quite important:
- Not very important:
- Unimportant:

Please, justify your response (main reason):

11. Would you be willing to pay an entrance fee to the National Park?

- Yes:
- No: Please, state briefly why you would not be willing to pay an entrance fee:

-If your previous response was YES: Please, specify how much you would be willing to pay to access the National Park:

- Up to 1€:
- From 1-3€:
- From 3-5€:
- From 5-10€:
- More than 10€:

- If your previous response was NO: Would you be willing to pay an entrance fee to the National Park in any of the following circumstances?

- If a reduced fee was applied to some groups such as retired people, unemployed people, students, etc.):
- If the entrance fee was applied only to visitors (not to residents):
- If the money collected through the fee was invested in the national park:
- Other circumstance (open response):

12. Comments on the survey:

Thank you very much!

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