

REPORT

Exploring conservation discourses in the Galapagos Islands: A case study of the Galapagos giant tortoises

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Abstract Conservation discourses change rapidly both at global and local scales. To be able to capture these shifts and the relationships between humans and nature, we focused on a local and iconic conservation case: the Galapagos giant tortoises (*Chelonoidis* spp.). We used the Q methodology to contextualize conservation for science and decision making and to explore the multidimensionality of the conservation concept in Galapagos. The results indicate four prevailing discourses: (1) Multi-actor governance; (2) giant tortoise and ecosystems conservation; (3) community governance; and (4) market and tourism centred. These findings allow us to identify foreseeable points of disagreement, as well as areas of consensus, and to discuss the implication of the findings to address socio-ecological conservation and sustainability challenges. This can help the different involved stakeholders (managers, scientists and local communities) to the design and apply contextualized conservation actions and policies to contribute to a better sustainable management of the archipelago.

Keywords Conservation-development · Discourse analysis · Galapagos giant tortoises · Iconic species · Conservation governance · Q methodology

INTRODUCTION

Conservation is a trans-disciplinary science and practice that addresses the protection of species, communities, ecosystems, biodiversity and human wellbeing (Soule 1985; Kariva and Marvier 2012). Conservation is, however, also

influenced by social and geopolitical dynamics such as the politicization of conservation in protected areas (Chamberlain et al. 2012) or the different views, values and attitudes of local communities over conservation that affect and modify conservation framings, discourses and actions (Hutton et al. 2005). Conservation framings are never static, and they transform and shift according to political-economical contexts (Jepson and Barua 2015). Henceforth, understanding conservation framings and discourses can allow us to contextualize shared assumptions occurring at a particular place. Discourses are structured ways of representation that evoke particular understandings (e.g. framings) and may subsequently enable particular types of actions to be envisaged (Hugé et al. 2013). Therefore, the way the relationship between human and nature is viewed will influence how conservation is framed and practised. Although at a global scale, major trends in conservation discourses have shifted from nature-centred discourses (1960s–1990s) to more human-nature-oriented discourses (2000–present) (Mace 2014), at local and contextualized scales, these shifts might not be so evident. In order to understand and capture these shifts and the relationship between humans and nature, we focused on the iconic Galapagos giant tortoises (*Chelonoidis* spp.) to explore conservation discourses on the Galapagos Islands, a place that on a very limited geographical scale, has a strong focus on conservation and elicits strong interests from the international community.

Iconic species are ‘charismatic species that serve as a symbol or focus point to raise environmental consciousness’ (Caro 2010). They have been used as means to promote conservation management strategies (Simberloff 1998), public interest, economical development and international political agendas (Buckingham et al. 2013). Moreover, iconic species have a strong potential to mobilize social actions within the political and economical

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contexts of conservation where politics and economics usually shape and favour certain conservation interventions that are related to public and private interests (Jepson and Barua 2015).

In Galapagos, the history of the relationship between humans and giant tortoises dates from the late eighteenth century when buccaneers, whalers and seal hunters stopped in the islands for water and food. Giant tortoises were especially important due to their long-standing ability to live during months without water and food (Townsend 1925; Nicholls 2006). Once the first human settlements were established in 1832, giant tortoises were affected by excessive hunting and by introduced species, particularly by rats eating giant tortoises' eggs (Froyd et al. 2014). With the establishment of the Galapagos National Park (GNP) and the Charles Darwin Foundation (CDF) in 1959, a giant tortoise status review revealed that only 11 of the original 15 species (Poulakakis et al. 2015) remained, most of which were endangered or at the brink of extinction (Cayot 2008). These extant 11 species are distributed over six islands; four of which (Santa Cruz, San Cristobal, Isabela and Floreana) have a history of human settlement and colonization (Fig. 1).

The iconic characteristics of giant tortoises (e.g. endangered, charismatic, keystone species) made them a conservation priority (Cayot 2008; Edwards et al. 2013). Over time, giant tortoise representations have become ubiquitous in the archipelago. They are used as names in shops, restaurants, NGOs, schools and even as a political party logo. The successful captive breeding centres, restoration and repatriation programmes (Gibbs et al. 2014), promoted tourism and conservation awareness in the four inhabited islands (Cayot 2008). However, issues have emerged such as the occasional killing of giant tortoises on Isabela Island due to local beliefs (needs for post-parturition mothers) and retaliations against GNP and conservationists (Márquez et al. 2007).

The dynamics of conservation discourses are especially relevant in long-lasting conservation challenges centred on iconic species such as giant tortoises. This is inherently related to the different perspectives on the values of nature that co-exist in a society where iconic species have been assumed to have an intrinsic value, assuming that nature is inherently valued by the public (Home et al. 2009). However, it must also be understood that the quality of being an iconic species does not imply effective and widely accepted conservation measures. For instance, in 2002, the popularity of giant tortoises was used by protesters who threatened to kill them if fishing quotas were not increased (Pablo Gordillo, mayor of Isabela, pers. comm.). This led to a shift in discourse from the influential stakeholders (e.g. GNP, CDF, WWF), from a 'nature despite people' to a 'nature for

people' discourse where ecosystems became a priority and community-based tourism was promoted as the consensus solution. Lately, the increasing human pressure from tourism (200 000 visitors per year) and local population (25 000 inhabitants) rapidly shifted discourses to a more pronounced 'people and nature' discourse with the aim of involving all local communities in conservation (Cairns et al. 2013; Tapia et al. 2013).

Conservation challenges centred on iconic species demand insight in the various dimensions of conservation, as well as an exploration of the differences in perceptions among stakeholders (Reed et al. 2009). This research aims at mapping and positioning the discourses underlying the role of giant tortoises in conservation, social development, science and cultural identity in the Galapagos archipelago. We use a scientific approach to study human subjectivity and inter-subjectivity (Q methodology), to contextualize conservation for science and decision making and to explore the multidimensionality of the conservation concept in Galapagos. We highlight the differences in perceptions among different stakeholder groups, we identify local conservation discourses and analyse the degree to which these have been influenced by global conservation governance, and we relate our findings to other local cases of conservation conflicts with iconic species.

MATERIALS AND METHODS

Developed by the physicist and psychologist William Stephenson in the 1930s, Q methodology is a scientific approach to the study of human subjectivity and inter-subjectivity in an organized, structured and statistically interpretable form. It combines the qualitative study of attitudes with the statistical rigour of quantitative research techniques (Barry and Proops 1999; Watts and Stenner 2012). The method is widely used in social science research and is increasingly used in conservation biology and policy-related research (Addams and Proops 2000; Davies and Hodge 2007; Sandbrook et al. 2011; Rastogi et al. 2013). Q attempts to elicit a variety of accounts or discourses about or around a particular discourse domain, theme, issue or topic (Barry and Proops 1999). Q is used as a discourse analysis tool because participants' responses are consistently comparable and limited to a number of ordered patterns (factors or discourses) that are revealed in a structured and interpretable form. Q is, therefore, particularly suited to studying those social phenomena around which there is much debate, conflict and contestation, such as the environment, for its explicit aim is to elicit a range of voices, accounts and understandings (Barry and Proops 1999).

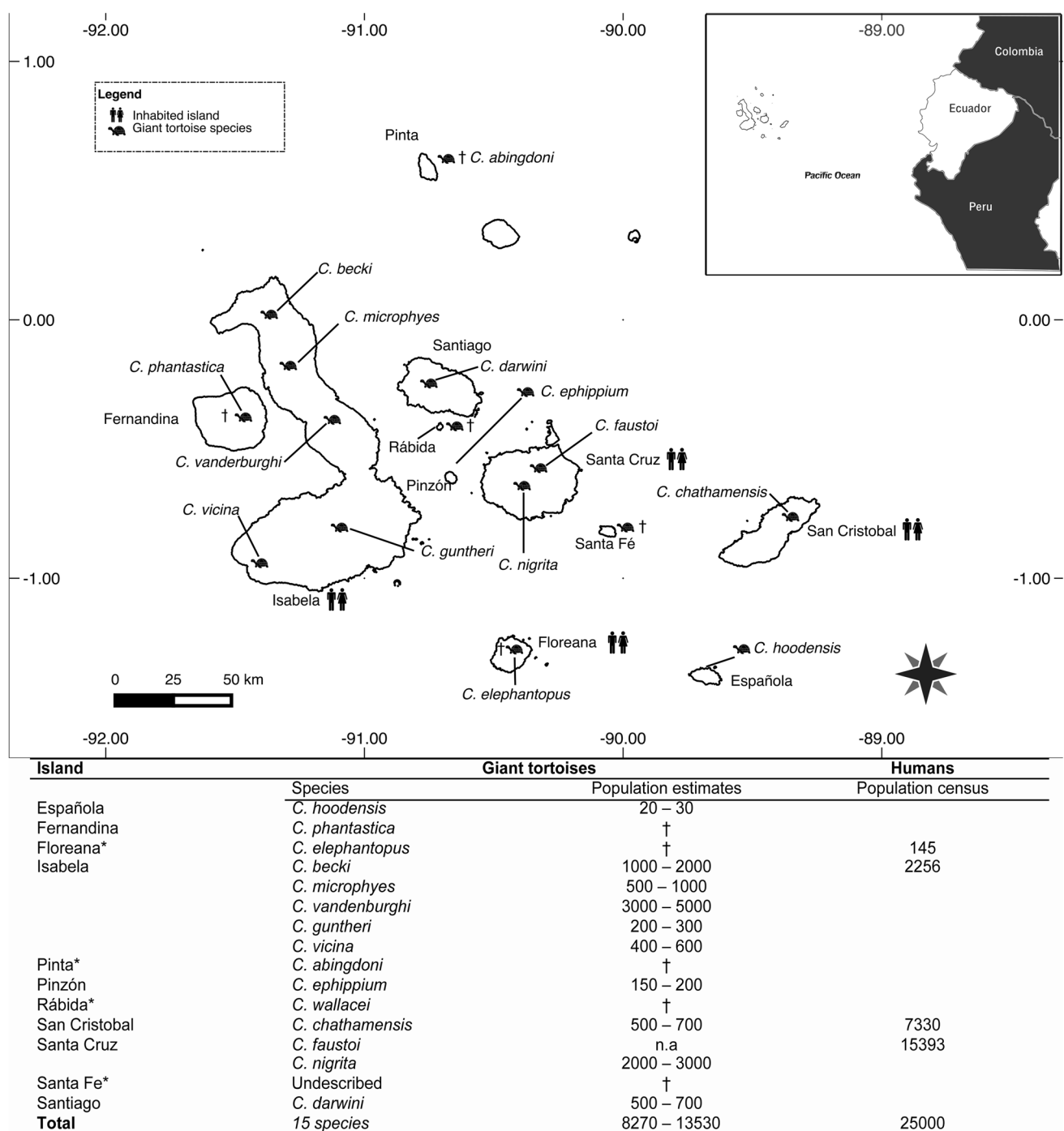


Fig. 1 Giant tortoises (GT) distribution and human settlements in the Galapagos Islands. The total human population reaches 25 000 inhabitants in the four inhabited islands. Giant tortoises (*Chelonoidis* sp.) population estimates are between 8270 and 13 530 (Márquez et al. 2007; Poulakakis et al. 2015). Dagger extinct species; asterisk giant tortoise restoration initiative

Data collection

Q data are collected through several continuous steps starting with the *concourse*, which is the body of information about a research topic (here gathered throughout 54 interviews in the

four inhabited Islands and through a literature review) from which a *Q-sample* (entailing a list of key statements derived from the Q concourse, $n = 60$) is generated (Table 1). Then, *Q-participants* are selected (Table 2) and asked to rank the statements of the *Q-sample* according to specific instructions in

what is called a *Q-sort* ($n = 28$). This is followed by a qualitative discussion/explanation of the participants' reactions to the statements that they most agree or disagree with (audio-recorded). When each Q-sort from each Q-participant is collected, statistical techniques of correlation and factor analysis are applied to reveal patterns with which people associate opinions. In the factor interpretation and result section, we have added this qualitative information in quotes, followed by the Q-participant's number (i.e. Qsort15-). Each statistically extracted pattern (factor) is interpreted, and the discursive framework of the research is identified. In Fig. 2, we summarize the Q process followed, but in Table S1, we detail each specific step as conducted in this research.

Data analysis

From the entire set of Q-sorts ($n = 28$), each conducted by a different Q-participant (Fig. 4c–d; Table 2), factor analysis or principal component analysis (PCA) was used to reduce the diverse points of view to a smaller set of factors that reflect shared ways of thinking (Sandbrook et al. 2011). The data were analysed with PQ method, a software specifically designed for the Q methodology (Schmolck 2014), and with the 'qmethod package' in R software (Zabala 2014). Both the softwares allowed us to have an in-depth analysis, in particular due to R's online resources accessibility and varied data-analysis packages that can complement Q analysis (i.e. nFactors, FactoMineR packages). The statistical analysis had three statistical procedures: (1) calculation of a correlation matrix, (2) extraction and rotation of significant factors; and (3) the computation of a set of factor scores for each factor (Addams and Proops 2000; Watts and Stenner 2012).

The first procedure involved a correlation analysis among all Q-sorts; a 28-by-28 correlation matrix was generated. The second procedure involved a PCA of the correlation matrix with the aim of identifying which participants' Q-sorts clustered in a number of explanatory factors (Cairns et al. 2013). Initially, there were nine factors with an eigenvalue (EV) > 1 . Although there is no precise mathematical based decision rules regarding the number of factors that should emerge in a Q study, statistical calculations are nevertheless used to support the decision on the number of factors to extract. Therefore, we calculated those Q-sorts that loaded significantly with a factor at $> \pm 0.33$ which is significant at a level of $p < 0.01$ (Brown 1980). If at least two loaders in each factor had higher values than ± 0.33 , then those factors could be considered for extraction.

$$x = 2.58 \left(\frac{1}{\sqrt{n}} \right); \quad x = 2.58 \left(\frac{1}{\sqrt{60}} \right); \quad x = \pm 0.33 \quad (1)$$

As a result, seven factors had more than two loaders at $> \pm 0.33$ $p < 0.01$. Among those seven factors, most

loaders were confounders (loading in more than one factor), which is not ideal for factor interpretation (Table S4). To reduce the number of factors, we used the *Castell scree test* with *parallels analysis* to help in the decision on how many factors to extract (Watts and Stenner 2012). Taking the advantage of working with R, we used the nFactor package and run these tests (Raichem and Magis 2011). Figure 5 suggests that the factor extraction leads to the selection of two to four factors. We decided to keep four factors based on the results obtained with parallel analysis since its selection criteria are stricter (Table S5). To decide which four factors to extract, we used Hampreys' rule of extraction (HRE), which considers that a factor is significant if the cross-product of its two highest loadings exceeds twice the standard error (Brown 1980).

$$SE = 1 \div \sqrt{\text{No. of Q statements}}$$

$$SE = 1 \div \sqrt{60} \quad (2)$$

$$SE = 0.13$$

$$2 \times SE(0.13) = 0.26$$

After retrieving the four factors in the adequate threshold for extraction according to the HRE (Table S4), we proceeded to the last and third part which involved the varimax rotation of the four factors. We used a varimax rotation to ensure that factors were positioned so that the overall solution maximizes the amount of the study variance explained (Watts and Stenner 2012). Each rotated factor had a particular weighted average of the Q-sorts that defined each factor. Again, the Q-sorts that significantly correlated with a factor at $> \pm 0.33$ were considered representative of that view (Table S6). After the comparison of factors, we sought a solution that maximized the number of participants loading on just one factor, ensuring that each factor contained at least three Q-sorts that loaded on one factor alone. The degree of correlation between factors (Table S7) and the weighted average of the loaders' sort patterns for a factor were used to calculate an idealized sorting pattern per factor along the original response scale (-6 to $+6$). Examining these idealized sorting patterns (factor arrays) and analysing the post-sorting comments made by some of those participants, we drafted narrative descriptions of each factor.

RESULTS

A factor is a condensed statement of the relationship between variables (Kline 1994). Although it can be argued that all 9 factors ($EV > 1$) could emerge as different discourses, our extraction selection factor criterion (Hampreys' rule of extraction, number of loaders on each factor),

Table 1 List of Q-statements, Z-score and rank associated with each factor and Eigenvalues (GGT Galapagos giant tortoise)

Statements	Factors							
	1		2		3		4	
	Z-score	Rank	Z-score	Rank	Z-score	Rank	Z-score	Rank
S1 GGTs have a key role in the ecological restoration of the islands	-0.11	-1	1.88*	6*	-0.15	-1	-0.96*	-3*
S2 Work in conservation should be on ecosystems and not only on iconic species such as the GGT	1.35	5	1.59	5	0.43*	1*	-0.76*	-2*
S3 GGTs are living examples of evolution that deserve to be studied	-0.04	0	0.23	1	1.03*	4*	-0.92*	-3*
S4 It is sad that certain individuals such as Lonesome George disappear; they are a loss both for humanity and science	0.54	2	0.00	0	-0.03	0	0.07	0
S5 Despite the fact that GGT are so iconic, they have been studied very little	-0.67*	-2*	-1.37*	-4*	0.51	1	0.20	1
S6 Scientists coming to Galapagos should change their way of researching from not only doing science IN Galapagos but also FOR Galapagos	1.09*	3*	-0.44	-2	0.60	2	-0.39	-1
S7 Scientific knowledge about GGTs and their natural history must be generated and disseminated so that people can understand what is being done	0.40	1	0.78	2	1.68*	5*	-0.38*	-1*
S8 Genetic and migratory studies about GGTs are key for ecological restoration of their population	0.29	1	1.43*	5*	0.39	1	0.16	0
S9 GGT conservation is a priority for the archipelago because of its social, economical, cultural and scientific value	0.02	0	1.16*	4*	0.23	0	1.85*	6*
S10 GGT conservation and breeding programmes serve two purposes: ecological restoration and tourism	0.17	0	0.49	1	0.60	2	0.81*	3*
S11 The success in conservation with GGTs maintains public interest in conservation, which is essential to raise funding and influence political or community organizations	0.10	0	1.20*	4*	-0.92*	-2*	-0.10	0
S12 Conservation is the best business that exists, it is the capital that sustains activities in Galapagos	-0.30	-1	0.11*	0*	-0.36	-1	-0.71	-2
S13 Conservation means protecting species but also making use of those species, natural resources and landscapes	0.69*	3*	-1.56*	-4*	-0.60	-2	-0.34	-1
S14 The efforts from the GNP to relate to the community are very isolated and specific. A holistic approach spanning the growing and dynamic community of the islands is needed	1.25	4	-0.23*	-1*	0.95	3	0.19*	1*
S15 Much has been invested in conservation and little in social issues such as health, mobility and environmental education	0.58*	2*	-0.32	-1	0.42	1	-0.99*	-4*
S16 The State and institutions have adequately managed human settlement in Galapagos	-2.30	-6*	-1.69*	-5*	-1.13	-4	-2.39*	-6*
S17 Introduced species are a great threat for the conservation of GGTs	-0.01	0	1.29	4	1.94	6	0.10	0
S18 Politicians in Galapagos demonize conservation	-0.63	-2	-0.30	-1	1.13*	4*	-1.46*	-5*
S19 At present, the local community understands recycling as a synonym of conservation	-1.41	-4	-0.41*	-1*	-1.28	-4	-1.15	-4
S20 The majority of the local community is aware about conservation and protect, care and they respect nature	-1.00	-3	-1.26	-4	-1.37	-4	-0.76	-2
S21 GGT is a wonderful animal because it attracts many tourists	-1.32*	-4*	-0.12	0	1.26*	4*	0.31	1
S22 To a large degree, the Galapagos economy is based on tourism and consequently in the conservation of GGT	-1.02*	-4*	0.82	2	-0.62*	-2*	0.99	3
S23 Economically one GGT is worth more alive than dead	0.69	2	0.71	2	0.49	1	0.22	1
S24 Tourism is the only productive activity in Galapagos	-2.38*	-6*	-1.70	-5	0.43*	1*	-1.73	-6
S25 Tourism has generated economical benefits to the local community; and at the same time, locals have begun to realize the benefits of conservation	0.18	0*	0.93*	3	-0.08	0	-0.60	-1
S26 GGTs are convenient because they are another product that can be promoted, as long as the rules and codes of conduct established by the GNP are followed	-1.04	-4	-1.19	-3	-0.66*	-2*	-1.03	-4
S27 Handicrafts, fisheries and agro-production should be promoted as alternative productive sectors and of identity in Galapagos	1.85*	6*	-0.63*	-3*	0.15*	0*	1.09*	3*
S28 Lonesome George was a commercial flagship individual that represented very little to conservation	-0.84	-3	-1.68*	-5*	-0.51	-2	-0.05	0

Table 1 continued

Statements	Factors							
	1		2		3		4	
	Z-score	Rank	Z-score	Rank	Z-score	Rank	Z-score	Rank
S29 Galapagos needs to be managed socially, economically and environmentally by all the galapagueños and people that live on the archipelago	-0.47	-2	-0.61	-2	1.63*	5*	2.48*	6*
S30 The Galapagos Islands that are visited by tourists are usually completely unknown by a large proportion of the local community	0.52	2	0.96*	3*	0.98	4	0.03	0
S31 The physical and emotional connections with nature are very low in the local community	-0.23	-1	-0.45	-2	-0.98	-3	-0.70	-2
S32 The touristic attraction of GGTs is a synonym of respect for nature by tourists and the community	-0.49	-2	-0.60	-2	0.54*	2*	0.54*	2*
S33 Fishermen and farmers respect nature equally	-1.63	-5	-0.70	-3	-1.38	-5	-1.26	-5
S34 Environmental education in the archipelago must be established as a policy priority for the decision makers": Galapagos Governing Council (GGC), Municipalities, Galapagos National Park (GNP) and ministries	1.22	4	0.60*	2*	-0.33*	-1*	1.59	5
S35 In Galapagos, there is a negative environmentalism, and everything is prohibited. There should be opportunities in accordance with the islands' reality	0.58	2	-1.94*	-6*	0.37	0	-0.86*	-3*
S36 Nature has rights, but the human race is the one that needs to survive over all the rest	-0.30*	-1*	-1.95	-6	-2.12	-6	0.90*	3*
S37 The successful conservation of the Galapagos Islands is a result of the hard work of different organizations and a public policy for the conservation of the archipelago	0.48	1	1.20	4	-1.13*	-4*	0.58	2
S38 The GNP has done a good job in conservation issues, but has sought to intervene in things that are not within its competence	1.39*	5*	-0.31	-1	-0.91	-3	-0.65	-1
S39 The strengthening of the Galapagos Governing Council (GGC) is key to helping all parts to coordinate and establish planning policies in the short and long terms	1.84*	6*	0.34	1	-0.39*	-1*	0.87	3
S40 The web of corruption and cronyism in Galapagos needs to be broken; it prevents Galapagos from raising	1.62	5	-0.93*	-3*	1.96	6	1.12	4
S41 All institutions in Galapagos have a responsibility in conservation	1.15*	4*	1.95	6	0.31*	0*	-0.68*	-2*
S42 The sponsorship (godparenting) of GGTs following all the established regulations from the GNP is an interesting proposal for the development of community tourism	-0.52	-2	-0.01	0	0.79	3	1.24	4
S43 Municipalities should be empowered, and the excessive number of governmental institutions should be reduced	0.64*	2*	-0.02*	0*	-2.18*	-6*	-0.86*	-3*
S44 GNP decision making is based on many scientific and technical criteria	-1.68	-5	0.63*	2*	-1.42	-5	-0.71	-2
S45 Galapagos' political model is a replica of the continent (Ecuador), but geographically and socio-economically the archipelago reality is very different	1.18*	4*	0.02	0	-0.25	-1	-0.65	-1
S46 Galapagos' economical model needs to be rethought towards a model of fair community tourism	-0.17	-1	-0.57	-2	0.80*	3*	-1.18	-4
S47 More support from the communities towards the institutions is needed (i.e. locals respecting and promoting biosecurity restrictions to prevent the introduction of invasive species)	-0.75	-3	0.65*	2*	-0.15	-1	-0.85	-3
S48 Galapagos belongs to its original inhabitants; this means and includes the tortoises and all its flora and fauna	-1.01*	-3*	0.02*	0*	0.86	3	0.78	2
S49 Human activities in the archipelago are directly and indirectly related to the GGT	-2.18	-5	-1.04*	-3*	-1.81	-5	1.59*	5*
S50 GGT is the name that represents the islands globally and that has achieved that Ecuador positions itself as a country and owner of the archipelago	0.43	1	-0.20	0	0.18	0	1.82*	5*
S51 Beyond the economical benefits that GGTs can generate, there is also the advantage of living surrounded by Galapagos' natural wonders	1.08	3	0.34	1	0.77	2	0.66	2
S52 GGTs are animals that help us to understand and value the complex and interconnected world we live	-0.36	-2	0.13	1	-0.45	-1	1.27*	4*

Table 1 continued

Statements	Factors								
		1		2		3		4	
		Z-score	Rank	Z-score	Rank	Z-score	Rank	Z-score	Rank
S53 GGTs are the example of what has to be done with the archipelago; this means": protecting and conserving it so that it can last for many generations		-0.23	-1	1.39	5	0.69	2	0.29	1
S54 GGTs are unique and endemic species, and this is why we all should contribute to their conservation in order to avoid their extinction		0.75	3	1.13	3	0.75	2	0.54	2
S55 GGT is a charismatic and harmless species with which man can peacefully live side by side		0.37	1	0.33	1	0.83	3	0.41	1
S56 GGT symbolizes the survival and adaptation of all the species of the world under different circumstances		0.73*	3*	-0.57	-2	-1.02	-3	-0.02	0
S57 GGTs were one of the most affected species by mankind, and this is the reason we currently need to protect them		-0.72*	-3*	0.96	3	1.41	5	0.52	2
S58 The GGT symbolizes the work being done on the conservation of the archipelago		0.27*	0*	1.16	3	-1.00*	-3*	1.23	4
S59 GGT is what identifies galapagueños (local people from Galapagos)		-0.06	0	-1.24	-4	-0.68	-2	0.10	0
S60 Despite the fact of living on a the day-to-day basis surrounded by Galapagos' natural environment, the influence of globalization and consumerism generates a loss of wonder and respect for nature		0.41*	1*	-0.41*	-1*	-1.21	-4	-1.44	-5
Eigen values		4.68		3.63		2.58		2.37	

* Statements significance at $p < 0.01$ level

allow us to discard 5 of the 9 factors, as they were lacking explanatory power in the study.

Factor interpretation and description

The interpretation of the factors was based on a systematic analysis using the crib sheet approach that examines the factor array (z-scores and rankings) in detail, through a systematic and consistent process that helps understanding the participants' viewpoints at a qualitative level (Watts and Stenner 2012). Therefore, it is the combination of the statistical/quantitative information from each statement in each factor (z-scores and rankings), the qualitative information from the post-sorting interviews; and our understanding of the current debates regarding giant tortoises, policies, conservation and socio-economical development in the Galapagos Islands, that allow us to generate each narrative or discourse. Table 3 summarizes each discourse by key statements and stakeholder's characteristics; whereas Table 4 presents a synthesis of the results in with the consensus and dissensus by statements and discourses.

Discourse 1: Multi-actor governance

Adherents of discourse 1 focus on social and governance issues by emphasizing changes in the Galapagos political model (S45), by breaking the webs of corruption and cronyism (S40), and by strengthening institutions (S39). It considers that there has been an overlap of institutional competences in particular within the GNP, an institution that has well performed in conservation issues (S38), but that still requires more scientific and technical criteria on which to base their decisions (S44). The adherents of this discourse agree on an ecosystem approach to conservation (S2) but conservation should also be economically profitable (S13). Conversely, market-oriented points of view with regard to giant tortoises (S21, S26) are rejected and although this discourse values giant tortoises as important symbols of evolution (S56), they consider that they have been extensively and sufficiently studied (S5).

In discourse 1, giant tortoise conservation is not of primary importance for the economy (S22). The adherents of discourse 1 strongly support the promotion of alternative productive sectors besides tourism (S27, S24). "It is precisely in the diversification of activities that we will find a sustainable development. Not by only basing our activities only on tourism" -Qsort 14-. The adherents of discourse 1 strongly agree that human settlements were not adequately managed (S16) and that there is little conservation awareness in the local community (S20, S33, S31). For the adherents of this discourse, conservation will work only with the involvement of the community and other actors (S47, S14), and thus prioritizing policies on environmental

Table 2 Summary of the Q-participants' demographical elements

Sex	
Female	12
Male	16
Average years lived in Galapagos	24
Place of birth	
Santa Cruz	4
San Cristobal	2
Isabela	1
Floreana	2
Ecuador mainland	16
Foreign country	3
Working sector	
Public	14
Private	8
NGO	4
Other	2
Working area	
Conservation	
Scientist giant tortoises	3
Conservation giant tortoises	1
Restoration of island's ecosystems	1
Conservation and sustainable development	2
Environmental management	1
Policy and decision makers	
Parrish board	1
Tourism in Santa Cruz	1
Giant tortoises	1
Science ecology	1
Agriculture	1
Galapagos Governing Council	1
GNP-San Cristobal	1
Tourism in San Cristobal	1
Sustainable development Santa Cruz	1
Tourism	
Giant tortoises ranches	5
Hotel	1
Restaurant	1
Guide	1
Biosecurity	2
Fisheries	1
Total	28

education is mandatory (S34). "There is a governance component that for me is not working. This is why governance and environmental education and in general social issues are mandatory, if you correct this then everyone including giant tortoises have a chance to thrive" -Qsort 25-.

Discourse 2: Giant tortoise and ecosystems conservation

Adherents of discourse 2 focus on giant tortoise conservation as a priority because of their ecological, scientific and socio-economical value (S9, S11). Giant tortoises need to be protected (S57, S54) which is related to the ecological role that giant tortoises have (S1, S8). "Giant tortoises have a key role in the ecological restoration of the islands, they are the ecosystem engineers of Galapagos-creating opening, dispersing seeds, etc. They are a critical component of the ecosystems of the larger islands" -Qsort27-. However, an ecosystem approach to conservation (S2) is also considered relevant. "All components of ecosystems are important for maintaining self-sustaining populations of individual species (including giant tortoises)" -Qsort27-. Positioning humans over other species (S36) and framing conservation as a mean to use species is rejected (S13, S26). Adherents of this discourse considers that the efforts invested in the conservation of Lonesome George, the last known purebred individual of the species *Chelonoidis abingdoni* native to Pinta Island (Edwards et al. 2013), as with the rest of giant tortoises (S28), is the result of hard work on conservation (S58) and should be an example for the archipelago as whole (S53). "Lonesome George was an icon for conservation, and his death is a reminder of how hard we have to work in order to prevent extinctions" -Qsort28-. Moreover, the adherents of this discourse consider that giant tortoises are not central to the identity of *galapagueños* (S59) even if giant tortoises have been extensively studied and are iconic in Galapagos (S5). "Giant tortoises have been abundantly studied, but the problem is that the information is not being transmitted, or has not been disclosed and this is why people do not know what's being done" -Qsort16-.

Similar to the adherents of discourse 1, adherents of discourse 2 agree that human settlements were not adequately managed (S16) and that there is little conservation awareness in the local community (S20, S19) but that the economical benefits from tourism are raising awareness (S25). This discourse supports the re-enforcement on environmental education policies by the major decision-making institutions (S34) and supports the GNP work and decision making (S44). However, adherents of discourse 2 disagree with the idea of managing the archipelago only with local people (S29): "Thinking that only the *galapagueños* know the reality of the islands is also a myth! It is always positive to count on the experience on what is being done in other parts of the world and that people from the outside give us a hand. Not that they do our job but that they can guide us" -Qsort22-.

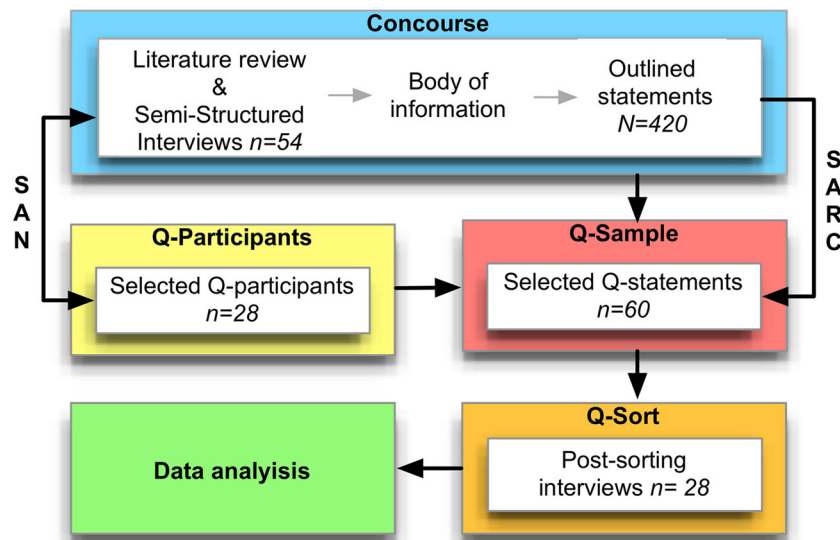


Fig. 2 Diagram flow for gathering data in Q methodology. From the *top left to right*: a stakeholder analysis (SAN) was used to identify and capture the spectrum of opinions occurring in Galapagos (Table S2) and to further identify relevant Q-participants. A structured approach to reduce the concourse (SARC) from 420 to 60 statements was used to generate the Q-sample. Q-participants ranked the Q-statements according to her/his preferences (agreement or disagreement) over a forced Gaussian distribution from -6 to $+6$ (Fig. 3). Post-sorting interviews were conducted to record participants' reactions to particular statement(s) of their interest, upon Q-sort completion

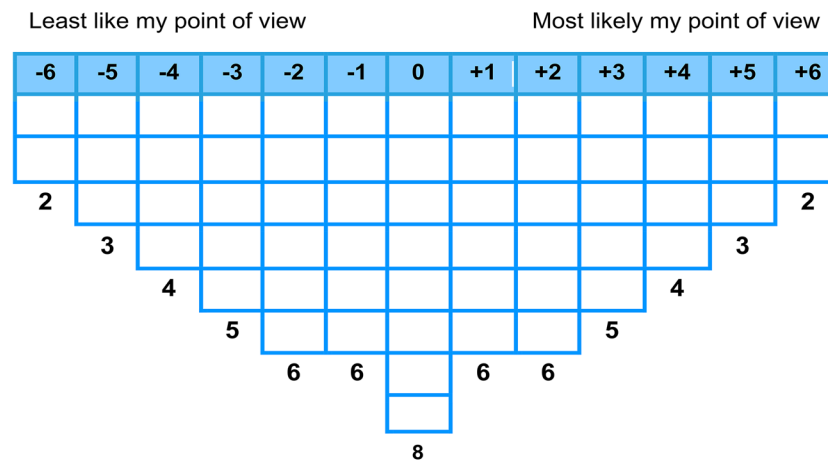


Fig. 3 Example of pyramidal quasi-normal distribution used to sort and rank the Q-sample. The *black bold numbers* indicate the total number of Q-statements that needed to be placed on each ranking category

Adherents of discourse 2 agree that there is a positive environmentalism in Galapagos (S35) and that the success in conservation in Galapagos is a consequence of public policies for conservation, the hard work of several institutions in favour of conservation (S37). Hence, promoting a sense of responsibility for conservation within all institutions in Galapagos is considered more important (S41) than political or institutional changes (S36, S39, S40, S43). As one of the loaders clarified: “It is useless that only the GNP protects the protected areas when inside the urban and rural

areas there is a chaos. Everything done in the urban or rural areas affects the protected areas and vice versa. We have to break the scheme that the GNP is the only responsible for conservation” -Qsort22-.

Discourse 3: Community governance

Adherents of discourse 3 reflect concerns of the local communities, particularly in terms of social needs and inclusion emphasizing community empowerment over



Fig. 4 Major research steps. **a** iconic Galapagos giant tortoise (*Geochelonoides* spp.) at a touristic farm in Isabela Island, **b** interviewee from touristic farm in Isabela Island, **c** scientist; and **d** decision maker, completing the *Q*-sorts in Santa Cruz island (photographs by F. Benitez-Capistrós)

institutional change. Adherents of this discourse agree that institutions have not adequately managed the archipelago, neither socially nor environmentally (S16, S37, S38, S44), and expresses distrust for politics and politicians (S18) “If politics would not be involved we could do a much better work in conservation. Many themes have been left aside because maybe politically it is not convenient to show internationally the state of Galapagos to the world” -Qsort10-. Therefore, adherents of this discourse disagree with empowering municipal and governmental institutions (S43, S39). “I would agree to empower municipalities if they were to serve the community. However, empowering the municipalities will only serve the same people, and that needs to change” -Qsort7-. Adherents of this discourse 3 consider that what Galapagos needs is to break the web of corruption and cronyism (S40) and let the *galapagueños* and the people that live in the islands—who in a large proportion do not even know their homeland (S30)—to

manage the archipelago socially, environmentally and economically (S29). “I am aware that we need help, we still do not have the capacity, but for me it would be ideal” -Qsort9-.

Adherents of this discourse 3 also agree that the community is not aware of conservation (S20, S33) but differentiate among local groups: “Galapagueños are more aware of conservation but it is the people coming from outside who are not really aware. There are some that assume the responsibility but others just come to Galapagos to do business and there is no respect” -Qsort7-. Interestingly, adherents of this discourse disagree with the promotion of environmental education as a policy priority (S34), but do consider that the GNP needs to make an effort to better relate to the community (S14). Adherents of this discourse consider humans and nature as equals (S36) and state that there is a moral duty to protect giant tortoises (S57), but emphasize the importance of controlling

Non Graphical Solutions to Scree Test

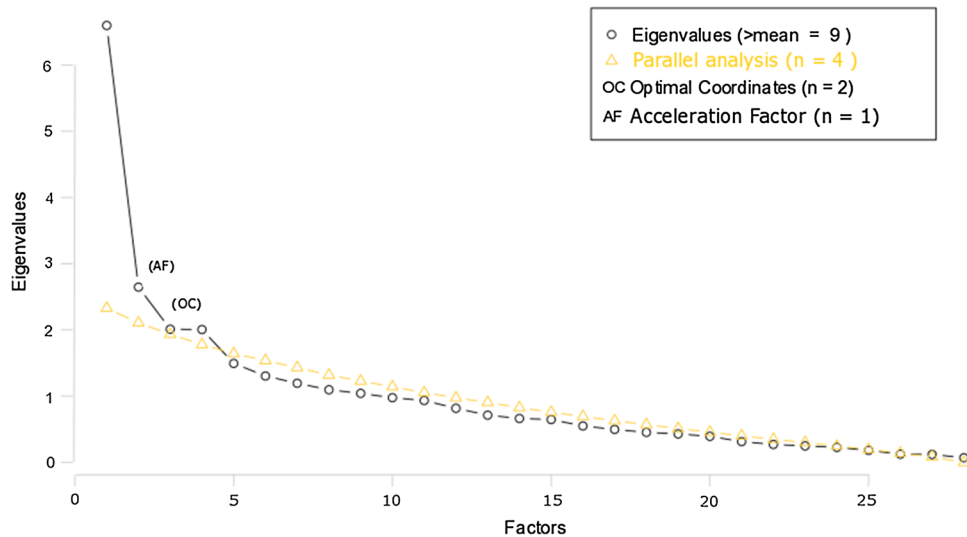


Fig. 5 Non graphical solutions to the Cattell subjective scree test. EVs as major factor extraction decision criteria. An acceleration factor (af) and the optimal coordinates index (oc). The *af* indicates where the elbow of the scree plot appears. It corresponds to the acceleration of the curve. The *oc* are the extrapolated coordinates of the previous eigenvalue that allow the observed eigenvalue to go beyond this extrapolation (made by a linear regression using the last eigenvalue coordinates and the $k + 1$ eigenvalue coordinates) (Raichem and Magis 2011). See also Electronic Supplementary Material Table S3

introduced invasive species (S17). “The eradication of invasive species and the restoration of endemic species must go together. Unfortunately this is not happening because the political parties affect this process and do not let us improve” -Qsort 10-.

Moreover, adherents of discourse 3 do not consider that the giant tortoise symbolizes work in conservation (S58) or that it is even successful (S11). Adherents of this discourse disagree that giant tortoises have a relation with human activities in Galapagos (S49) but consider them a charismatic species (S55) and important for attracting tourists (S21). Although there is an agreement that giant tortoises need to be studied because of their evolutionary importance (S3), adherents of this discourse consider that there is no disclosure of scientific knowledge about giant tortoises (S7). “Scientific knowledge of giant tortoises should be disclosed so that people know what is being done. This is important because many people complain that they do not know what scientists are doing and if it is going to work or be useful for something” -Qsort 7-.

Discourse 4: Market and tourism centred

Adherents of discourse 4 reflect a discourse that acknowledges institutional deficiencies (S16, S40) but see a positive environmentalism in Galapagos (S35). They state that politicians do not demonize conservation and that investment in conservation and social issues is similar (S15). Contrary to the adherents of discourse 1 and 2, adherents of

discourse 4 agree that conservation should be focused on iconic species (S2). Giant tortoises’ conservation is considered a priority not because of ecological or evolutionary reasons (S3, S1) but because human activities are related to them (S49): tourism, economy (S22) and science (S9). For the adherents of this discourse, giant tortoises represent the hard work in conservation (S58) and this represents the archipelago at a global scale (S50). Although adherents of this discourse consider that giant tortoises should not be looked at as commercial products (S26), they support the god-parenting of giant tortoises (a pilot programme developed in Isabela island with the idea of giving farmers the chance to protect giant tortoises in their farmlands for later restoration; which at the same time allowed some eco-tourism chances) (see Cameron 2005): “God-parenting is interesting, because on the one hand you help generating awareness about conservation, you protect giant tortoises; and on the other hand you can have an economic benefit. For example, you can have a restaurant and this also promotes the local economy” -Qsort 18-.

Adherents of discourse 4 agree that humans are more important than any other life forms over nature (S36) and like those adhering to discourse 3, agree that Galapagos needs to be managed by local people (S29): “I have seen many cases that people just come to Galapagos to take advantage of it, to make money and they pass over conservation, laws and they just do not care about anything, people that come here only see the dollar sign” -Qsort4-. As with the rest of discourses, the adherents of discourse 4

Table 3 Discourses by key statements and stakeholder's characteristics

Discourse	Key statements*	Stakeholder's characteristics			
		Q-sort	Sector	Work area	Agency/institution
1. Multi-actor governance	45, 40, 39, 38, 44, 2, 13, 21, 26, 56, 5, 22, 27, 24, 16, 20, 33, 31, 47, 14, 34	6	Private	Tourism	Hotel owner
		12	Public	Sustainable development	Municipality
		13	Public	Tourism	Municipality
		14	Public	Agriculture	Ministry of Agriculture (MAGAP)
		15	Public	Government	Galapagos Governing Council (GGC)
		23	Public	Tourism	Municipality
		24	Public	Fisheries	Fishermen association
		25	NGO	Conservation and S. development	Conservation international
2. Giant tortoise and ecosystems conservation	9, 11, 57, 54, 1, 8, 2, 36, 13, 26, 28, 53, 59, 5, 16, 20, 19, 25, 34, 44, 39, 35, 37, 41, 36, 39, 40, 43	16	Public	Giant tortoises	GNP
		22	Public	Decision maker	GNP
		27	Scientist	Conservation giant tortoises	University of Georgia
		28	NGO	Conservation giant tortoises	Galapagos Conservancy
3. Community governance	16, 37, 38, 44, 18, 43, 39, 40, 30, 29, 20, 33, 34 14, 36, 57, 17, 58, 11, 49, 55, 21, 3, 7	7	Public	Restoration islands ecosystems	GNP
		9	Private	Tourism	Restaurant owner
		10	Independent	Conservation giant tortoises	No affiliation
4. Market and tourism centred	16, 40, 35, 15, 1, 2, 3, 9, 49, 22, 58, 50, 26, 36, 29, 20, 33, 60, 34, 47, 41, 39, 43, 27, 24, 42	4	Private	Tourism giant tortoises	Tourism lodge
		18	Public	Biosecurity and farming	Galapagos Biosecurity Agency (GBA)
		21	Private	Tourism giant tortoises	Giant tortoises touristic ranch

* Statement significance at $p < 0.01$ level

agree that there is little conservation awareness within the local community (S20, S33); but consider that it is not caused by global external influences (globalization and consumerism) (S60) but by the lack of environmental education programmes that need to be established as a policy priority by all the decision makers (S34). The adherents of this discourse disagree with locals supporting institutions (S47) and with the statement that all institutions in Galapagos share responsibility regarding conservation (S41). Institutionally, adherents of discourse 4 agree with institutional strengthening of the Galapagos Governing Council (GGC) (S39) but not with empowering municipalities (S43): “Municipalities are not working; they only see what is in the interest for them. They do not give sanctions to the people because they don’t want to make enemies and because they win votes” -Qsort18-.

Adherents of discourse 4 disagree with changing the current economical model but, as with discourse 1, support the promotion of alternative productive sectors (S27) besides tourism (S24): “Of course not only tourism. There

are people that also work in fisheries. This sector should be promoted because sometimes tourism decreases and the economy of the islands, which relies on tourism, is affected and then everyone here is affected. So, if there are other activities, it can help to compensate a little” -Qsort4-.

Consensus and dissensus statements among discourses

The analysis of the results with R, also indicated that there were 6 consensus statements significant at $p > 0.01$ and $p > 0.05$ (S4, S20, S23, S26, S54 and S55). Three statements (S20, S26, S54) generated the strongest consensus to the extremes of our rating scale ($\text{Med} \geq \pm 2.5$) and were considered as relevant. The three remaining statements (S4, S23, S55) were considered non relevant ($-2.5 \leq \text{Med} \leq \pm 2.5$) because of their central ranking tendency. Statements 27, 41, 43 are significantly the most different among each factor comparison ($*p < 0.05$ or $**p < 0.01$ levels), suggesting these statements to be most controversial.

Table 4 Synthesis of results with identified category, forming statement (FS), discourse(s) agreement (A) or disagreement (D) and the identified consensus (CN) or dissensus (DS)

Identified category	FS	A	D	CN/DS
Conservation				
Ecosystem conservation	S2	1, 2	4	DS
Conservation–profitability	S13	1	2	DS
Giant tortoises’ market-oriented views	S21	1		
	S26*		1, 4	CN
Positioning humans over other species	S36	1, 4	2	DS
Giant tortoises conservation priorities	S1		2, 4	CN
	S3		4	
	S8	2		
	S9	2		
	S11	2		
	S22	1		
	S54*	2		
	S57	2		
Actors’ inclusion in conservation	S14	1		
	S47	1		
Control of invasive species	S17	3		
Governance				
Institutional strengthening	S39	1, 4	2, 3	DS
	S43**		2, 3, 4	CN
	S14	3		
	S44	1, 2		
Institutional involvement in conservation	S41**	2	4	DS
Political/economical changes	S45	1	4	DS
Breaking webs of corruption	S40	1, 3, 4		CN
Alternative productive sectors	S24*	1, 4		CN
	S27*	1, 4		CN
Adequate public policies of conservation	S37	1		
Environmental education prioritization	S34	1, 4	2	DS
Management				
Effective management of human settlements	S16		1, 2, 3, 4	CN
Only by locals (galapagueños)	S40	3, 4		CN
Community related				
Conservation awareness	S19	2		
	S20*	1, 2, 4		CN
	S33	1, 3, 4		CN
	S31	1		
	S25	2		

Most consensual (*) and significantly the most different statements (**) among each factor comparison (* $p < 0.05$ or ** $p < 0.01$ levels)

DISCUSSION

Q methodology (Q) has proven to be a strong method to map discourses around sustainability and conservation (Barry and Proops 1999, Addams and Proops 2000). Although Q does not allow making quantitative generalizations, our results confirm that diverse views and

values—ranging from the intrinsic value of species to the use-values of nature to humans—exist across a wide range of individuals and organizations in Galapagos. We see that influential managers and decision makers from the local government and authorities (municipalities, ministries, GNP) and NGOs represent discourse 1 and 2; whereas locals with no managerial influence represent discourse 3

and 4. Moreover, we could map different points of view about several relevant conservation and sustainability issues that can be related to known conservation discourses that have emerged over the past decades and have influenced Galapagos' conservation perspectives over time. Moreover, it is important to note that no discourse questions the importance of giant tortoises. This might be related to the fact that giant tortoises are positioned in the worldview and local views on conservation because the Galapagos archipelago has a role (leading image) in conservation conflicts around the world. The importance of giant tortoises in Galapagos can thus be argued to be intrinsically recognized at different levels of organization and prioritization in society, which allows one to think that prolonged conservation of iconic species has the potential to shape values and favour conservation.

In our research, we can trace Mace's conservation framings into four discourses. For example, we see that all four discourses share elements of the 'nature for people' discourse where an ecosystem approach to conservation (discourse 1, 2, 3), ecosystem services and economical value are prioritized (discourses 1, 4). However, we can also see that discourse 2 shares more elements of both 'nature for itself' and the 'nature despite people' discourses, where species, wilderness, protected areas, habitat loss and threatened species are prioritized. Discourse 3, on the other hand, is related to the 'people and nature' where socio-ecological systems and resilience and adaptability are prioritized. Mace's (2014) conservation discourses are interesting as a global temporal structure but her analysis was not intended to give the detail and context of a specific place and conservation case. Each discourse reflects differences that not only relate to conservation framings but also to modern environmental and conservation governance theory (Lemos and Agrawal 2006; Dressler and Roth 2011; Jepson and Ladle 2011).

Situating discourses in conservation governance theory

Governance in Galapagos has been often coined as inefficient and weak (Ciccozzi 2013; Benitez-Capistros et al. 2014). This has also been pointed out in the four discourses in particular with statements S16 and S40. Governance challenges in Galapagos can be related to different views on conservation governance that we identified in each of our four discourses. In recent years, international scholarly and policy debate concerning the appropriate approach to conservation has led to the re-emergence of a variety of approaches such as protectionist approaches, participatory community-based conservation (CBC), regulatory; and, non-state market-driven approaches (Fletcher 2010; Dressler and Roth 2011; Jepson and Ladle 2011). The last

two contrasting approaches: (i) regulatory and (ii) non-state market-driven conservation, are increasingly interdependent. Although certain elements of these two approaches can be traced in all four identified discourses, they surface most clearly in the 'multi-actor governance framework' (Discourse 1); and in the 'market tourism-centred' discourse (discourse 4).

Regulatory conservation governance is intended to control any harvest and/or trade of species at risk of extinction by unifying international regulatory regimes (i.e. CITES), supporting institutions (i.e. WWF), and domestic legislation (Jepson and Ladle 2011). Discourse 1 is closely related to this approach as it focuses on strengthening governance and institutional components (S40, S43, S39), prioritization of social development issues (S34, S27, S44), the involvement of the community and other actors (S47, S14) and prioritizing policies on environmental education (S34). A similar finding, framed under this regulatory conservation governance is also highlighted in one of Cairns et al. (2013) discourses, where the power and control of the natural resources in Galapagos absconds to the regulations by international community (e.g. UNESCO). Jepson and Ladle (2011) warn that its effectiveness depends on the existence of sufficient political and bureaucratic will, on the resources to enforce policies on the ground, on an accurate and up-to date knowledge of species population trends, and on responses to target species and on the willingness and ability of the public to abide by conservation regulations. This last issue requires special attention, since the lack of conservation awareness in the local community (S20) has been repeatedly highlighted in conservation discourses research in Galapagos (Cairns et al. 2013). It might be one of the reasons why trusting in the regulatory conservation governance in Galapagos can prove to be misleading in practice.

The non-state, market-driven approach entails the enrolment of market forces to embed environmental and social values within supply chains and within the process of production (Jepson and Ladle 2011). Discourse 4 has a clear market-driven approach. It is not concerned about political or economical changes (S45, S46), although it does support social development issues (S34, S27) in line with discourse 1. Conservation-tourism-economy is strongly symbiotic in this group, a consequence of the multiple 'nature for people' framings that promote resourceist approaches to conservation (Buscher and Whande 2007; Dressler and Roth 2011). Moreover, contrary to discourse 1 and 2, adherents of discourse 4 consider that conservation should focus on iconic species (S2). Giant tortoises have an iconic symbolic connotation (S58, S50) in terms of conservation, in relation to human activities (S53, S49, S22, S9) and in relation to their importance for touristic purposes (S42). This non-state, market-driven approach to conservation has been criticized

for the exacerbation of social, political and economy inequality and warrants some attention in the sense that the non-state, market-driven approach to conservation lacks regulatory strength, favour certain consumers and producers, lack a systematic focus or targeting and at worst are little more than marketing tools that support corporate “green-washing” (Gulbrandsen 2004). It is important to note that although the market-driven conservation governance can be thought to be equal to resourcist approaches conservation governance (e.g. neoliberal); they are distinctively different in character, impact and outcome. A resourcist conservation might refer to an increased co-production of capitalism and conservation; where a variety of actors adopt markets as a panacea to solve environmental crisis (Buscher and Dressler 2007).

Giant tortoise and ecosystems conservation (discourse 2) can be contextualized with the protectionist paradigm of conservation governance. Discourse 2 reflects the so-called ‘deep ecology’ perspective that claims an essential human need for connection with pristine ‘wild’ spaces (Fletcher 2010). This approach is reflecting the discourses of an epistemic community of knowledge-based experts who aim at influencing governance towards more radical conservation approaches. Hence, adherent of discourse 2 focus more on science, conservation (S35, S37, S38) and giant tortoises (S10, S57, S54, S17) than on social, governance and political issues (S29, S36, S39, S40, S43, S45, S35). In fact, this discourse considers that the conservation of the giant tortoises is relevant for scientific and social–economical reasons (S9, S11). Discourse 2 is strongly rooted in science and in functional ecological theory, and the effectiveness of research–discourse–action in Galapagos. The iconic giant tortoises have been used to bridge research, conservation discourses and actions throughout practical and successful conservation actions and interventions (Blake et al. 2013; Hennessy 2013; Gibbs et al. 2014). Yet, although giant tortoises are considered scientifically successful (e.g. abundantly studied and well conserved), an ecosystem approach to conservation (S2) is considered important in order not to ignore other ecosystem priorities.

Finally the community-centred discourse (discourse 3) is closely related to the CBC governance literature. Emerging in the 1990s, it was based on the idea of achieving conservation and sustainable development simultaneously (Berkes 2004). Adherents to discourse 3 consider giant tortoises charismatic (S55) and important for tourism (S21), but not for conservation (S28, S11, S58). Discourse 3 is more concerned about the redistribution of benefits and community empowerment and involvement (S42, S46, S29). In line with what Chase et al. (2004) state, discourse 3 reflects the contestation by local users dissatisfied with institutions and with management, frustrated with insufficient opportunities for participation and

involvement in conservation and wildlife management. In this sense, it is important to note that although discourse 3 is also concerned about species and protected areas (S36), it is also confronted with valuing biophysical processes that are provided by nature (e.g. form, adaptability and resilience), which span long-term temporal, physical and spatial scales with which human management cannot cope (Mace 2014). In fact, community governance approaches have been widely criticized either by broad biodiversity conservation agent that features conflicting objectives such as species protection and sustainable development (Wilshusen et al. 2002); not by its implications with the resourcist ideology where marginal communities are disenfranchised from their local resources as these become incorporated into extended market structures; as well as to the increase of influence over local resource by corporations and international agencies (Fletcher 2010).

Consensus, dissensus and controversial statements

Consensus, dissensus and controversial statements allow us to propose shared conservation/management practices supported by different group of stakeholders, which have key practical hands-on implications. The three most significant consensus statements (S20, S26, and S54) ($p > 0.01$) refer to interrelated societal attitudes and values with giant tortoises, with S20 indicating the recurrent low conservation awareness in the community in Galapagos (Cairns et al. 2013) and S26 and S54 reflecting the intrinsic valorisation of giant tortoises: a moral-duty conservation discourse commonly identified in the context of iconic species conservation (see Rastogi et al. 2013). However, this intrinsic valorisation of giant tortoises can be contrasted with other elements of the four identified conservation discourses in this research; in particular the more utilitarian ones (discourse 1 and 4). The effects of valuing a species as a product (e.g. natural capital) in a society with low conservation awareness and mainly driven by economical pursuit, could have detrimental ecological effects that need to be considered.

The three statements that proved to be most controversial (S27, S41, S43) referred to the type of expected economical and institutional changes. The most contrasting views from discourse 1 and 2 reflect different approaches to conservation (market and tourism vs. giant tortoises and ecosystem conservation). S27, the promotion of agro-production, was argued to be the solution for avoiding the importation of goods and controlling introduced species (Q-sort13). However, S27 could be outweighed by the implications that the promotion of agro-production could have at the various levels; in particular at the ecological level due to the high fragility of islands ecosystem. Hence,

S27 could become a true ‘wicked problem’ meaning that the solution to a problem could become an even bigger problem.

The other two controversial statements (S41, S43) refer to institutional power-based changes. After analysing *z*-scores and rankings (Table 1) we noted similarities between discourse groups. However, we see that a separation between stakeholders with formal, institutionalized and decision-making power (influential stakeholders) and those with none or less influence (non-influential stakeholders), is determined by their institutional affiliation, which explains the groups discourse 1–2 and discourse 3–4 (Table 3). These controversial statements show how language reflects the existing power relationships that are constructing Galapagos society and that are being shaped by recent political changes locally (Ecuador) and regionally (South America). Power bases in Galapagos have shifted from dominant private institutions and NGOs (i.e. Charles Darwin Foundation) to local governmental institutions (e.g. GNP, CGG) (Pennisi 2014). We highlight the importance of discourse analysis through Q methodology to understand the different values of different stakeholders regarding conservation with the use of iconic species. As we have identified here, the role of iconic species in conservation (beyond the ecological, intrinsic values) relies on the pervasiveness of environmental representations they are able to generate which we consider essential for a correct interpretation of context specific conservation and how this can facilitate the comparison across different conservation contexts.

Policy and conservation planning implications

As we have detailed, the four identified discourses of this study share elements of conservation governance and global conservation framings, which require to be assessed in the context of policies. For example, Table 3 indicates that discourse 1 (multi-actor governance) can certainly have more “immediate” policy implications because decision makers mostly populate this discourse category. If this regulatory discourse is to be reinforced by policy makers in Galapagos, then we suggest that it should also be challenged with the inclusion, or at least the acknowledgement of all the rest of discourses that we have found. For example, improving the relationship and inclusion of local communities in conservation and development interventions (discourse 3, 4); or the acknowledgment of the socio-ecological importance giant tortoises and ecosystems conservation in the archipelago (Discourse 2).

Nevertheless, we acknowledge that the disclosure of information about the four discourses is not a straightforward task, but communication channels such as workshops, public debates and the mandatory research talks at the GNP

can strengthen the relevance of the identified discourses. This has the potential to be effectively transmitted to local actors and also to generate punctual debates and discussions about how different conservation discourses and views are shaping Galapagos politics and governance. We also want to highlight the importance of our results for both the policy makers or local residents in terms of dissensus and its implications. Dissensus statements such as S11 (success of giant tortoise conservation) or S2 (ecosystems approach to conservation) might seem to be based on disconnected but not necessarily conflicting views, which can be easily straightened by facts and possible changes of views and discourses.

Every discourse we identified reflected a particular worldview, and with it a particular way of imagining and consequently realizing conservation or sustainable management which can certainly influence or have an effect on other species. Our study has shown how discourse analyses through Q methodology and the use of iconic species can identify the different views on local conservation discourses and can contribute to understand how these views are influenced by global conservation governance discourses. In this regard, we recognize the potential of Q methodology for studying local conservation discourses and their interconnection with global conservation governance.

Q methodology also proved adequate to identify and to work closely with policy makers and managers that are more likely to consider and acknowledge the different discourses for framing policy decisions. Although this is still difficult to assert; we see good indications of change. For example, one of the main objectives (No. 4) of the latest Galapagos management plan 2015 is to boost social participative and inclusive processes by relating the distant local communities to conservation or acknowledging the management of Galapagos as a socio-ecosystem. Although this is somehow reassuring, Galapagos decision and policy makers (e.g. GGC, GNP), ought to compare these policy intentions with the practical implementation in other protected areas around the world (Brooks 2006; Benjaminsen and Svarstad; Witter 2013) to avoid similar mistakes. In particular, we consider that any participatory process needs to expose open and honest views and opinions even if this can lead to confrontation rather than consensus building.

Galapagos case vis-a-vis other iconic species conservation conflicts

Although this study is focused in the iconic Galapagos giant tortoises, other species of both terrestrial and marine environments (i.e. sea lions, Darwin finches) have a similar potential to mobilize social actions within economical and

political contexts of protected areas. If compared to other conservation conflicts with other iconic species such as the African elephants and rhinos or tigers in India; we can note three major different conservation rationales:

1. Galapagos tortoises are arguably the best-known giant tortoises; and it appears to be of common knowledge that Galapagos were uninhabited until discovered. However, the scientific discovery by Charles Darwin contributed to the view of a spoilt paradise, of which giant tortoises are both the symbol and the victims (Hennessy 2013). This may be different in comparison to the other iconic species, which are known or felt as having had long-standing relations to human communities (Jepson and Barua 2015).
2. Unlike predators (e.g. wolves and tigers), which have been historically configured in terms of 'disgust/fear' (Emel 1995), giant tortoises and in general Galapagos' wildlife, has been historically and ecologically recognized as 'tame' and gentle (Cooper et al. 2014). Although this could be similar for example with the recent case of the white rhino in South Africa (Brooks 2006), the difference is the time people had to develop a particular stance towards a specie (i.e. respect, care) and which will imminently affect or favour a species' conservation over time.
3. The socio-ecological and political structure relevant for giant tortoises conservation in Galapagos is different from other areas. Protected areas were delimited only since 1959 in the global frame of 'fortress/protectionist conservation', but allowing human settlements in 3% (4 islands) of the total island territory (7880 km²). This situation gives Galapagos giant tortoises an advantage in terms of conservation conflicts with humans because 8 out of 11 extant species do not have a direct interference with human activities (Fig. 1). However, this is not the case in many other (non-Galapagos) settings where the geographical limits of protected areas are in direct conflict with human boundaries. For example in Tanzania, despite the official CBC discourse, influential actors (NGOs and government officials) are extending conservation areas for African elephant over territories of local communities; which generates locals' reactions and retaliations (e.g. elephant killings) against the protected species (Benjaminsen and Svarstad 2010; Witter 2013).

Although, the case study with giant tortoises in this work has differences compared to other iconic species, parallels with similar research approaches using Q methodology and other iconic species are more straightforward. For example, in their research using the tiger as the iconic species, Rastogi et al. (2013) identified five discourses which all share

elements with our results: (1) a 'community discourse' with shared elements such as: the empowerment and inclusion of local communities in conservation processes or the distrust of politics/policies. (2) An 'iconic species discourse (giant tortoises/tigers)' with shared elements such as: the support for government and public policies, and the unneeded role of local communities for giant tortoise/tiger conservation. (3) A 'top down institutional solver discourse' that shares: the role of governmental/non-governmental institutions as solvers in conservation conflicts, the acknowledgment of institutional weaknesses; and the importance of bridging conservation and community interests. Last but not least, (4) a 'wildlife intrinsic value discourse' that shares: human-nature equality and the moral duty to conserve giant tortoises/tigers.

Despite the differences, the parallels highlight the importance of using Q methodology as a reliable methodology which can be replicated, for comparing and studying conservation discourses in different contexts; and possibly also as an approach to foster our understanding of how elements of global conservation discourses can strongly influence or even shape local conservation discourses. In fact, our research has parallels with Sandbrook et al. (2011) who studied conservation discourses at a global scale. We find that both studies identify bio/eco-centric approaches to conservation (usefulness for humans), ecosystem conservation priorities, economical approaches to conservation, species intrinsic values and the ecological roles of species. A distinctive difference, however, is that Sandbrook et al. (2011) investigated the diverse views on conservation across a wide range of individuals and organizations working in conservation. In our case, individuals were working in different sectors and institutions, regardless of their relation to conservation.

CONCLUSION

The different views expressed in each discourse reflect associated values with regard to giant tortoises, conservation dilemmas and socio-political issues that steer conservation actions in Galapagos. Iconic species such as giant tortoises are key for framing conservation discourses in well-known conservation hotspots such as the Galapagos Islands. Discourse mapping with Q methodology has allowed us to identify consensus and dissensus among stakeholders and discourses. We see that discourse mapping has a direct relevance to conservation management actions. Shared views among stakeholders groups (i.e. discourses 1–4; discourses 2–3) can lead to consensual and potentially more effective debates over values that differentiate each group's aims and means. However, as also mentioned by Cairns et al. (2013), it is not an issue of increasing the amount of information about conservation in

Galapagos, but rather acknowledging divergent perspectives about desired pathways of conservation and development that co-exist in Galapagos. We consider that understanding how or why stakeholders are adhering (consensus) or not (dissensus) to a specific discourse is very relevant in conservation. Shared consensual elements of different discourses among different societal actors can allow individual's self-effort to be encouraged, stakeholders can realize collaborative actions towards common goals and the increasing possibility for partnerships (Wallis 2006). Although some shared elements of consensual and controversial statements have practical action-generating potential, and are good starting points for policy debates and stakeholder inclusion, they should not be imposed as a panacea to solve complex issues. As Sandbrook et al. (2011) argue, and this is where the consensus and dissensus are particularly relevant: Under a set of circumstances, shared policy strategies can be acceptable (consensus), but when circumstances change, it is the different values/views that exist (dissensus) that can facilitate stakeholders to adopt different strategies. Conservation needs a plurality of views (not necessarily consensus) so that actors can build more honest, adaptable and effective relationships with each other and with the wider public (Sandbrook et al. 2011).

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