RESEARCH ARTICLE

Socioeconomic effects of protected areas in Spain across spatial scales and protection levels

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Abstract Impacts of the legal designation of protected areas (PAs) may have contrasting implications for different stakeholders, and at different spatial scales. In this study, we analysed the organisational perception on the socioeconomic effects of PA designation from all sectors of activity in Spain, accounting for PAs' legal stringency. A semi-structured questionnaire was administered to 68 organisations at national, regional (Andalusia) and local scales (two municipalities in the Almería province, Andalusia) through an online survey. Local stakeholders and the primary, secondary and tertiary sectors were most concerned about the social and economic impacts of PAs designation on their organisations. By contrast, organisations at the national or regional scales together with public institutions, the quaternary sector and other miscellaneous stakeholders perceived predominantly positive effects. Only national organisations perceived an increase in local social and economic effects from the designation of legally stringent PAs with regard to multiple-use PAs.

Keywords Europe · Institutional stance · National park · Natura 2000 site · Stakeholder · Sustainability

INTRODUCTION

Protected areas: Effects beyond nature

Protected areas (PAs) are legally and spatially defined areas set aside primarily for biodiversity conservation. PAs

seek to conserve valuable genes, species and habitats that provide a range of benefits in terms of ecosystem services to nearby human populations and society as a whole (Dudley 2008). They do this by applying a legal and, sometimes, managerial regime that forbids or restricts some human activities that may compromise biodiversity conservation (Schreckenberg et al. 2010; Rodríguez-Rodríguez et al. 2016). The International Union for Conservation of Nature (IUCN) devised six standardised PA categories of decreasing legal restrictions according to their managerial objectives in use worldwide (Dudley 2008). As a result of those limitations, the wellbeing of some stakeholders that live, work or use those areas may be affected (Franks and Small 2016).

Currently, 14.7% of the land surface in the World is covered by PAs (Bhola et al. 2016). The Convention on Biological Diversity (CBD) set the target to reach 17.0% of terrestrial and freshwater ecosystems under protection by the year 2020 (CBD 2010). This implies that approximately 3 million more square kilometres will need to be effectively conserved by 2020, with important consequences for land and freshwater users. Thus, it is important to identify which stakeholders are most affected by PA designation, and how, in order to maximise gains and mitigate losses, so human wellbeing, social support for PAs, and nature conservation can be enhanced (Calvet-Mir et al. 2015; Blicharska et al. 2016).

All stakeholders are not affected equally by PAs, nor do all types of PAs affect stakeholders equally (Holmes and Cavanagh 2016; Oldekop et al. 2016). Stringent PA regulations forbidding or restricting most human activities are likely to be more effective at conserving biodiversity (Pallares-Blanch 2012; Rodríguez-Rodríguez and Martínez-Vega 2018) but also likely to have more impact on the local socioeconomy than more lenient, multiple-use

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regulations. Moreover, distinct stakeholders are likely to have different perceptions on the effects of PAs depending on the scale of the assessment, with local stakeholders tending to be more affected by PA regulations (Jentoft et al. 2012; Bennett and Dearden 2014).

Theoretical background

Assessing the socioeconomic impacts of PAs has been a long-lasting research topic that could be traced back to the late 1980s with the *sustainable development* concept, which accounts for environmental, social and economic issues (UN 1987). In the mid-2000s, the Programme of Work on Protected Areas recognised the essential role of PAs at conserving biodiversity and called Parties to the Convention on Biological Diversity to: “Assess the economic and socio-cultural costs, benefits and impacts arising from the establishment and maintenance of protected areas, particularly for indigenous and local communities, and adjust policies to avoid and mitigate negative impacts, and where appropriate compensate costs and equitably share benefits in accordance with the national legislation” (CBD 2004). Following this, the CBD called on Parties to ensure that PAs contribute to poverty eradication and sustainable development (CBD 2008). More recently, the CBD further insisted that, by 2020, valuable ecosystems contributing to human wellbeing are safeguarded considering the needs of local communities and other stakeholders (Aichi Target 14) through equitable PA management (Aichi Target 11) and ensuring fair benefit sharing from biodiversity (Aichi Target 16; CBD 2010). Currently, a number of studies and methods have assessed the social impact of conservation actions, although many had different objectives and used different methods and assumptions, thus providing little consistent evidence on the socioeconomic effects of PAs (Schreckenberg et al. 2010). Thus, the CBD’s mandate remains unfulfilled and the socioeconomic effects of PAs are still largely unknown globally (Bhola et al. 2016) and at the European scale, where environmental and social effectiveness indicator systems are scarce and urgently needed (Blicharska et al. 2016). Some methodologically detailed initiatives such as the Integrated Marine-Protected Area Socioeconomic Monitoring and Assessment Framework (Rodríguez-Rodríguez et al. 2015a) or the Social Assessment of Protected Areas (Franks and Small 2016) have been recently developed to help to fill that gap. However, uncertainty remains on the socioeconomic impacts of different legal frameworks of PAs.

The Spanish case: The need for sustainable development

Between 2008 and 2014, Spain went through a deep economic crisis deriving from a long-lasting unsustainable

economic growth model based on mass construction and tourism that resulted in broad land-use changes with serious implications for the environment and society (Montes et al. 2011; Jiménez 2012). Unemployment reached 27% of the active population in the first quarter of 2013 (INE 2018), with severe effects for societal wellbeing through widespread poverty, evictions, emigration, social exclusion and decreasing salaries which, in addition to reduced public services and state support, worsened living conditions for most (Jiménez 2012; ADGSS 2017). Thus, it is paramount to explore more sustainable ways of development for a country with vast natural and cultural resources. Spain is a highly biodiverse country (Médail and Quézel 1999) with dozens of PA legal categories covering 27.3% of its land and freshwater area (Múgica et al. 2016), one of the broadest national terrestrial PA coverages in the world (UNEP and IUCN 2018). By the end of 2016, there were 1865 Natura 2000 Sites and 1958 nationally designated PAs, including 15 National Parks, 151 Nature Parks and 290 Nature Reserves (Múgica et al., 2016). Designation and management of PAs in Spain lies in the responsibility of the 17 Autonomous Regions with the central government just retaining minimal coordination competencies over the National Park Network across the country. Apart from the large amount of territory under biodiversity protection regulations, Spain has 46 sites included in the UNESCO World Heritage List, being the third country in the world with more such sites (Spanish Government 2018; UNESCO 2018).

Objectives

In this study, we made an unprecedented effort to survey 197 organisations across all socioeconomic sectors and sub-sectors to get their institutional stances on PA designation effects in Spain. Using a semi-structured questionnaire and an online survey application, organisations’ representatives were asked about their institutional stances on (1) PAs’ effects on territorial sustainability; (2) PAs’ effects on their organisations and (3) PAs’ effects on the local municipalities where they are designated. Two types of PAs were inquired about, depending on their legal stringency (and thus, their foreseeable impact on local socioeconomy): PAs of medium level of protection (e.g. Natura 2000 sites) and PAs of high level of protection (e.g. National Parks). The study also identifies the stakeholders (organisations, sub-sectors and sectors, by spatial scale) most affected by PA designation, and the social and economic variables that are perceived to vary most in intensity locally after the designation of PAs. Resulting from this selection of socially relevant variables, a PA socioeconomic indicator assessment system is proposed. Additionally, response consistency across spatial scales,

socioeconomic sub-sectors and respondent organisations was analysed for methodological improvements. Results will assist not only scientists but also territorial planners, PA managers and decision-makers to make more informed and equitable decisions for enhanced sustainable development in the country.

MATERIALS AND METHODS

Data collection

A reduced but comprehensive number of social ($n = 17$) and economic ($n = 11$) variables that influence living conditions was derived after an initial, non-exhaustive literature review (Appendix S1). They were classified in social or economic categories according to the Statistic Yearbook of Spain (INE 2016). The items represented by those variables define basic social and economic conditions for human wellbeing at national and international scales (INE 2016; EUROSTAT 2018; World Bank 2018) and are also policy-relevant (EEC 1992; CBD 2010). An attempt was made to show a balanced representation of effects of PAs on local communities. Thus, variables were classified from an *a priori*, subjective perspective in *negative* and *positive* variables to local social or economic sustainability. Using the literature reviewed and our experience as a starting point, we also identified a comprehensive number of socioeconomic sectors and sub-sectors that may be affected by PA designation in Spain. The number of socioeconomic sub-sectors was maximised as much as possible in order to depict a comprehensive representation of the socioeconomic effects from PA designation in Spain. In order to reduce reported biases towards positive or negative effects of PAs (Schreckenberget al. 2010) and provide a balanced picture of the perceived effects of PAs by the Spanish society, sub-sectors were preliminarily classified as ‘positively affected’ (48%), ‘negatively affected’ (48%) and ‘uncertainly affected’ (4%) by PAs (Appendix S2). Ecological farming and stockbreeding organisations of the primary sector were identified for additional analysis given their likely different perceptions on the topic (Štraus et al. 2011).

We then identified relevant organisations belonging to those sub-sectors. At national and regional scales, we used criterion sampling whereby a maximum of five of the most representative meta-organisations per sub-sector and scale were identified (e.g. associations, federations or ministries). Organisations were selected on the basis of our previous knowledge and purposive online search. At local scale, a preliminary GIS analysis was performed to select a recently designated, non-overlapping PA where effects could be more easily perceived and validly detected: the

Special Area of Conservation of Sierra de Cabrera-Bedar, in the south-easternmost part of the Almeria province (Andalusia region). This area is a multiple-use, Natura 2000 site and was thus classified within PAs of medium level of protection. Among the seven municipalities in the PA, we selected those with at least 66% of their territories inside the PA, as they are the ones most likely affected by its designation: Bedar (71.4% of its territory in the PA) and Turre (78% of its territory in the PA). Two online business repositories were used to quota sample a maximum of three organisations per municipality and sub-sector: Universia (2016) and Expansión (2016). Those business-type stakeholders were complemented with sub-sector-purposive online search to identify non-commercial organisations (e.g. environmental NGOs; local councils). Local primary sector organisations were not included in either repository and could not be found from our subsequent purposive search. The whole set of socioeconomic sectors, sub-sectors and organisations identified by scale can be consulted in Appendix S3. Working definitions for each key concept used in the study can be found in Appendix S4.

Each of those organisations was contacted by phone and asked to participate providing the stances of their respective organisations, in order to maximise representation (Dillman et al. 2015). A semi-structured, online questionnaire was created using Survey Monkey software. The survey was piloted prior to its administration, amended accordingly and administered between the 5th of June and the 5th of July of 2017. A link to the questionnaire was emailed to the respondents who agreed to fill it in. The initial sample included 119 national organisations, 65 regional organisations and 13 local organisations. Two reminders were sent to non-respondents. Thirty-nine responses were obtained at national scale, twenty-three responses were compiled at regional scale and six responses were collected at local scale. The median time to complete the survey was 18 min at national scale, 26 min at regional scale and 16 min at local scale.

The questions and definitions in the survey remained the same at the three scales (Appendix S5). The only changes referred to the scale-related introductions to some questions. Organisations were queried about their institutional stance on three main items: (1) PAs’ general effects (environmental, social and economic); (2) the effects of PAs on their organisations and (3) the intensity of PA effects on the socioeconomy of the municipalities where they are designated. For this last item, PAs were divided into PAs of high level of (legal) protection, and PAs of medium level of protection. PAs of high level of protection were descriptively assimilated to IUCN’s Management Categories I–III (Dudley 2008), whereas PAs of medium level of protection corresponded to Categories IV–VI, as differentiated previously (Nagendra 2008).

Fig. 1 Conceptual outline of the study

Response options were also the same across scales, the only difference being that local stakeholders were not asked to assess the local effects of PAs of high level of protection, as they were only asked about Sierra de Cabrera-Bedar Natura 2000 Site (Fig. 1).

Data analysis

Closed-ended responses on the perceived general and organisational effects of PAs were numerically coded for statistical analysis according to the following ordinal scale: ‘very negative effect’ = -2; ‘negative effect’ = -1; ‘No effect’ = 0; ‘positive effect’ = 1 and ‘very positive effect’ = 2. The intensity of PA effects on local socioeconomy was also coded on an ordinal scale for mean comparison: ‘large decrease’ = -2; ‘slight decrease’ = -1; ‘No effect’ = 0; ‘slight increase’ = 1; ‘large increase’ = 2. For communication purposes, the range of continuous mean values of the perceived intensity of PA effects was split into equal intervals using quartiles: 0 – ± 0.50 (no effect: 0 – ± 3% increase/decrease of the variable’s baseline value); ± 0.51 – ± 1 (slight effect: ± 3–± 6% perceived increase/decrease); ± 1.01–± 1.50 (moderate effect: ± 6–± 10% perceived increase/decrease) and ± 1.51–± 2 (large effect: > ± 10% perceived increase/decrease). Indicators for which moderate or large effects of PAs were averagely perceived by stakeholders at any scale of assessment or protection level were selected for creating a socially relevant local PA socioeconomic assessment system.

Differences in the organisational perception of the social and economic effects of PAs of medium and high levels of protection were analysed at national and regional scales via paired *T* tests after checking the normality of the differences between both levels of the factor ‘protection’. It was assumed that the same organisation’s representative responded to the entire survey. Differences in the organisational stances on the local social and economic effects of PAs at different spatial scales were assessed via ANOVA tests or Kruskal–Wallis tests, according to the normality and homoscedasticity of variables. Significance level for all tests was set at 0.05. Open responses were codified in a number of limited options. In cases when the same respondent gave different reasons for their responses, they were considered individually and summarised according to the number of mentions each codified response had among all respondents. In order to analyse the time taken to complete the survey, only responses that were completed on the same day of being started were considered.

For analysing perceived general effects of PAs, effects on organisations and local effects, when more than one complete response was obtained by the same organisation for a given scale, the response that took the longest to be answered was retained, assuming that a more careful reply to the questions was given. For analysing response consistency, all duplicated responses were used to test internal organisational response consistency. In order to avoid comparing responses by the same person, we made sure

that each of those organisationally duplicated responses had been made from a different I.P. address.

Three analytical dimensions were used to analyse the response consistency on the perceived intensity of PAs of high level of protection on local socioeconomy: (1) within sub-sectors (same scale: national; different organisations), for the following sub-sectors of similar foreseen response to the topic: research, environmental NGOs, mining and hunting; (2) between spatial scales (same organisation; different scale: national vs regional), for the following organisations: COAG (farming organisation) and SEO-Birdlife (environmental NGO) and (3) within organisations (same organisation; same scale: national or regional; different respondent), for the following organisations: RADA (legal representatives; national scale), AAMA (rangers; regional scale) and Ecologistas en Acción-Andalucía (environmental NGO; regional scale). The original responses were codified on an ordinal, increasingly positive scale: ‘very negative effect’ = 1; ‘negative effect’ = 2; ‘No effect’ = 3; ‘positive effect’ = 4 and ‘very positive effect’ = 5. To test for differences in response consistency, we used Kruskal–Wallis tests after checking the non-normality of the original and log10-transformed variables, for a significance level of 0.05. All the statistical analyses were done using SPSS v.23 and Microsoft Excel.

RESULTS

Sample characterisation

The sample of selected organisations was balanced according to their foreseen preliminary stances on PAs

(with a slightly greater initial selection of ‘positive’ organisations) and economic sectors, although local scale primary and quaternary sector organisations were absent. On the contrary, there was a stark difference in the size of organisations between national and regional scales, on one side, and local scale, on the other (Table 1).

General effects of PAs

The organisational perception of the sustainability of PAs was ‘globally’ positive at national and regional scales but slightly negative at local scale. At all scales, the environmental dimension was the best rated, followed by the social and the economic dimensions, respectively (Table 2). The perception of the sustainability of PAs was the greatest by the quaternary sector and the lowest by the primary sector. The main stated reasons in favour of PAs by national, regional and local organisations were that PAs enhance economic development and nature conservation, respectively. Restrictions to socioeconomic activities and insufficient local engagement were stated as PAs’ main drawbacks.

Effects of PAs on organisations

On average, at national scale all economic sectors except the primary sector perceived to be positively affected by PAs. The most positively affected sector was ‘Miscellaneous’, chiefly represented by environmental NGOs. At regional scale, all sectors stated to be positively affected by PAs. Only the quaternary sector, represented by journalists, perceived not to be affected by PAs. At local scale, both the secondary sector and the ‘Miscellaneous’ sector reported

Table 1 Main characteristics of responding organisations

Main characteristics	National organisation (n)	Regional organisation (n)	Local organisation (n)	N (%)
Median membership (number of members)		> 250	> 250	1–9
Preliminary stance on PAs				
Positive	19	13	4	36 (52.9%)
Neutral	3	1	0	4 (5.9%)
Negative	17	9	2	28 (41.2%)
N (%)	39	23	6	68 (100%)
Sector				
Primary	8	4	0	12 (17.6%)
Secondary	4	3	2	9 (13.2%)
Tertiary	16	4	1	21 (30.9%)
Quaternary	6	1	0	7 (10.3%)
Public	3	6	2	11 (16.2%)
Miscellaneous	2	5	1	8 (11.8%)
n (%)	39 (57.4%)	23 (33.8%)	6 (8.8%)	68 (100%)

Table 2 Organisational perception of the environmental, social and economic effects of protected areas in Spain by spatial scale and economic sector (on a − 2 to +2 scale)

Mean perceived effect	Scale	Sector							
		Prim	Eco-Prim	Sec	Tert	Quat	Publ	Misc	All
Environmental	Nat	0.88	2.00	1.50	1.56	1.83	2.00	2.00	1.51
	Reg	0.75	1.00	1.33	1.25	2.00	1.67	1.60	1.39
	Loc			0.00	− 1.00		1.00	2.00	0.50
Social	Nat	0.13	0.50	1.25	0.81	1.50	2.00	2.00	0.97
	Reg	0.50	0.00	1.00	1.00	2.00	1.17	1.00	1.00
	Loc			− 1.50	− 1.00		0.00	2.00	− 0.33
Economic	Nat	0.13	0.50	0.50	0.56	1.33	1.67	2.00	0.74
	Reg	0.50	0.00	0.33	0.25	2.00	0.83	0.60	0.61
	Loc			− 1.50	− 2.00		0.50	2.00	− 0.33
Global (sustainability)	Nat	0.38	1.00	1.08	0.98	1.56	1.89	2.00	1.08
	Reg	0.58	0.33	0.89	0.83	2.00	1.22	1.07	1.00
	Loc			− 1.00	− 1.33		0.50	2.00	− 0.06

Nat National, *Reg* Regional, *Loc* Local, *Prim* Primary, *Eco-P* Eco-Primary, *Sec* Secondary, *Tert* Tertiary, *Quat* Quaternary, *Publ* Public, *Misc* Miscellaneous

Table 3 Perception of the effects of protected areas on Spanish organisations by sector and scale, and main stated reason

Sector	National scale		Regional scale		Local scale		<i>n</i>
	Mean perceived effect on own organisation	Main stated reason	Mean perceived effect on own organisation	Main stated reason	Mean perceived effect on own organisation	Main stated reason	
Primary	− 0.13	Restrictions to socioeconomic activities	0.75	Increased bureaucratic work			12
Eco-Primary	1.50	Greater environmental awareness	1.00	Positive. if there are incentives to eco-friendly businesses			3
Secondary	0.25	Restrictions to economic activities	0.67	It clarifies limitations to activities	0.00	No effect	9
Tertiary	0.25	PAs do not affect their activity directly	0.50	It increases economic activity	− 2.00		21
Quaternary	0.83	It increases research	0.00			Journalists are not sufficiently considered in PAs	7
Public	1.67	PAs contribute substantially to nature conservation	0.83	Socioeconomic development	1.00	Economic development; Little effect on daily tasks	11
Miscellaneous	2.00	PAs are one of their goals	1.20	PAs are one of their goals	0.00		8
All	0.46	Restrictions to socioeconomic activities	0.78	Socioeconomic development	0.00	No effect	68

not to be affected by PAs. The construction company was perceived to be negatively affected, whereas the cheese manufacturer business was perceived to be positively

affected. The organisations that provided some reasoning for that perception stated little or no effect of PAs on their activities (Table 3).

Table 4 Mean perceived change in the value of social and economic indicators at local scale as a result of protected area designation (on a + 2 to – 2 point scale)

	National scale		Regional scale		Local scale
	PAs of MLP	PAs of HLP	PAs of MLP	PAs of HLP	PAs of MLP ^a
Social indicator					
Vulnerability of local populations to natural disasters	– 0.42	– 0.50	– 0.60	– 0.50	– 0.17
Residents' age	0.00	– 0.06	0.15	0.20	0.17
Number of local health infrastructures	0.03	– 0.03	0.11	– 0.05	– 0.50
Number of local security and justice infrastructures	0.08	– 0.03	0.05	0.00	– 0.50
Number of local education infrastructures	0.18	0.10	0.33	0.17	– 0.33
Number of residents	0.18	– 0.11	0.14	– 0.48	– 0.33
Educational degree of residents	0.19	0.25	0.24	0.10	– 0.17
Local traditions	0.22	0.24	0.52	0.48	0.33
Local cultural, recreational and sport offer	0.32	0.51	0.89	0.79	0.33
Health of residents	0.46	0.53	0.89	0.94	– 0.33
Number of local (non-commercial) associations	0.53	0.67	0.95	0.91	0.50
Residents' participation in local environmental decisions	0.59	0.56	0.85	0.90	0.33
Number of regulation breaches & sanctions	0.89	1.22	1.14	1.27	– 0.17
Restrictions to local property rights	1.03	1.58	1.24	1.48	0.50
Residents' environmental awareness	1.05	1.30	1.14	1.36	0.50
Scientific and/or technical research activities in/on the site	1.06	1.43	1.18	1.64	0.25
Economic indicator					
Residential construction	– 0.26	– 0.43	– 0.74	– 1.26	– 1.20
Number of local transport infrastructures	0.03	– 0.03	– 0.09	– 0.36	– 0.50
Number of local technological infrastructures	0.11	0.29	0.05	– 0.10	0.33
Local taxes	0.26	0.39	0.50	0.43	0.33
Residents' income	0.29	0.46	0.52	0.45	– 0.40
Number of local enterprises and businesses	0.44	0.84	0.59	0.53	– 0.50
Local quality of life	0.46	0.74	1.00	1.14	– 0.33
Local employment	0.53	0.67	0.47	0.55	– 0.20
Local council's budget	0.54	0.94	0.95	1.00	– 0.60
Price of local products and services	0.64	0.86	0.65	0.80	0.00
Local bureaucracy	0.71	1.00	1.05	1.19	0.17
Local tourist activity	1.13	1.54	1.50	1.29	0.20

Note PAs of MLP: protected areas of medium level of protection; PAs of HLP: protected areas of high level of protection

^a Sierra de Cabrera-Bedar Special Area of Conservation

Effects of PAs on local communities

Mean perceived change of social and economic indicators

Table 4 shows the average valuation of the intensity and direction of change of social and economic indicators in the municipalities where PAs are designated at the three surveyed scales. Eight socioeconomic variables were perceived to vary the most for both protection levels of PA designation at most scales: 'residents' environmental awareness' (social), 'restrictions to local property rights' (social), 'number of regulation breaches & sanctions' (social), 'scientific and technical research activities in/on the

site' (social), 'local bureaucracy' (economic), 'local quality of life' (economic), 'local tourist activity' (economic) and 'residential construction' (economic).

Perceived change in local socioeconomic conditions across protection levels

National organisations did not perceive statistically significant changes in local social conditions after designating PAs of high vs medium levels of protection. However, national organisations did perceive significantly greater change in local economic effects for highly protected PAs than for PAs of medium level of protection: 0.59 ± 0.54 vs

0.40 ± 0.38 ($t_{(10)} = 3.42$; $p = 0.007$). For regional stakeholders, there were no statistically significant differences in the mean perceived change of local social or economic conditions between PAs of high and medium levels of protection.

Effect of scale on stakeholder perception

Local organisations perceived significantly lower social and economic effects of designating PAs of medium level of protection on affected municipalities compared to national organisations ($\chi^2_{(1)} = 5.58$; $p = 0.018$) or regional organisations ($\chi^2_{(1)} = 8.81$; $p = 0.003$). There were no statistically significant differences in organisational perception of the change of local social or economic conditions from designating PAs of high level of protection between national and regional stakeholders.

Response consistency

Within socioeconomic sub-sectors

There were statistically significant differences in the valuation of the socioeconomic effects of PAs of high level of protection within three of the four analysed sub-sectors, except for *research*, where responses across organisations showed consistency: *Environmental NGOs* ($\chi^2_{(1)} = 4.59$; $p = 0.03$); *Mining* ($\chi^2_{(1)} = 6.34$; $p = 0.01$) and *Hunting* ($\chi^2_{(1)} = 8.05$; $p = 0.01$).

Between spatial scales

There were statistically significant differences in the valuation of the socioeconomic effects of PAs of high level of protection between spatial scales for certain organisations. Regional COAG (farming organisation; $\chi^2_{(1)} = 4.47$; $p = 0.03$) stated greater perceived effect than its national representative. However, there were no statistically significant differences for SEO-Birdlife (environmental NGO).

Within organisations

There were no statistically significant differences in the valuation of the socioeconomic effect of PAs of high level of protection on local communities within organisations.

DISCUSSION

Perceived general effects of Spanish PAs

The perceived general effects of the designation of Spanish PAs by Spanish organisations were positive on average.

However, differences are apparent among territorial scales and sustainability dimensions. Firstly, there was a general gradient in the perceived sustainability of PAs across all scales: environmental sustainability > social sustainability > economic sustainability. Such gradient has been shown chiefly for local stakeholders at European scale (Blicharska et al. 2016) and also for national organisations in north-European marine environments (Rodríguez-Rodríguez et al. 2015b), which suggests a socially consistent perception pattern on the sustainability of (M)PAs, at least in Western Europe.

Local stakeholders were the most critical towards the general effects of PAs even though when they were only asked about a multiple-use, leniently regulated Natura 2000 Site and in absence of primary sector organisations. Some authors suggest overemphasis on local drivers of environmental degradation by territorial planners, managers and decision-makers which may result in unnecessarily harsh restrictions to local activities and inequitable compensation to the most sensitive groups (Palmer et al. 2015; Suding et al. 2015). Additionally, insufficient and/or poor quality local involvement in PA planning and management processes has led to feelings of marginalisation across Europe (Ferranti et al. 2014; Blicharska et al. 2016), and in Spain (Rodríguez-Rodríguez et al. 2017). Genuine, representative local stakeholder engagement in PA designation proposals results in effective outcomes and broad acceptability (Tomićević et al. 2010; Perez de Oliveira 2013). Thus, responsible authorities should make suitable effort to adequately engage the most critical local stakeholders in PA initiatives in order to facilitate implementation and enhance socioeconomic outcomes (Oldekop et al. 2016).

Perceived effects of PAs on socioeconomic sectors and sub-sectors

Two clearly differentiated opinion groups were apparent. On the one hand, public institutions (governance, PA managers and surveillance), the quaternary sector (essentially research centres) and the miscellaneous sector (predominantly the environmental NGO sub-sector) generally had a positive stance towards PA contribution to socioeconomic and nature conservation outcomes, as shown previously (Rodríguez-Rodríguez et al., 2015b). In contrast to the study by Rodríguez-Rodríguez et al. (2015b), here the hospitality sub-sector stated consistently positive effects from PA designation across scales. This aligns with previous claims that accommodation makes one of the largest expenditure categories for travellers to PAs (Eagles et al. 2002). Apart from accommodation businesses, catering activities have also been mentioned as benefiting most from visitors to PAs (Alló et al. 2010).

On the other hand, some sectors and sub-sectors perceived that PAs had a negative effect on their activities. The primary sector mostly perceived to be negatively affected at national scale due to restrictions to socioeconomic activities, but perceived to be positively affected at regional scale. Sub-sectors from the primary and secondary sectors as well as landowners greatly depend on natural resource use. Thus, they are among the most negatively affected sub-sectors by PA regulations (Alló et al. 2010; Kati et al. 2015; Blicharska et al. 2016), especially in long-used European cultural landscapes (Järv et al. 2016; López and Pardo 2018). In turn, ecological farming organisations consistently perceived to be positively affected by PAs across scales, probably as a result of their competitive advantage given by PA regulations over less nature-friendly farming practices (Basha et al. 2015) and the suggested greater environmental awareness of local populations near PAs (Štraus et al. 2011). Farmers, environmental managing agencies and landowners were considered the most influential stakeholder groups on farmland biodiversity issues at regional and local scales in other European settings (Hauck et al. 2016), which suggests that their consideration in land management issues in Europe is paramount.

It is noteworthy that some sub-sectors of the secondary sector, such as construction or mining, that are often the primary targets of PA regulations (Spanish Government 2007, 2014; Järv et al. 2016) due to their serious impacts on biodiversity (Forman and Alexander 1998; McKinney 2002; Brooks et al. 2014) mostly did not perceive to be affected by PAs in Spain at regional and local scales, and even stated positive effects of PAs on their organisations at national scale. Recent studies have shown that land development processes, to which both sub-sectors largely contribute, were generally lower in Spanish PAs than in surrounding areas (Martínez-Fernández et al. 2015), whichever their levels of protection (Rodríguez-Rodríguez and Martínez-Vega 2018). In contrast to results in other European countries where MPAs were considered as impediments to resource extraction (Rodríguez-Rodríguez et al. 2015b), construction and mining organisations in Spain seem to have assimilated the actual impact that PA regulations have on their activities and adopted (or at least, state) a pragmatic approach to existing status quo.

In turn, some sub-sectors of the primary sector (hunting), and tertiary sector (recreation) felt generally negatively affected by PAs in Spain at different scales. Organisations pertaining to both sub-sectors stated restrictions to their activities by PA regulations as their main effect. In a review on management effectiveness of European PAs, Nolte et al. (2010) identified recreational activities as the major threat to those areas. Thus, evidence points to the need of regulating organised or spontaneous

recreational activities in European PAs to limit their impact on natural and cultural heritage (Blicharska et al. 2016). The mainstream recreation sub-sector seems largely unaware of, or unable to benefit from, the alleged new opportunities generated by new regulatory frameworks and the benefits to their activities from increased tourism in PAs (Phillips 1998; Christiansen and Conner 1999; Alló et al. 2010).

Our results are coherent with a recent study that also showed that national organisations from the primary sector (fishers), secondary sector (the aggregate industry) and tertiary sector (recreation) perceived to be negatively affected by MPA designation in northern Europe (Rodríguez-Rodríguez et al. 2015b). In that study, organisations in the quaternary (research), public (governance and MPA managers) and miscellaneous sectors (environmental NGOs) also perceived to experience a positive effect from MPAs.

Perceived effect of PAs on local socioeconomic conditions

Half of the variables that were perceived to vary most by Spanish terrestrial stakeholders coincided with those that were perceived to vary most in intensity by marine stakeholders in the UK and France: ‘residents’ environmental awareness’, ‘number of regulation breaches & sanctions’, ‘scientific and technical research activities in/on the site’ and ‘local tourist activity’ (Rodríguez-Rodríguez et al. 2015b), which suggests a common pattern of socially perceived local effects of PAs regardless of their major environment. Other variables perceived to vary most in intensity have also been mentioned in the European literature on PA designation constraints: ‘local bureaucracy’ (Järv et al. 2016; Blicharska et al. 2016), ‘restrictions to local property rights’ (Rekola et al. 2000), ‘residential construction’, and benefits: ‘local quality of life’ (Järv et al. 2016). In other parts of the world, and using a carefully designed research framework, Andam et al. (2010) found that PAs in some tropical countries resulted in alleviating poverty in surrounding communities when compared to suitable control communities.

Interestingly, local employment was not considered to vary much as a result of PA designation in Spain. In contrast to common claims (Kettunen and ten Brink 2013), Spanish PAs are not perceived to provide a strong-enough alternative to the usual employment-creating sectors for local development despite the intensity of the recent economic crisis in the country and the need to diversify its economy (Jiménez 2012; INE 2016; ADGSS 2017). Further studies should confirm such perceptions.

A highly participative local socioeconomic assessment system of PAs was devised. Although perceived intensity

of effects does not equal organisational importance, which should have been studied separately (Rodríguez-Rodríguez et al. 2015b), five of the eight socioeconomic variables perceived to vary most by Spanish stakeholders were included under priority indicators for marine stakeholders in the UK and France (Rodríguez-Rodríguez et al. 2015b). This suggests that a broadly applicable, socially relevant and efficient Local Socioeconomic Assessment System of PAs could be developed based on the aforementioned eight indicators. That system would help to fill the gap in social effectiveness research in European PAs (Blicharska et al. 2016).

Perceived effects of PAs across protection levels

National organisations tended to report a greater effect to PAs of high level of protection compared to PAs of medium level of protection, whereas regional stakeholders did not perceive such difference in local impacts. The small size of and discontinuous management activities in many nature reserves in Andalusia, and the fact that, as of January 2019, only two national parks exist in the region: Doñana National Park and Sierra Nevada National Park, might have made most regional stakeholders identify regional PAs with multiple-use PAs, that are likely to generate less intense ecological (Oldekop et al. 2016) and socioeconomic effects (Holmes and Cavanagh 2016).

Perceived effects of PAs across spatial scales

Spatial scale was shown to influence the perception on the change of local socioeconomic conditions from PA designation in Spain. The surveyed local organisations reported more negative effects from PA designation than the regional or national organisations, even when asked about a multiple-use, leniently regulated Natura 2000 site, and despite lack of generally averse primary sector organisations in the local stakeholder sample. Different authors have similarly pointed to the reluctance of local stakeholders to implementing multiple-use PAs across Europe (Kati et al. 2015; Blicharska et al. 2016), even if their views may not match existing socioeconomic statistics (Rodríguez-Rodríguez and López 2018). Our results also align with those by Ferraro (2002), who suggests an uneven distribution of costs and benefits from establishing PAs in Madagascar across spatial scales, with most opportunity costs borne by local residents but most benefits in terms of tangible (e.g. tourism) and intangible (ecosystem services) assets being generated at other scales (regional and national). In developing regions of the world, local dwellers and PA users tend to identify PAs with restrictions to natural resource use and harsher living conditions (Ferraro et al. 2011; Kelboro and Stellmacher 2015). In

Spain, the central national park administration provides subsidies to compensate local populations for opportunity costs from the designation of those highly protected PAs (Spanish Government 2014). However, to our knowledge, there is no such consistent economic compensation applied to any other PA category in the country.

Response consistency

Organisations in the same sub-sectors generally provided different valuations of the socioeconomic effects of PAs on local communities even if the assessed sub-sectors might be thought to have a similar view on the topic, such as environmental NGOs. Thus, surveyed organisations' responses on the topic are little representative of those of the same sub-sector, resulting in undue generalisations. These results are consistent with previous studies in other settings which suggested (Calvet-Mir et al. 2015) and showed (Rodríguez-Rodríguez et al. 2015b) that organisation classification in categories is often more a conceptual artefact than an empirical reality. In contrast to the study by Rodríguez-Rodríguez et al. (2015b) in which scientific organisations rated the importance of socioeconomic indicators for MPAs differently, here Spanish research organisations showed a consistent perception of the effects of PAs on local socioeconomy. The fact that scientific organisations in the study by Rodríguez-Rodríguez et al. (2015b) were from different countries may have increased response divergence.

Response consistency by the same organisation across scales was organisation-specific, which suggests that it should not be taken for granted. By contrast, respondents of the same organisation and spatial scale showed consistency, which suggests non-substantial inter-personal bias indicative that the use of organisations is a valid unit of analysis in perceptual studies related to local socioeconomic effects of PAs in Spain.

Methodological considerations

The non-random selection of the organisations participating in the survey means that generalisations from our findings should not be made and, when they are, they should be made with caution. Though the survey's sample included a wide selection of meta-organisations that were supposedly representative of their sub-sectors (e.g., associations), a larger sample would have been needed to enhance societal representation.

Some non-responses to the survey were noteworthy, especially among local stakeholders who are most likely experiencing the limitations and opportunities of PAs (Coad et al. 2008; Blicharska et al. 2016). For instance, the a priori highly affected local primary sector was absent

from this analysis. This resulted from the inexistence of primary sector organisations in the consulted online local business repositories. Also, even though a broad spectrum of major political organisations was invited to participate in the survey ($n = 5$, at national and regional scales), only one political response by a regional green party was obtained, suggesting low political interest in the topic (Kati et al. 2015; Rodríguez-Rodríguez et al. 2015c).

Finally, sector and sub-sector-result comparison across scales should be made with much caution, as different types and numbers of organisations and even sectors completed the survey at different scales.

CONCLUSION

Broad positive perception of PA designation in Spain is inferred from our results, even though the non-random selection of our sampled organisations induces that generalisations from our findings should be made with caution. The fact that most PAs in Spain are multiple-use rather than highly restrictive ‘reserves’ may have resulted in better societal perception. There was general perception of the positive effects of such public policy, especially regarding its environmental effects. However, the social and, chiefly, economic benefits of PAs were more contested, mostly at local scale and among tertiary, secondary and primary sector organisations, as found elsewhere (Kettunen and ten Brink 2013; Heagney et al. 2015). Proper engagement of those stakeholders should be the primary target of responsible authorities to smooth PA implementation processes and make them not only environmentally sustainable, but also socially and economically sustainable (Oldekop et al. 2016).

A number of local socioeconomic indicators that were perceived to vary most after the designation of PAs in Spain would allow for a socially relevant PA socioeconomic assessment system, still largely lacking in the country. That system would be useful to comprehensively assess the sustainability of such territorially broad and socially impacting public policy as well as to track progress towards national targets (Spanish Government 2007, 2014) and international commitments (EEC 1992; CBD 2010).

Proper representation of organisational stances on PAs’ effects within sub-sectors, sectors or at different spatial scales is unlikely in Spain and elsewhere (Rodríguez-Rodríguez et al. 2015b) given incomplete or absent organisation censuses and response inconsistency, and should be adequately accounted for when selecting survey samples and interpreting results in similar perceptual studies. We hope that these results may help to steer current territorial development towards greater sustainability

in a time when recent unsustainable dynamics seem to reappear in Spain.

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