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Manuscript Details

Improving social impact assessment of Protected Areas: A review of the literature and directions for future research

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Abstract

Protected areas are the most widely applied policy tool for biodiversity conservation. However, effective management of protected areas is often obstructed by conflicts mainly associated with the social impacts imposed on local communities and other users by their establishment. Despite the importance of these social impacts they remain significantly under-researched. There is now an increasing need to incorporate social impacts in decision making processes by providing accurate estimations and develop ways to forecast their change in the future. Considering the increase of studies identifying this need, the present paper aims to indicate three main directions that will assist in designing effective tools for measuring and most importantly understanding social impacts: a) perceptions on social impacts of individuals who are directly affected by protected areas need to be incorporated in management evaluation techniques in a meaningful and accurate way and be combined with objective measurements of impact; b) understanding the factors determining the actual and perceived levels of social impacts is a key step for the design of effective management frameworks of protected areas and c) social impacts should not be seen as static concepts but should be seen as a dynamic and long-term factor which needs to be incorporated in decision-making processes.

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Keywords protected areas; biodiversity; social capital; place attachment; social impacts

Improving social impact assessment of Protected Areas: A review of the literature and directions for future research

1. Introduction

Protected areas are of growing importance internationally due to the urgency in meeting biodiversity conservation targets and also because of their role in adaptation and mitigation of climate change impacts (Dudley et al., 2010; IUCN, 2012; Soares-Filho et al., 2010). In this context, the need to create new, and re-strengthen existing, legislative frameworks concerning Protected Areas (PAs) will become essential in the near future, both by the establishment of new PAs or through reconsideration of the boundaries of existing ones.

PAs are established in order to meet two main targets: to conserve biodiversity but also to provide society with ecosystem services, such as protection from flooding and food production (Dudley, 2008), as well as cultural ecosystem services through tourism and recreation (Church et al., 2014). In the present paper we aim to discuss social impacts assessment of PAs as this type of impacts are a major factor influencing social acceptability for conservation initiatives. Several factors have been identified explaining the reasons behind social acceptability and compliance with PA regulations (Adams et al., 2011; Gall & Rodwell, 2016). The social impacts of some types of protected areas are a key topic in this discourse (Andrade & Rhodes, 2012; Bennett & Dearden, 2014; de Lange et al., 2016; Gall & Rodwell, 2016; Voyer et al., 2012) as they represent the costs and benefits following the designation of a PA (Charles & Wilson, 2009; Lowry et al., 2009; West et al., 2006). Apart from their physical composition, the effectiveness of PAs will depend on the willingness of communities (affected by their establishment) to comply with any new regulations imposed and their social impacts.

In our analysis we will focus on PAs where humans are significantly influenced by their establishment. In order to further explain this we need to briefly describe the main categories of PAs internationally. According to IUCN there are 6 main types: (Ia) *Strict Nature Reserves* which is the most restrictive type of PA regarding human activities; (Ib) *Wilderness Areas* where there are significant restrictions for humans but there has been also traditionally a limited impact by humans in the area; (II) *National Parks* which are usually large areas established in order to ‘*protect natural biodiversity along with its underlying ecological structure and supporting environmental processes, and to promote education and recreation*’. This type of PA will often have zones where regulations resembling those of category Ia are enforced; (III) *Natural Monuments or Feature Areas* which are often small

64 areas with a large number of visitors; (IV) *Habitat/Species Management Areas* which focus
65 on the protection of a particular species or habitats and require intervention to secure
66 successful protection; (V) *Protected Landscape/ Seascape areas* which are of significant
67 value due to the unique interaction which has been developed between humans and nature;
68 (VI) *Protected areas with sustainable use of natural resources* where biodiversity
69 conservation targets are not the primary focus. The aim is to preserve the area along with
70 local cultural values through a traditional resources management system. There are also 4
71 different types of management frameworks recognized by IUCN: Public (managed by the
72 state), Private (governance by private owner or non-profit organisations), Shared governance
73 (referring mainly to collaborative management frameworks) and PAs governed by indigenous
74 people and local communities. Social impacts are expected to be more evident in ‘strict’
75 management frameworks, such as *Strict Nature Reserves* which impose significant
76 restrictions on local populations as all activities are prohibited in the specific geographical
77 area and also *National Parks*. In the latter case due to the large size of national parks and
78 their multiple aims in terms of biodiversity conservation it is expected that their
79 establishment will affect a variety of local uses, increasing potential conflicts. On the
80 contrary, wilderness areas are those where there has been very limited intervention by
81 humans and Natural monuments are often very small areas where the focus is on tourists and
82 protected landscape designation does consider the co-existence of local communities within
83 the specific landscape. Regarding the different management frameworks, in our analysis we
84 will focus mainly on public and shared governance of PAs as these are frameworks where
85 there is a clear influence from a top-down mechanism in the formation of social impacts.

86 Although the discussion around social impacts of PAs has significantly increased in the
87 past decade and several methods have been proposed incorporating the assessment of PAs’
88 impacts in policy-making processes (Franks & Small, 2016; Leverington et al., 2010;
89 Schreckenberg et al., 2010; Tempesta & Otero, 2013) they remain one of the most under-
90 represented topic in the field of biodiversity conservation (Voyer et al., 2012). This is a gap
91 that has been recognised in the Social Impact Assessment (SIA) literature where often in
92 large projects there is a ‘technical and technocratic focus’ with non-technical issues such as
93 social being given limited attention (Vanclay et al., 2015).

94 In this paper we take a closer look at social impacts of PAs, focusing on the specific types
95 of PAs mentioned above, and we discuss three main challenges in this process. Firstly, we
96 propose the need to develop evaluation frameworks which focus both on subjective and
97 objective measurements of social impacts. These refer both to the impacts as these are

98 perceived by communities affected by the designation of a PA combined with more
99 'objective' measurements allowing the detailed observation of social impacts. Secondly, we
100 emphasize the need to develop a framework explaining the numerous factors influencing the
101 level of social impacts. Finally, we propose that social impacts should not be seen as static
102 concepts but as a dynamic and long-term factor which needs to be incorporated in decision-
103 making processes.

104

105 **2. Social impacts of PAs**

106

107 **2.1. Social impacts**

108

109 Social impact refers to *'the consequences to human populations of any public or private*
110 *actions that alter the ways in which people live, work, play, relate to one another, organize to*
111 *meet their needs and generally cope as member of the society'* (Burdge et al., 1995). These
112 social impacts can refer to a variety of issues such as the change on *'Peoples' way of life,*
113 *their culture, their community (and its' cohesion), their political systems, their environment,*
114 *their health and well-being, their personal and property rights, their fears and aspirations'*
115 (Vanclay, 2003). In the Ecosystem Services literature, social impacts are often included under
116 the wider umbrella of well-being and according to the Millennium Ecosystem Assessment
117 (2005) there are five determinants constituting well-being linked with ecosystem services: a)
118 security, b) basic material for a good life, c) health, d) good social relations and e) freedom of
119 choice and action; each one including several sub-categories.

120 In the next paragraphs we will analyse the main impacts that have been presented through
121 case studies and theoretical discussions in the literature of biodiversity conservation and
122 social impact assessment. We start our analysis based on the fundamental argument that the
123 most important change that a PA establishment brings (especially in the case of National
124 Parks and Strict Nature Reserves) is the imposition of a new management framework where
125 new regulations in relation to the natural resources and infrastructure are imposed (Ghimire
126 & Pimbert, 2000; Stevenson et al., 2013; Charles & Wilson, 2009; Rees et al., 2013).

127

128 ***Poverty***

129 Poverty levels are influenced by PAs mainly due to the development of tourist and
130 recreational activities and the change in the use of natural resources (Ferraro & Hanauer,
131 2014). Three main categories of impacts have been identified in the literature relating to

132 poverty: security, opportunity and empowerment (Gurney et al., 2014). Although concerns
133 have been raised in the literature that PAs can significantly affect local communities
134 financially in a negative way (Eneji et al., 2009), there is strong and recent evidence that PAs
135 can contribute to the reduction of poverty levels in local communities (Ferraro & Hanauer,
136 2014; Canavire-Bacarreza & Hanauer, 2012; Clements et al., 2014). The establishment of a
137 PA often implies significant positive impacts on employment (Cernea & Schmidt-Soltay,
138 2006) through the creation of new job opportunities such as personnel for the protection of
139 the area, staff for environmental management projects and also new jobs linked with
140 recreational activities and eco-tourism. Furthermore, the production and sale of traditional
141 products is also a major additional source of income in several PAs promoting traditional
142 uses of natural resources.

143

144 ***Health***

145 Protected Areas are linked indirectly also with health mainly due to the ‘services’ they
146 provide to communities. The main aim of a PA, the protection of the environment, can be
147 considered one of the most important social benefits for local communities (Charles &
148 Wilson, 2009; Coad et al., 2008) as it can increase quality of life. An effective protected area
149 implies a healthy ecosystem, which means access to resources of good environmental quality
150 for local communities (Corvalan et al., 2005), such as safe drinking water (Dudley & Stolton,
151 2003). Furthermore, there is evidence that effective PAs can assist in a ‘higher energy and
152 protein intake’ for local communities (Aswani & Furusawa, 2007). However, there is also
153 evidence that PAs can have health ‘costs’ as access to natural resources essential for the
154 nutrition of local populations can be restricted (Ferraro, 2002). For example, in the study of
155 Gjertsen (2005) a restrictive management framework is described where fines were imposed
156 on locals who attempted to access natural resources in order to feed their families and as a
157 result there was a negative impact on their health.

158

159 ***Displacement***

160 A significant social impact of several major projects is displacement (IASA, 2015). In
161 PAs displacement can be voluntary, forced or induced (Lasgorceix & Kothari, 2009) and can
162 have accompanying risks such as marginalisation of certain groups and loss of income
163 (Cernea & Schmidt-Soltay, 2006; Brockington & Wilkie, 2015), change in the distribution of
164 powers and relocation of access and management rights (Mascia & Claus, 2008). Despite
165 these significant impacts currently there are no specific guidelines on how to address

166 displacement of PAs (Agrawal & Redford, 2009). However, recent IASA propositions
167 include a Resettlement Policy Framework that needs to be in place in order to facilitate the
168 implementation of a large project (Vanclay et al., 2015), such as the designation of a PA.

169

170 ***Re-distribution of power***

171 The designation of a PA often implies the application of a new management framework
172 and with this change often there is also a re-distribution of power in the area and the
173 formation of alliances between different entities affected by the PA (Celata & Sanna, 2012).
174 A change in the distribution of power will define the impact on well being and the sense of
175 (in)justice developed especially when local people consider that the restrictions imposed are
176 not equally distributed among them (Hattam et al., 2014; Kellert et al., 2000). Such issues can
177 aggravate social conflicts between local stakeholders (Bennett & Dearden, 2014; Hattam et
178 al., 2014). It should be noted that this impact will be significantly determined by the type of
179 management framework applied with a general agreement in the literature that co-
180 management frameworks where locals are involved in decision making processes can assist
181 in a higher level of compliance (Andrade & Rhodes, 2012).

182

183 ***Human Rights***

184 The establishment of PAs can have a significant impact on human rights of local
185 communities as it affects ‘*customary laws and traditional institutions, customary rights to*
186 *their territories, lands, waters, natural resources, and knowledge systems*’ (Makagon et al.,
187 2014). Indicative categories of human rights affected are economic, social and cultural as
188 well as civil and political (Pullin et al., 2013). Although it is widely accepted that
189 conservation initiatives can have significant impact on human rights they have not been
190 incorporated widely in impact assessment for PAs. Human Rights Impact Assessment
191 (HRIA) however has been increasingly recognised as an important tool, especially for private
192 projects from businesses (Kemp & Vanclay, 2013; Esteves et al., 2012) such as mining
193 (Boele & Crispin, 2013), and could be adapted by PAs. Useful lessons that can be learned
194 from HRIAs are on the methods measuring this impact and the process of evaluation (Boele
195 & Crispin, 2013) including the shared understanding and prioritization of human rights.

196

197 **2.2. Assessing social impacts of PAs**

198 Studies and methodological approaches measuring social impacts of ecosystems services
199 have significantly increased in the past decade (de Lange et al., 2016; Franks & Small, 2016;

200 Ervin, 2003; Stolton et al., 2007). Table 1 lists the most commonly used methodologies
 201 which have been applied in either the original or an adapted form to assess impacts on
 202 individual PA sites and networks of PAs. Most are focused on informing a system of adaptive
 203 or responsive management for specific PA sites (Cifuentes et al., 2000; Corrales 2004;
 204 Pomeroy et al., 2004; Staub & Hatziolos 2004; Stolton et al. 2007; Hockings et al.2008)
 205 whilst a few, such as Ervin (2003), are focused more on a system-wide analysis. Specific
 206 methods proposed within the broader methodologies range from desk studies and rapid-
 207 scoring assessments by management stakeholders, through to more detailed data gathering
 208 such as distribution of questionnaires, household surveys, semi-structured interviews, focus
 209 groups and workshops. Thus, data gathered may be quantitative, semi-quantitative or
 210 qualitative (de Lange et al., 2016; Oldekop et al., 2016).

211 Despite the increase of studies focusing on social impact assessment (Vanclay et al,
 212 2015), currently there is no official protocol or widely accepted standard tool in order to
 213 assess social impacts of PAs in particular. In our view, there are two main issues causing this.
 214 First, defining social impacts indicators is an extremely challenging task and it is a field
 215 which is constantly developed both in the ecosystem services literature (de Lange et al., 2016;
 216 Oldekop et al., 2016) but also in the field of impact assessment (Vanclay et al., 2015). A
 217 second issue is that social impacts can be measured both in an objective way (e.g increase of
 218 employment in the area) but also in a subjective way (e.g. perceptions of local communities
 219 on the change of their well being). In large-scale data collection studies, social impacts are
 220 often only investigated, if at all, from the perspective of the management actor thus providing
 221 a more objective measurement (e.g. Staub & Hatziolos, 2004; Stolton et al., 2007; Vokou et
 222 al., 2014). In some cases, very brief and general guidelines are provided for their exploration
 223 based on citizens' perceptions (Tempesta & Otero, 2013; Stolton et al., 2007; Pomeroy et al.,
 224 2004). Thus, the treatment of social impacts may be somewhat cursory or partial in the
 225 deployment of methodologies in a site-specific context. Table 2 provides an overview of the
 226 main categories of indicators used by such assessment methodologies to identify and evaluate
 227 socio-economic and cultural impacts of PAs.

228

229 **Table 1. Commonly-used evaluation frameworks incorporating social impact**
 230 **assessment in their measurement**

Measurement framework	Reference
SAPA: Social Assessment of Protected Areas	Franks & Small (2016)

EoH Enhancing our heritage	Hockings et al. (2008)
METT Management effectiveness tracking tool	Stolton et al. (2007)
How is your MPA doing?	Pomeroy et al. (2004)
World Bank MPA score card	Staub and Hatziolos (2004)
Rapid evaluation of management effectiveness in marine protected areas of Mesoamerica	Corrales (2004)
RAPPAM Rapid assessment and prioritization of protected area management	Ervin (2003)
WWF CATIE	Cifuentes et al. (2000)

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234 **Table 2. Social Impacts of PAs: broad indicator themes and example studies and**
 235 **methodologies considering them**

Impact indicators	References
Income, Employment and monetary wealth	Cernea & Schmidt-Soltau, 2006; Foerster et al., 2011; Oldekop et al., 2016; Mascia et al., 2010; Ervin, 2003; Staub & Hatziolos, 2004; Hockings et al., 2008; Pomeroy et al., 2004; Stolton et al., 2007; Stuhsaker, 2005
Landlessness & Homelessness	Cernea & Schmidt-Soltau, 2006
Poverty	Garney et al. 2014; Canavire-Bacarreza & Hanauer, 2012; Brockington & Wilkie, 2015; Daw et al., 2011; Foerster et al., 2011
Conflicts and conflict management	Oldekop et al., 2016
Access to natural resources	Cernea & Schmidt-Soltau, 2006; Oldekop et al., 2016
Quality of life	Jones et al., 2012; Pomeroy et al., 2004; Courrau, 2005
Empowerment	Oldekop et al., 2016; Gurney et al., 2014
Equity and social justice	Banini et al., 2006; Pomeroy et al., 2004; Staub & Hatziolos, 2004; Struhsaker et al., 2005
Culture and Cultural relationships	Leverington et al., 2010; Ervin, 2003; Pomeroy, 2004; Staub & Hatziolos, 2004; Stolton et al., 2007; Cifuentes et al., , 2000; Leverington et al., 2008; Courrau, 2005
Engagement & communication	Wells and Mangubhai, 2004; Stolton et al., 2007; Pomeroy et al., 2004; Staub & Hatziolos, 2004; Hockings et al., 2006
Local values and beliefs	Pomeroy et al., 2004
Social structure and trust	Courrau, 2005; Hockings et al., 2006; Pomeroy et al., 2004; Staub & Hatziolos, 2004; Stolton et al., 2007; Foerster et al., 2011
Economic and Physical Displacement	Brockington et al., 2008; Oldekop et al., 2016; Brockington & Wilkie, 2015; Hockings et al., 2008; Pomeroy et al., 2004; Courrau, 2005; Corrales, 2004
Health	Aswani & Furusawa, 2007; Leisher et al., 2013; Mascia &

	Claus, 2008
Human Rights	Makagon et al., 2014; Boele & Crispin, 2013

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239 **3. Challenges and directions for future research**

240

241 **3.1. Measuring social impacts**

242 A key question when measuring social impacts of PAs concerns how to measure them.

243 There are three different ways that this can be achieved. First, data can be obtained regarding

244 the impact of the PA on the total population focusing on issues such as employment and

245 nutrition. Second, social impacts can be measured based on the perceptions of the

246 management actor. Thus, apart from the more objective measurements mentioned above,

247 members of the management authority can be asked to evaluate the impact on the local

248 population based on their experience. A third way is to focus on perceptions of local

249 communities and explore what impact does the PA has on their lives on issues such as well

250 being, quality of life and their everyday activities.

251 Up until recently most large scale studies and evaluation methodologies for PAs focused

252 on social impacts which can be measured through secondary data or indicators which are

253 reported by the management actor of the PA (e.g. Staub & Hatziolos 2004; Stolton et

254 al.2007). In some cases, very brief and general guidelines were provided for their exploration

255 based on citizens' perceptions (Pomeroy et al. 2004; Stolton et al. 2007; Tempesta & Otero

256 2013). However, measuring social impacts based on the management actors' perceptions, can

257 be somewhat cursory or partial in the deployment of methodologies in a site-specific context

258 (Paleczny & Harhash 2007). The development of social impacts of PAs that are based on

259 perceptions of citizens affected, are equally, or even more, important to be assessed (Vanclay

260 2012) and assessment of social impacts through a participatory process is considered a

261 significant requirement for Social Impact Assessments techniques (Esteves et al. 2012;

262 Nzeadibe et al., 2015).

263 There is now a growing body of literature measuring aspects of social impacts of PAs

264 based on local communities' perceptions and emphasizing the value of this information for

265 biodiversity conservation (Stevenson et al., 2013). Thus we claim here that it is crucial for

266 future policy decisions for PAs to measure social impacts taking into consideration both

267 subjective and objective measurements. The incorporation of data measuring social impacts
268 based on the perceptions of those who are affected by the designation is crucial and factors
269 influencing these perceptions should also be taken into consideration.

270

271 **3.2. Understanding how perceptions on social impacts are formed**

272 The measurement of social impacts based on citizens' perceptions brings an additional
273 challenge. Differences are expected between individuals' perceptions, making the
274 interpretation of these impacts even harder when compared to environmental (e.g. change in
275 species) or economic (e.g. income level) indicators. These differences can occur even when
276 we are exploring them in the context of the same management framework. An indicative
277 example are National Parks across Europe where there are sites with similar management
278 frameworks established in different parts of Europe (often state management or some type of
279 participatory management with local stakeholders). However, the impact of these sites, as
280 these are perceived by citizens, will not be the same across European states. The key point
281 here is that the level of social impacts perceived will significantly depend on the socio-
282 economic context in which the PA is designated and the cultural differences among people of
283 different countries on nature conservation. Future research should focus in the identification
284 of these explanatory factors as they are expected to influence social acceptability for
285 biodiversity conservation projects, similarly to social license for private projects (Dare et al.,
286 2014).

287 Although this is clearly an emerging field we would like to propose here a list of factors
288 proposed in the fields of social impact assessment and environmental social science which
289 can assist in the understanding of how social impacts are formulated. Several *demographic*
290 *factors* are expected to influence social impacts as perceived by citizens. Gender is one of
291 them (Coad et al., 2008), mainly because differences in use and power may mean that there
292 will be different impacts between men and women. Communities connected with a protected
293 area are often composed of different ethnic groups, which vary in their use of the resource,
294 tenure rights and power (Coad et al., 2008). Furthermore, the economic circumstances that
295 exist in a region are also likely to influence the way these impacts are perceived by citizens
296 (Coad et al., 2008). The location of the community is also expected to influence perceptions
297 (Karki, 2013). Specifically, the perceived benefits will be influenced by how close a
298 community is to the new benefits, such as new facilities, provided by a PA (Ezebilo &
299 Mattsson, 2010). Other demographic factors that may affect perceptions towards impacts
300 refer to age, education and household characteristics (Karki, 2013).

301 A recent development in the PA literature is the identification of links with *social capital*
302 issues (Jones et al., 2012, Gutierrez et al., 2011). Several elements have been considered as
303 components of social capital in the literature, those commonly used in international studies
304 being social trust, institutional trust, social networks and social norms (Putnam et al., 1993;
305 Coleman, 1990; Adger, 2003; Pretty, 2003). Social capital has a significant influence on the
306 level of social impacts perceived by local communities and also on the level of public
307 acceptability of public policies (Jones & Clark, 2014; Jones et al., 2015, 2012). This is mainly
308 because in communities with low levels of trust (both institutional and social) individuals
309 regard proposed public policy measures as ineffective and perceive higher impacts from the
310 application of such policies. Thus, introducing policies demanding a significant change by
311 local people will also be seen as imposing increased negative social impacts on them. Equally
312 important are local values and beliefs (Pomeroy et al, 2004; Loxton et al., 2013). Depending
313 on whether local values ‘support’ or not the establishment of a PA and its’ causes they will
314 also influence perceptions on social impacts (Loxton et al., 2013). Furthermore, social
315 networks are expected to influence the type and flow of information and as a result will have
316 an impact on perceptions for the necessity of public policy intervention and its possible
317 consequences (Wolf et al., 2010; Jones & Clark, 2014).

318 *Place attachment* is another important factor influencing citizens’ perceptions and public
319 acceptability of environmental strategies (*emotional bonds and place related symbolic*
320 *meanings*) (Devine-Wright, 2011). The opposition of citizens towards specific policies can be
321 conceived as a ‘*place-protective action*’ (Devine-Wright, 2009). In the case of PAs, the
322 geographical area where a PA is created has a specific value for the local community
323 (Pomeroy et al., 2004; Charles & Wilson, 2009) and this value is expected to have an
324 influence on the impacts that are connected with the PA (Pomeroy et al., 2004). In the context
325 of this parameter, tenure rights and uses of the resources included in the PA should also be
326 taken into consideration (Coad et al., 2008). This is mainly because the social costs and
327 benefits from the designation of a PA are expected to be different depending on the use of a
328 resource by individuals in a community and this will also have an effect on the value that
329 individuals have for a specific place.

330 Several frameworks have also been developed in the past decades aiming to understand
331 the relationship between *humans and nature* and the reasons influencing humans’ attitudes
332 towards the natural environment. Indicative examples include the New Ecological Paradigm
333 (Dunlap et al., 2000), the Environmental Identity Scale (Clayton, 2003) and the Nature
334 Relatedness Scale (Nisbet et al., 2008). Thus additional factors which need to be taken into

335 consideration when exploring the formation of perceptions on social impacts include
336 connectedness to nature (Gosling & Williams, 2010), past experiences (Kals et al., 1999) and
337 pro-environmental attitudes (Carrus et al., 2005).

338 *Level of awareness* about the PA and satisfaction with, or approval of, its presence is
339 expected to also have an impact on individuals' perceptions (Courrau, 2005; Tempesta &
340 Otero, 2013; Staub & Hatzioiols, 2004). Similarly, environmental education initiatives and
341 awareness of their own responsibilities in the context of a conservation policy will also have
342 an impact (Tempesta & Otero, 2013; Courrau, 2005; Rees et al., 2013; Stolton et al., 2007;
343 Nisbet et al., 2011). Based on theoretical assumptions (Jones & Clark, 2013) higher levels of
344 environmental awareness can lead to lower perceived costs, as citizens recognise the multiple
345 benefits of a proposed policy and the subsequent socio-economic benefits. It should also be
346 noted that the level of awareness is expected to have a clear link with social networks, as a
347 parameter of social capital, as these provide the main source of information for environmental
348 issues (Wolf et al., 2010).

349 Finally, the *Management framework of the PA* is also expected to influence perceptions
350 on social impacts. There are different management frameworks that can be applied when
351 designating a PA. The main distinction as mentioned in the introduction of the paper is
352 between public, private, co-managed and PAs managed by indigenous people and local
353 communities. There is significant evidence that co-management frameworks can be very
354 effective and can lead to an increase of the benefits for the local community from the
355 establishment of a PA (Stoll-Kleemann et al., 2010), such as empowerment and monetary
356 benefits (Oldekop et al., 2016). A collaborative management framework assists in the
357 inclusion of people in decision-making (Berkes, 2004) promoting the principles of equity and
358 fairness while assisting in the organisation of local communities and the promotion of
359 'common property regimes' (Bennett & Dearden, 2014). Thus an increased engagement can
360 lead to 'obtaining' a social license for projects, such as PAs, to operate (Dare et al, 2014).
361 However, the influence of the management framework on social impacts may not be so
362 straightforward considering the fact that co-management does impose certain costs on the
363 community as it necessitates public engagement (Jones et al., 2012). Furthermore, the
364 influence of the management framework on social impacts will also be affected by the level
365 and type of recreational and cultural activities developed (Coad et al., 2008; Sims, 2010;
366 Bennett & Dearden, 2014; Charles & Wilson, 2009; Hattam et al., 2014). Despite the
367 importance of the management framework currently there are very limited studies exploring
368 whether social impacts are lower when co-management frameworks are applied, revealing the

369 need to conduct comparative studies in order to explore the impact of the management
370 framework on social impacts.

371

372 **3.3. Exploring the change of social impacts through time**

373 A final point we would like to underline in the paper is that social impacts are not static
374 concepts but are expected to change over time (de Lange et al., 2016; Gurney et al., 2014;
375 Ferraro et al., 2015). Currently no large-scale longitudinal survey exists exploring the change
376 of social impacts through time. Dudley et al. (2007) suggests that if improvements in the
377 management framework are implemented through time then this will affect a PAs
378 effectiveness, in line with the model of adaptive or responsive management. There has also
379 been some limited empirical evidence that time is linked with effectiveness of Marine PAs
380 (Vandepierre et al., 2011), reduction of poverty (Canavire-Bacarreza & Hanauer, 2012) and
381 also short-term positive impacts on poverty (Gurney et al., 2014). However, we have no clear
382 evidence how time interacts with social impacts especially in relation to how these are
383 perceived by citizens. Thus, there is no proof if increased effectiveness is due to higher
384 compliance and if compliance is linked to a reduction in the negative social impacts along
385 with an increase of benefits.

386 This is a crucial area of investigation for environmental policy planning and
387 implementation processes and it is linked with the issue of social acceptability. Its importance
388 rests mainly on the fact that when measuring social impacts, when a policy is initially
389 implemented, it is useful to be able to predict the change of these impacts over time.
390 Reframing any area as a primarily 'natural' space will start a process to reshape other aspects
391 of the space: cultural, social and economic. An application of a very restrictive policy for
392 example is expected to initially raise significant concerns among locals and as a result an
393 assessment of social impacts at that stage would emphasize the negative social impacts for
394 local communities. However, the level of acceptability even for some very restrictive policies
395 can change through time, especially when the benefits of the policy become more apparent
396 for local communities and also when the new regulations become part of the everyday habits
397 of people. From the methodologies explored in this study, none had incorporated as an
398 objective to undertake an initial baseline assessment (measuring individual perceptions)
399 either before or during the designation of the PA against which to assess subsequent change.
400 Without such research, some changes, perhaps the most significant, may not be captured by
401 an assessment exercise.

402

403 **4. Conclusion**

404 The aim of this paper was to highlight certain issues that need to be addressed and taken
405 into consideration in the future in order to improve social impact assessment of Protected
406 Areas. In particular, we focused on three main challenges: the incorporation of both local
407 subjective perceptions as well as potentially more objective indicators in social impact
408 assessment for PAs; the impact of certain factors on citizens' responses to and perceptions of
409 these impacts; and the change of social impacts through time. Addressing these issues is a
410 challenging task that requires the re-consideration of current techniques assessing social
411 impacts of PAs. Based on our analysis we regard as necessary that a methodology should be
412 developed which can be applied in different areas allowing the estimations of social impacts
413 while permitting the comparison of impacts between different protected areas. Furthermore,
414 social impact assessment techniques for PAs need to incorporate the opinions of different
415 stakeholders including the users of the PAs. In the context of such studies different factors
416 influencing these perceptions can be measured explaining the level of social impacts as these
417 are perceived by different social groups. In addition, we propose that social impact
418 assessment for PAs should be periodically repeated. By observing the change in social
419 impacts through time significant information can be provided regarding the role of the PA for
420 local communities and the change in the geographical space which is designated as a nature
421 reserve. Assessing social impacts prior to implementation and monitoring them after the
422 designation of a PA will provide valuable information for decision-makers in order to achieve
423 a balance between biodiversity conservation and socio-economic justice.

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