

**A critical analysis of the discourses of conservation
and science on the Galápagos Islands**

Rose Cairns

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The candidate confirms that the work submitted is her own and that appropriate credit has been given where reference has been made to the work of others.

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Abstract

Conservation of the world's biodiversity is a paradigmatic example of a 'wicked problem', a problem that resists resolution because it is defined, experienced and measured differently by different people, in ways that are inseparable from a range of competing value positions. Drawing insights from political ecology, policy sciences and science studies, this thesis examines the discursive struggles around conservation in the Galápagos Islands. It charts the historical rise of a narrative of ecological crisis on the islands, examines the multiple ways in which 'the problem' of conservation is understood in contemporary Galápagos society, and reveals the different ways in which the role of science and (different types of) scientific knowledge are constructed in these debates.

The thesis is split into three empirical sections. The first takes a historical approach, illustrating the ways in which the entwined histories of science and conservation have played a key role in the discursive transformation of the islands from a damned/worthless place to a 'natural laboratory' and finally a 'paradise in peril'. The second section examines the discourses of conservation currently held by the range of Galápagos stakeholders, highlighting the political nature of apparently apolitical environmental discourses, and problematizing recent calls for Galápagos society to mobilize around a 'shared vision' of conservation on Galápagos. The final section examines how members of the 'conservation community' understand the role of science in conservation on the islands. The results illustrate the multiple ways in which the boundary between science and society on Galápagos is constructed and contested, and these findings are used to critique arguments that more science necessarily holds the key to the achievement of sustainable development and conservation in the archipelago.

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List of acronyms and abbreviations

CAPTURGAL	Cámara Provincial de Turismo de Galápagos (Galápagos Chamber of Tourism)
CBC	Community based conservation
CBD	Convention on Biological Diversity
CDF/ FCD	Charles Darwin Foundation / Fundación Charles Darwin
CDRS/ECCD	Charles Darwin Research Station/ Estación Científica Charles Darwin
CI	Conservation International
COPAHISA	Cooperativa de Pesca Artesanal de Isabela (Artesanal fishing cooperative of Isabela)
COPESAN	Cooperativa de pesca de San Cristóbal (San Cristobal fishing cooperative)
COPROPAG	Cooperativa de Producción Pesquera Artesanal Galápagos (Artesanal fishing cooperative of Galápagos)
ESRC	Economic and Social Research Council
FOGO	Friends of Galápagos Organization
FUNDAR	Fundación para el Desarrollo Alternativo Responsable (Foundation for responsible alternative development)
GAIAS	Galápagos Academic Institute for the Arts and Sciences
GMR	Galápagos Marine Reserve
GNP/PNG	Galápagos National Park / Parque Nacional Galápagos
INGALA	Instituto Nacional de Galápagos (National Institute of Galápagos)
INGO	International non-governmental organization
IUCN	International Union for Conservation of Nature
JMP	Junta de Manejo Participativo (Participatory Management Board)
MAGAP	Ministerio de Agricultura, Ganadería, Acuacultura y Pesca (Ministry of agriculture, farming, aquaculture and fisheries)
NERC	Natural Environment Research Council
NGO	Non-governmental organization
SICGAL	Sistema de Inspección y Cuarentena de Galápagos (Galápagos system of inspection and quarantine)
SSK	Sociology of Scientific Knowledge
STS	Science and Technology Studies
UNEP	United National Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WWF	World Wildlife Foundation

Chapter 1. Introduction

1.1 Discourses of conservation

Human responsibility for large and growing numbers of species extinctions is now an indisputable fact, and the conservation of the world's biodiversity is one of the great challenges facing humanity in the 21st century. Conservationists refer to the current levels of species loss as being akin to 'one of the great extinction spasms of geological history' (Wilson, 1992 p. 268), or the 'sixth great mass extinction' (Wake and Vredenburg, 2008, Leakey and Lewin, 1995), and the term 'anthropocene' has been coined to argue that humankind's impacts on the planet's geology and ecology can now be considered akin to a 'global geophysical force' (Crutzen, 2002 p. 1). However, acknowledging the pressing moral urgency of what has been called the 'conservation imperative' to prevent species extinctions (Wilhusen et al., 2003 p. 3), does not and cannot obscure the fact that at its heart conservation is a 'question of human organization' (Brechtin et al., 2002 p. 42), and as such is inevitably and inherently political. Conservation often involves difficult trade-offs between environmental and social concerns (Hirsch et al., 2011), affects livelihoods, and may act to aggravate poverty and social injustice (Brockington, 2002, Agrawal and Redford, 2009). It also has profound impacts on the ways in which a large proportion of humanity interacts with and understands the natural world (Adams, 2003). Scholars from a range of disciplines¹ have thus long argued that as environmental concerns become ever more pressing and ubiquitous in global debates and political struggles, in addition to research into the material impacts of humans on the environment, there is an urgent need for work which brings a critical perspective to bear on the existence of 'diverse, often contested, visions of the environment, environmental problems, and the forms of agency such discourses conjure into (or out of) being' (Brosius, 1999 p. 277). This thesis seeks to respond to this need by providing a critical analysis of the discourses of conservation and science currently present on the Galápagos Islands, asking how different people understand the project and ideal of Galápagos conservation, exploring the role that science is afforded in these debates, and asking what an analysis of these discourses can reveal about contemporary conservation as a social and political process.

¹ Including political ecology, anthropology, human geography and policy studies among others.

This research ties in with a body of critical literature from a range of disciplines which, while not questioning the reality of environmental and social problems, seeks to critically examine the claim that a singular self-evident problem exists, that requires an equally self-evident set of solutions. The political scientist Maarten Hajer for example, argues that ‘the new environmental conflict should not be conceptualized as a conflict over a predefined unequivocal problem with competing actors pro and con’, but rather should be seen as ‘a complex and continuous struggle over the definition and the meaning of the environmental problem itself’ (Hajer, 1997 p. 14). A similar point is underscored by researchers who apply the concept of frame analysis (Goffman, 1974, Schön and Rein, 1995) to the study of environmental conflicts (e.g. Bardwell, 1991, Gray, 2003), highlighting the fact that ‘[d]ivergent perceptions of problems are at the crossroads of conflict, implicitly rooted in divergent inculturated beliefs about the appropriate state of the world and appropriate outcomes of management’ (Mattson et al., 2006 p. 401).

In recent decades analysis of discourse and framing has become a central element of much social scientific engagement with conservation and environmentalism more broadly, and the analyses presented in this thesis tie in with what has been called a ‘discursive turn’ in the field of political ecology (cf. Bryant, 2000). Within this diverse body of work, discourses are understood as an important and powerful part of reality, conditioning the ways in which issues are understood and discussed, and creating or limiting spaces for collective and individual action in addressing these issues. Attention to discourse within the political ecology literature on conservation has not only highlighted the ways in which an understanding of the framing of conservation problems is often at the heart of understanding conflicts in conservation (e.g. Clark et al., 1996), but has also stressed the ethical need to examine the ways in which discourses act to ‘define various forms of agency, administer certain silences, and prescribe various forms of intervention’ (Brosius, 1999 p. 278). In line with much of this work, this thesis is motivated by an interest in examining the power inequalities and interests at play in these discursive struggles (cf. Frost and Wrangham, 2004, Neumann, 2004, West, 2006).

The increasing attention paid to discourse in the academic literature has also impacted on traditional understandings of participation in conservation practice and policy. Although participation has come to occupy an ever more prominent place in the language and practice of conservation and environmental policy making over recent decades (Holmes and Scoones, 2001) - most visible perhaps, in the rise of the paradigm of Community Based Conservation (Brosius et al., 2005, Western and Wright, 1994) - some scholars have highlighted weaknesses

in traditional models of increased citizen participation in conservation and environmental policy making. It has been suggested that participatory approaches may be equally as vulnerable to the influence of dominant power interests as non-participatory approaches (Peterson et al., 2005) and face additional challenges to ensure the legitimacy of decisions (Parkinson, 2003). Furthermore real participation in policy making may be limited by the dominance of particular discourses or problem frames (Stirling, 2008)². For example, Hajer and Fischer paint a picture of international environmental policy making as occurring through the actions of powerful actors loosely linked through their shared adherence to particular discourses. These often geographically disparate groups form 'discourse coalitions' which frame the issues under discussion, determine the language in which the debate is conducted, and pre-define the direction in which solutions are to be sought. Thus 'in order to be heard one needs to comply with the terms of this pre-given discourse and, at least as important, engage in a debate with the aforementioned actors' (Hajer and Fischer, 1999 p. 4). As a result of this discourse analytical work in the social and political sciences which have revealed policy making as a 'constant discursive struggle' (Fischer and Forester, 1993 p. 1), more reflexive ideas regarding participation have emerged. Notions such as 'discursive democracy' (Dryzek, 1990) have been coined to describe the ideal of participatory democracy built on open and deliberative communication (cf. Habermas, 1984), and it has been suggested that participation needs to be re-cast in terms of the 'opening –up' of policy to the full range of discourses or framings of an issue (Stirling, 2008). Thus rather than a focus on the participation of a diverse group of individuals, it is argued that participation needs to occur at the level of discourses, meaning that 'the plurality of different opinions on an issue must be given space for consideration' and 'the values, interests and subjective assumptions that underpin the construction of these different opinions must be exposed to critical reflection' (Ockwell, 2008 p. 264).

The debates around problem framing, discourse and participation all have fundamental implications for the role of science and scientific knowledge in policy making. Although science (particularly biological sciences such as ecology) has traditionally played a central role in defining conservation problems and steering conservation policies, the depiction of scientific knowledge as an objective mirror of reality has been thoroughly critiqued over 50 years of scholarship in fields such as science studies and the sociology of scientific knowledge (Kuhn,

² These critiques are distinct from what has been referred to as the 'resurgent protection paradigm' (Wilshusen et al., 2002 p. 42) which questions the effectiveness of participatory conservation initiatives from an environmental point of view (e.g. Terborgh, 1999, Oates, 1999).

1962, Latour, 1993, Jasanoff, 1995), and cross-fertilisation between these disciplines and the fields of political ecology and policy studies has resulted in calls for a more critical stance being taken towards the role of science in conservation (e.g. Forsyth, 2003). Furthermore, the plurality of legitimate perspectives around conservation, the variety of different problem definitions, and the inherent complexity and uncertainty that often characterise the issues involved, mean that conservation problems are paradigmatic examples of what Rittel and Webber (1973) originally termed ‘wicked problems.’ By their nature, these problems resist solution: they are defined, understood and measured in different ways by different academic disciplines and other forms of knowledge, and are inseparable from a range of competing value positions. As a result, there is a body of critical work that suggests that ‘wicked problems’ such as those posed by conservation make untenable the idea that ‘experts, using scientific methods, can manage the world’s problems by objective and efficient means’ (Ludwig, 2001 p. 758). There has thus been a growing emphasis on creating policy spaces for debating the role of the scientist/expert in policy making more broadly (Bloomfield et al., 2001, Smith, 2001), and suggestions that there needs to be shift away from an understanding of science’s relationship to policy as one of truth speaking to power, towards a more deliberative ideal which conceptualises the process as one of ‘making sense together’ (Hoppe, 1999 p. 201).

1.2 ‘Ecological crisis’ in Galápagos

The Galápagos Islands offer the ideal case study site in which to explore these debates. Conservation of the famous archipelago is currently the focus of a great deal of international concern which crystallized into a coherent narrative of ‘ecological crisis’ in 2007 with the (albeit temporary) addition of the Galápagos to UNESCO’s list of World Heritage sites in danger³, and the issuing of an emergency decree by Ecuadorian president Rafael Correa, stating that the Galápagos was in a state of risk, and declaring their conservation a national priority (Presidential decree No. 270, 10/04/07). A series of reports and publications produced in the following years further underscored the sense of crisis: the Charles Darwin Foundation’s 2007 publication ‘Galápagos at Risk’ argued that the current development trajectory would likely lead to the loss of an ‘irreplaceable global treasure’ (Watkins and Cruz, 2007 p. 3), while a 2009 National Park publication maintained that as a result of a lack of a ‘shared vision about

³ The islands were subsequently removed from the list in 2010 in a decision that caused some controversy among conservationists. Johanna Barry, head of the Galápagos Conservancy was quoted in the Guardian newspaper at the time (29/07/10) as saying that she believed the decision to be ‘premature’.

the what, how and why of Galápagos conservation' (Tapia et al., 2009b p. 127), the archipelago was stuck in a 'profound socio-ecological crisis' (*ibid* p.128). In their decision to add Galápagos to the list of World Heritage sites in Danger, UNESCO cited a 'multitude of problems that need urgent resolution' and argued that 'many of the indicators of conservation are declining' (UNESCO, 2007 p. 1). In addition to concerns about uncontrolled growth in tourism and associated economic development, immigration to the islands, poor governance, inappropriate development and weak bio-security, the UNESCO mission, like the National Park, cited a lack of a 'common vision for Galápagos' (UNESCO, 2007 p. 9) as one of the key issues preventing effective conservation on the islands. This plurality of opinions about conservation on Galápagos is thus widely recognized, and generally cast in negative terms as a barrier to conservation. However, while the impacts of disagreements are felt to be real, the basis for these has been argued to be less tangible: the Charles Darwin Foundation report for example, argues that: 'disagreements in Galápagos seem to result more from differences in perspectives rather than from real differences' (Watkins and Cruz, 2007, p.4), due mainly to their being 'based on assumptions and perceptions' rather than 'holistic technical analysis' and 'solid information' (*ibid* p.4).

1.2.1 Questioning calls to a shared vision of conservation

Without denying the existence of important environmental and social challenges on Galápagos, the research presented in this thesis seeks to critically examine both the narrative of ecological crisis, and the concurrent claims that what is required is consensus around a 'shared vision' of the islands, and/or 'more science' in order to address this crisis. For example, a 2008 publication that exemplifies a number of elements of the crisis narrative, begins with the assertion that: 'recent reports suggest that the development model *has turned* unsustainable and that *the natural values* of the island might be seriously at risk' (González et al., 2008 p. 1 emphases added). The implicit (though as will be argued in chapter 4, historically inaccurate) assumption of the phrase is that the development model was sustainable in the not too distant past. This framing of the threat as recent and urgent, serves to obscure the way in which the islands have been continuously shaped by humans since their discovery, and draws on a wider, powerful discourse of the islands as natural 'untouched' or 'pristine' areas into which humans are (only recently) impacting. Furthermore, the suggestion that the islands have particular, self-evident, knowable 'natural values' is to downplay or ignore the way in which these 'natural values' have changed over time, and are in fact historically specific social constructions. In exploring the ways in which the meanings attributed to the nature of Galápagos have changed over time, chapter 4 provides evidence to support this assertion.

With regard to the need for a shared vision to address the 'crisis', while it may be true for example, that there is more common ground than at first appears between apparently conflicting ideas about conservation on Galápagos, insights from the field of political ecology and other disciplines teach us not to belittle these differences in perspective with the assumption that there will be one over-riding technical solution to *the* problem. Indeed, much discourse analytical work in the social and political sciences has highlighted the political nature of struggles over meanings and problem definitions with regard to environmental issues, and the political nature of crisis narratives in particular has been widely critiqued as one of the 'primary means whereby development experts and the institutions for which they work claim rights to stewardship over land and resources they do not own' (Roe, 1995 p. 1066). The analysis of the discourses of conservation presented in chapters 5 and 6, reveal that not only is there more diversity in the discourses about conservation than it at first appears given the apparent consensus between international bodies and conservation organisations around the dominant crisis narrative, but highlights the political and value laden nature of apparently apolitical conservationist discourses. Although the plurality of discourses about conservation uncovered by this study thus largely supports the claims that there is no 'shared vision' for Galápagos conservation, where others see this as necessarily negative, and suggest further research and education are required to build consensus, the results presented here suggest that acknowledging the plurality of perspectives is important, and that the search for societal consensus around the crisis claim is both unlikely to succeed, and inappropriate to attempt. In fact, the global trend toward consensus-building and the search for 'win-win' solutions in conservation has been remarked upon and critiqued as one of the more 'subtle effects of neoliberal transformation' of conservation (Buscher, 2008 p. 230), which is itself argued to be ultimately damaging to both conservation's aims, and social justice (Brockington and Igoe, 2007, Igoe et al., 2010). Instead, Leach and Mearns argue that

'a "democratic" approach to the research-policy process aims precisely to reveal the hidden social and cultural assumptions underlying apparently incommensurable world views... [and that rendering] such conflicts explicit may enable them to be addressed more openly, rather than remain concealed in hegemonic environmental readings and policy' (Leach and Mearns, 1996a p. 33).

Calls to 'more science' and in particular more interdisciplinary and applied science are another prominent element of the ecological crisis narrative (Tapia et al., 2009c). Implicit in these calls is a conceptualisation of science as an objective and value-neutral enterprise, and an assumption that the generation of more scientific information about the archipelago will necessarily lead to 'better' policy making for conservation and sustainability. However, insights from the fields of science studies and policy sciences suggest that neither premise is

entirely accurate (Jasanoff, 1995, Collingridge and Reeve, 1986, Pielke, 2007, Sarewitz, 2004). The material presented in chapters 7 and 8 reveals the diversity of discourses around science in conservation as held by members of the 'conservation community' on the islands. The boundary between science and conservation emerges as a contested site, and the value-laden, and political nature of the discourses around science are critically analysed. Calls to greater inter-disciplinary collaboration in conservation are problematized by the existence of fundamental differences in disciplinary conceptualisations of what science and conservation are, and the debilitating effects of a power hierarchy between natural and social science disciplines which acts as a barrier to meaningful collaboration.

The shifting, historically specific nature of the values and meanings attributed to the Galápagos environment, coupled with different contemporary societal understandings and problem framings around conservation, and different disciplinary perspectives of scientists and conservation managers towards the role of science in conservation, provide empirical evidence of the claim made by Ludwig (2001) that when dealing with 'wicked problems' such as those posed by conservation, 'there are no experts, nor can there be' (p. 763). Ludwig argued that rather than rely on expert analyses, 'we should establish and maintain a dialogue among the various interested parties...[which, in principle] includes all of us' (*ibid.* p 763). It is hoped that through the application of tools such as Q method and environmental history to reveal and explore the discourses that frame the debates around science and conservation in Galápagos, the material presented in this thesis can help to achieve this goal. With this in mind, the overall aim and research objectives of the thesis are listed in Box 1.1.

Box 1.1

Research aim and objectives

Aim: To contribute to a greater understanding of the social and political dimensions of biodiversity conservation on Galápagos through an analysis of the discourses of conservation and science on the islands.

Objectives:

1. *To investigate the changes in the discursive construction of the Galápagos Islands throughout their history.*
2. *To investigate and analyze the variety of discourses about conservation currently present on the Galápagos Islands.*
3. *To examine different discourses about the role of science in conservation currently held by conservation practitioners and scientists working on the Galápagos Islands.*
4. *To analyze the implications of the results for conservation on the Galápagos Islands and beyond.*

1.3 Thesis contributions

The contribution of the work presented in this thesis can be viewed from both an academic, and more practical/instrumental viewpoint. Through the use of Q methodology this research brings a novel empirical focus to debates in conservation biology and political ecology about different framing assumptions and values in conservation, which, in the existing literature have often tended to be ‘based on philosophical or principled arguments’ (Sandbrook et al., 2010 p.286). Similarly, debates about the role of (different types of) science in conservation, and disciplinary tensions within conservation have often taken the form of ‘anecdotes, relayed by researchers and practitioners in editorial style contributions that detail their own experiences’ (Welch-Devine and Cambell, 2010 p. 340). The approach taken in this thesis is to explore these debates empirically, providing evidence not just of the existence of diverse views or discourses, but exposing and critically scrutinizing the underlying assumptions and values that structure these, and the politics that flow from them. The two Q studies - a broad issue-framing Q study exploring social perspectives towards conservation, and a more focussed Q study regarding the particular role of science in conservation - in conjunction with the historical analysis, provide empirical evidence of the broader societal struggles over meanings and problem definitions in conservation, as well as illustrating the diverse ways in which the

boundary between science and society is discursively constructed and contested by different individuals within the broadly defined 'conservation community' on Galápagos.

In turning the lens of investigation in upon this diverse and heterogeneous conservation community the thesis answers calls for more nuanced accounts which do not portray conservation as a 'monolithic practice with identical practitioners' (Redford, 2011 p. 326). Instead the aim is to build knowledge that can help to facilitate '[c]ollaboration built on an understanding of ... variation within conservation, its sources, and its consequences... [and thus] provide a grounded understanding that would help [conservationists in their] practice and more accurately portray the work of conservation practitioners' (Redford, 2011 p. 326). In a related vein, by using Q method and ethnography to explore some of the disciplinary tensions in conservation, the research responds to calls for work that examines the 'cultures of diverse scholarly disciplines and the way they frame the worldviews of research practitioners' (Head et al., 2005 p. 10).

From a practical viewpoint, it is hoped that by critically examining the discourses around science and conservation, the results will contribute to greater self-awareness between proponents of the various views and thus facilitate more meaningful dialogue and potentially, enhanced collaboration in conservation. Interdisciplinary and trans-disciplinary work carried out at the border between the social and biophysical sciences have long been highlighted as being of crucial importance in conservation globally (cf. Ewel, 2001, Mascia et al., 2003, Balmford and Cowling, 2006), and Galápagos is no exception (Tapia et al., 2009b, PNG, 2006). However, on Galápagos, these calls for increasingly interdisciplinary work are taking place in a context in which some of the basic assumptions about the nature of conservation, the roles of different disciplines within conservation, and the potential barriers to inter-disciplinarity remain un-stated and unexamined. Indeed this appears to be a global issue, even as calls to bridge disciplinary divides appear ever more urgent (Fox et al., 2006). As Welch-Devine and Campbell argue: 'little research has been undertaken on the challenges of making conservation interdisciplinary, either within a broader group of conservation researchers or practitioners, or within specific contexts' (Welch-Devine and Cambell, 2010 p. 340). This research seeks to address this shortcoming, by exposing and exploring the different societal views of conservation – illustrating the divergent subjective ideals and values that structure different perspectives towards conservation - and furthermore exposing the different ways in which practicing scientists (of different disciplines), managers and policy makers, conceive of the role of science in conservation on Galápagos.

Finally, an issue that has been commented on by various authors is the apparent disconnect between the debates occurring in fields such as science studies and political ecology, and those occurring in fields such as conservation biology, or among practicing scientists attempting to produce policy-relevant science. As Vogel et al. put it:

‘although there is extensive research into ‘the social contract between science and society... and the science policy or (more generally) science practice interface ... [the attempt to] produce “useful” science occurs separately from this study of the science-practice interface’ (Vogel et al., 2007 p. 350).

In a similar vein, MacMynowski argues that ‘there is almost no overlap between the STS literature on interdisciplinarity and the discussions in ecology oriented journals’ (MacMynowski, 2007 p. 2). One of the further contributions of this thesis therefore lies in its linking of diverse literatures from science studies, political ecology and policy studies in the context of an analysis of conservation, in ways that are accessible and relevant to conservation practitioners.

1.4 Why Q methodology?

The central method for elucidating and analysing discourses that has been applied in this thesis is Q methodology. Originally developed in the field of psychology in the 1930s for the study of subjectivity (Stephenson, 1935), Q methodology is currently used in a range of social sciences to better understand subjective viewpoints or discourses about a wide range of different topics. The Q method (which will be explained in full in section 3.2.1) was selected for this thesis due to the way in which it has been argued to facilitate a democratization of the research process and the systematic reduction of researcher bias, and hence dovetails with longstanding calls from within political ecology for researchers to take reflexivity more seriously (cf. Leach, 2008). For example, the Q process emphasizes the meanings attributed to statements by participants themselves rather than categories pre-formulated by the researcher, thus as Robbins and Krueger put it: ‘by allowing the categories of analysis to be manipulated by the respondents, the researcher loses the exclusive power to signify the reality of the researched’ (Robbins and Krueger, 2000 p. 645). Dryzek and Berejikian argue that this focus on participants’ own frames of reference thus make it a ‘more reflexively democratic than other forms of measuring public opinion’ (Dryzek and Berejikian, 1993 p. 59). The reflexive nature of Q methodology as a research tool mean that it is increasingly finding application by political ecologists interested in understanding conflicts around natural resources (Robbins, 2006).

Furthermore, as a result of recent work in policy sciences calling not just for participation, but for the inclusion of diverse perspectives, knowledges and framings of policy issues into policy appraisal (Stirling, 2008, Elgert, 2010, Forsyth, 2003), there has been an increasing interest in tools and methodologies that might facilitate this process. Q method has been highlighted as particularly valuable in this context given its potential to reveal perspectives that may be under-represented in current policies, and may not be revealed by other forms of discourse analysis (Ockwell, 2008).

Finally, as will be discussed in chapter 2, conservation is an inherently multi-disciplinary endeavour, often spanning or dissolving traditional disciplinary boundaries. Q method's 'quali-quantitative' nature (drawing on both statistical analyses and more interpretive discourse analysis) provides a helpful bridge between the natural and social sciences (Sell and Brown, 1984), and is thus a useful tool for facilitating dialogue between these divergent research traditions. The choice of Q methodology thus also contributes to the interest of the thesis in promoting enhanced interdisciplinary understanding and communication, as a first step towards collaboration in conservation.

1.5 Discourse analysis: accessibility, ethics and application

Within conservation circles, research with a discursive focus, especially work that takes a more critical approach to science in conservation can be controversial. Some conservationists have reacted against what they see as an insidious 'assault on the legitimacy of scientific expertise and knowledge' (Mulder and Coppolillo, 2005 p. 176), others even claim that loosely defined 'postmodernist perspectives have accelerated environmental degradation' (Attwell and Cotterill, 2000 p. 571). Even from within the field of political ecology itself there have been concerns voiced that an undue focus on discourse may 'result in a turn away from the material issues that, after all, prompted the birth of Third World political ecology in the first place' (Bryant and Bailey, 1997 p. 192). Alert to the polarizing tendencies of these debates, it is the contention here that there is a need for work which, while critical to a degree, is also accessible and relevant to conservation practitioners. It is not the aim here to provide a critical analysis of conservation science that will be inaccessible, or highly critical to the point of alienating and thus becoming irrelevant to conservation biologists. The account presented here is thus in line with the work of authors such as Takacs, who suggests that much critical analysis of environmental science risks losing a potentially interested and key audience in conservation biologists. He highlights what he sees as a tension between particular studies and the scholars 'who would toe the academic line to further the relativist theorizing of the

discipline – no matter how alienating to practicing scientists – and those [like Takacs] who would bring science studies to the people we study’ (Takacs, 1996 p. 7). Martin (1993) makes a similar argument regarding the importance of accessibility in critical studies of science when he suggests that the excessive use of jargon and the levels of reflexivity, and relativism in evidence in much of the science studies literature, have resulted in its becoming overly ‘academic’, no longer providing ‘a critique of science for scientists...[but] a critique of science for sociologists’ (Martin, 1993 p. 247).

As will be outlined in section 3.1.1, unlike many science studies accounts, this thesis takes an explicitly normative position with regard to the need for conservation. This distinguishes this account from those of many science studies scholars who lack, according to Takacs, ‘normative commitments to real world change, in part because such engagement is difficult to defend in a relativist universe’ (Takacs, 1996 p. 111). Thus, while the analysis presented here is alert to the impact of framing effects, narrative and discourse on the understanding of environmental issues, and on the social and political realities of people living in and near protected areas, this should not be taken to indicate either a denial of real environmental and social problems, or of the wider structural drivers of environmental and social changes. In order to incorporate this understanding of reality, the research presented here is guided by the adoption of a critical realist philosophical framework (see section 3.1.1).

Despite acknowledging the material reality of environmental and social problems, the position taken in this thesis is that discourse analytical work around conservation is crucial due to the fact that, as Bryant (2000) points out, ‘politicized moral discourses...are inevitably at the heart of all conservation projects’ (p. 678). It is the clashes between these often unstated moral discourses or normative commitments - for example a commitment to social justice or the ‘conservation imperative’ of saving a given species from extinction – that tend to generate conflict between scholars from various traditions, acting as a barrier to meaningful collaboration, as well as leading to clashes between different stakeholders in and around protected areas. Often these different normative principles are felt to be at odds, and one principle is felt to automatically ‘trump’ the other, but as Wilhusen et al. point out, in conservation settings it is not often a straightforward moral conflict of good versus bad, but more often a much more troubling conflict of good versus good with no obviously morally superior outcome (Wilhusen et al., 2003 p. xiii). Bryant (2000) highlights the fact that:

[m]ost natural scientists believe, for instance, that biodiversity protection is not only a ‘practical’ (i.e. economic) matter, but also a question of the utmost moral importance and urgency linked to a visceral abhorrence of the human-induced extinction of

species... Many local activists and their NGO supporters believe equally fervently, in contrast, in the moral imperative of democratic local bio-cultural management' (*ibid.* p.677).

Discourse analysis can help to clarify these debates, revealing their political and moral dimensions, and guarding against these being hidden in 'a technical, managerial discourse' (Fairhead and Leach, 2003 p. 15).

Finally, it is clear that within a conservation setting such as the Galápagos Islands, there will be times when despite the range of existing views about a topic, a particular problem frame or policy narrative will be adopted in order for solutions to be proposed, decisions taken and policies implemented. Indeed, as Hoppe argues, people need frames as a sort of 'mental grappling hook' in order to 'infuse a polyvalent world with meaning, sense and purpose, and to make action and judgement possible at all' (Hoppe, 1999 p. 207), thus in policy making, frames or policy narratives 'are extremely useful' (Hirsch et al., 2011 p. 262). However, in the context of a crisis claim as in the Galápagos case, where multiple and often conflicting perspectives exist, it is important that decisions are taken with the full knowledge of the particular framing assumptions, divergent social values and conflicting interests that make up the different options, in order to enhance the transparency, accountability and legitimacy of the decision making process (cf. Ockwell, 2008, Leach and Mearns, 1996b, Leach et al., 2007, Stirling, 2008). The recognition and exploration of multiple perspectives towards Galápagos conservation, and the role of science in conservation, need not imply paralysis in policy making, but on the contrary could 'provide insight and opportunity for genuine reflection, honest communication and responsible action' (Hirsch et al., 2011 p. 263). Indeed, it has been argued that developing a greater understanding of the 'attitudes, sentiments, interpretations and interests' in Galápagos society is crucial to building the 'sort of mutual understanding that c[ould] redirect energies toward collaborative and other local approaches to the problems in the Galápagos' (Macdonald, 1997 p. 6).

In the remainder of this chapter the geo-political context of the Galápagos Islands will be introduced, followed by an overview of the specific literature on science and conservation on Galápagos, and the ways in which this research will advance this literature. In the final section the overall thesis structure will be summarised.

1.6 Study site: the Galápagos Islands

The Galápagos islands are a volcanic archipelago situated in the Pacific, straddling the equator, 928 km from the coast of Ecuador by whom they have been governed since their annexation in 1832 (See Figure 1.1). Situated at the confluence of warm and cool oceanic currents, the climate of the islands is moderate and dry despite their equatorial latitude. The islands were never joined to the continent, thus (until the discovery of the islands in the sixteenth century) all of the approximately 4000 species on the islands had arrived by chance, and evolved in isolation from their mainland ancestors, with the result that approximately 2000 of these are endemic i.e. found nowhere else in the world (Ospina, 2004 p. 17).

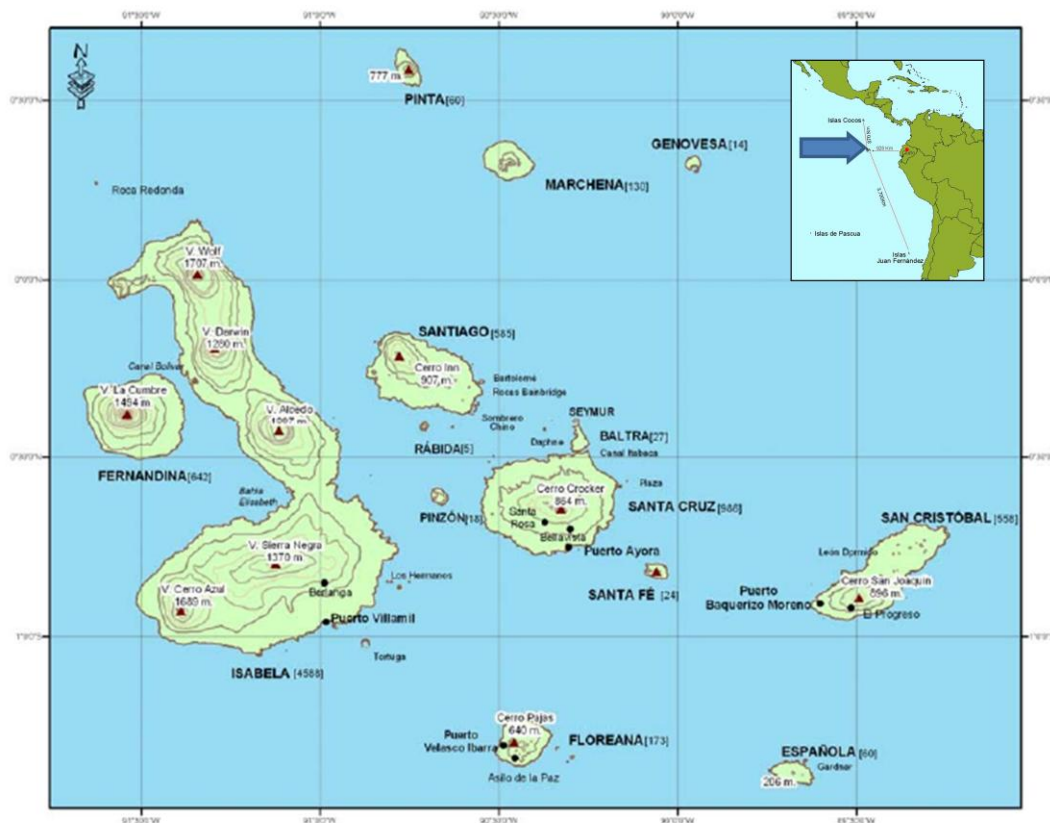


Figure 1.1 Map of the Galápagos Islands with an inset illustrating their location in relation to continental South America [Source: Galápagos National Park 2005]

Credited with providing some of the crucial inspiration behind Charles Darwin's theory of evolution by natural selection, the islands are famously home to a range of charismatic endemic species such as the Galápagos giant tortoises (*Geochelone elephantopus*), the only sea-going lizard in the world, the Galápagos marine iguana (*Amblyrhynchus cristatus*, see Figure 1.2), and the endangered Galápagos penguin (*Spheniscus mendiculus*). They are also

home to a (less celebrated) human population of between 25 - 27,000 people (UNESCO, 2006), inhabiting 5 of around 18 islands: Santa Cruz, San Cristobal, Isabela, Floreana and Baltra⁴ (see Figure 1.3). The unique flora and fauna of the islands are the subject of numerous documentaries, natural history books and popular literature, as well as being the draw for a growing number of tourists each year (more than 160,000 in 2009)⁵. Furthermore, ever since Darwin's visit aboard HMS Beagle in 1835, the archipelago has been the site of an ever growing number of scientific investigations: a bibliographic analysis carried out by Santander (2007) suggests that there had been at least 4884 publications about Galápagos up to 2007, of which 1392 were scientific publications in high impact academic journals, making the archipelago possibly one of the most studied places on the planet.



Figure 1.2. Endemic species such as the Galápagos marine iguana have contributed to the fame of the islands and are one of the draws for increasing numbers of tourists every year.

The islands' association with the ideas of Charles Darwin and their iconic flora and fauna have given them an almost mythical status matched by few other places in the world, and they occupy what is arguably a unique niche in global environmental discourse. They have been called a 'Mecca' (Sauer, 1969) for ecologists and natural historians, and are famously known as a 'natural laboratory' for the study of evolution (a construct which will be explored further in chapter 4). The fact that the archipelago was uninhabited when it was first discovered in 1535, and was not permanently colonised until the nineteenth century, has given rise to a

⁴ These population figures are for 2006 as published by UNESCO, however, unofficial estimates suggest that the population may now be nearing 40,000 people.

⁵ Source: Galápagos National Park compiled visitor statistics
http://Galapagospark.org/onecol.php?page=turismo_estadisticas

popular discourse that there is little ‘culture’ on Galápagos⁶. Such a narrow view of culture as limited to ‘indigenous’ or ‘tribal’ peoples has long been refuted by anthropologists and others (e.g. Rabinow, 1996, Escobar, 1988, Hardin, 2011), and on Galápagos various ethnographic works have provided an important counter weight to the idea that there is ‘no culture’ in the islands (Ospina, 2000 , Andrada et al., 2010, Guribye, 2000). Furthermore this limited view of culture ignores crucial insights from social and political sciences which have revealed the ways in which environmental discourse can itself be considered a potent cultural force (cf. Baviskar, 2003). For example, various authors have argued that interpreting culture is not limited to the understanding of ‘other’ cultures, but is (or should be) a more reflexive exercise, incorporating the analysis of projects such as sustainable development and conservation (Hardin, 2011, Fischer and Hajer, 1999).



Figure 1.3 The Galápagos population now stands at 25 - 27,000 people inhabiting five islands. Clockwise from top left: Men playing ‘ecua-volley’ in the centre of Puerto Ayora (Santa Cruz island, population ~15,400); children playing off the pier in the town of Puerto Baquerizo Moreno (San Cristobal island, population ~7,500); the sandy streets of Puerto Villamil (Isabela island, population ~2,200); fishing on the island of Floreana (population ~120) [Source: 2010 population census data from the Ecuadorian Institute of Statistics and Censuses, INEC].

⁶ See for example a typical tour operator website (<http://www.adventuretravelmentor.com/adventure-travel-Galápagos.html>) on which it is argued that ‘[t]here are no indigenous peoples on the Galápagos islands’ and suggests that ‘if you’re looking for rich cultural experiences you would be better off staying in Ecuador.’

Indeed, it has been argued that a productive framework for the analysis of environmental discourse is that of 'cultural politics', which shifts the focus of analysis on to 'the complex material and symbolic dimensions of how "natural resources" come to be imagined, appropriated and contested' (Baviskar, 2003 p. 5051). If the lens of cultural investigation is broadened to incorporate the discourses and practices of conservation and environmentalism, the peculiar and iconic place of Galápagos in global discourse, and the political importance of conservation discourses and practices on the everyday social realities of the islands, mean that far from lacking in culture, Galápagos emerges as the site of an extremely rich and varied cultural politics of conservation, well deserving of analytical attention through the analysis of the discourses of conservation and science.

Since the mid 1980s references to the archipelago as being 'in crisis', 'under threat' and 'at risk' have occurred with increasing frequency (cf. Watkins, 2008), culminating finally in the addition of the islands to UNESCO's World Heritage in Danger list in 2007. One of the central elements of the crisis narrative is tourism. Since its beginnings in the late 1960s, organised cruise tourism to Galápagos has been growing steadily (Epler, 2007, Taylor et al., 2003, Taylor et al., 2006), and generating growth in the Galápagos economy (Kerr et al., 2004). Tourism was estimated to have contributed around \$63 million to the local economy in 2007 (Watkins and Cruz, 2007). The ongoing levels of population growth, mainly through immigration as people have moved from the mainland to service the growing economy, has brought with it increasing pressures on natural resources, as well as requiring a growing infrastructure and additional developments, some of which have alarmed conservationists. Increasing tourism and related population growth has greatly increased the movement of goods and people to and between the islands, a development which compromises the physical isolation of the archipelago, and thus threatens to undermine the very characteristic that has given the islands their singular flora and fauna. Decreasing isolation increases the risk that non-native species will be introduced to the islands, whose potential to out-compete, predate upon or infect native and endemic species has been labelled as the greatest threat to the biodiversity of Galápagos (Causton et al., 2006). Finally, immigration has also resulted in a rapidly changing demographic structure and culture in Galápagos, for example, Heylings and Bravo argue that the majority of the population are now 'recently arrived, fragmented and heterogeneous', with 'no long tradition of resource use' and 'vary[ing] greatly in regard to ownership of assets, skills, knowledge, ethnicity and race' (Heylings and Bravo, 2007 p. 206). As mentioned, this

heterogeneity is seen by many as a further barrier to effective conservation (e.g. González et al., 2008).

1.6.1 Science and conservation on Galápagos

A discussion of the entwined histories and changing discourses of science and conservation in Galápagos will be provided in chapter 4, but for the purposes of introducing the salient features of the context of science and conservation on Galápagos today, a brief sketch of key institutional structures and legislation, and a number of recent events, publications and trends can be highlighted as particularly relevant.

The Galápagos National Park (henceforth GNP when referring to the institution and 'national park' when referring to the geographical area of the park) is the state institution responsible for management of the protected areas in the archipelago and surrounding waters. Officially founded in 1959, the national park covers approximately 95% of the terrestrial surface of the islands, while the Galápagos marine reserve (extended to its present limits in 1998) now covers the waters within 40 nautical miles of the outermost points of the islands, an area amounting to approximately 133,000 km², making this the third largest marine reserve in the world. The GNP currently employs 238 people and is budgeting for an annual income of more than \$15 million in 2011⁷, around 4.8 million of which will have come from the entry fee paid by all tourists to Galápagos (currently at \$100 for international visitors, \$6 for Ecuadorian nationals). As well as providing an income to the GNP, a percentage of the tourist fee also provides an important source of funding to the local municipal governments (25%), the regional government authority, the Consejo de Gobierno (20%), the naval authorities (5%), Marine Reserve (5%) and the quarantine and inspection service (Agrocalidad) (5%).

The Charles Darwin Foundation (henceforth CDF) is an international non-governmental organisation that was established under Belgian law in the same year that the national park was officially founded (1959). The mission of the CDF is '[t]o provide knowledge and assistance, through scientific research and complementary action, to ensure the conservation of the environment and biodiversity in Galápagos' (CDF, 2009). The CDF employs approximately 127 paid staff (plus around 130 volunteers), and manages a budget of \$ 4.4 million (CDF, 2010). Both the GNP and the CDF have headquarters in adjacent complexes in the outskirts of the town of Puerto Ayora on the island of Santa Cruz.

⁷ Figures published by the Galápagos National Park and available from their website <http://www.Galápagospark.org>

The CDF (and a group of international scientists and conservationists in particular) was instrumental in the creation of the national park, which, at the outset had no personnel or infrastructure to carry out conservation management tasks or enforce conservation legislation. Thus in the early years it was the CDF, an international institution staffed predominantly by international rather than national staff, that took on the government tasks of conservation management, as well as producing and facilitating the production of scientific knowledge by visiting international scientists. Early reports refer to these as the 'unusual circumstances' of Galápagos conservation (Snow and Grimwood, 1966 p. 2), and their repercussions can be felt up to the present day, in for example the widespread local perception that the CDF is an organisation run and staffed by 'outsiders' (Grenier, 2007 , chapter 3).

The CDF continues to provide logistical support to the bulk of the visiting scientists to the islands (approximately 174 people from 24 nationalities in 2009) and is an official advisor to the Ecuadorian government on matters related to the conservation of the archipelago, having a 25 year rolling agreement with the government to continue operating in the islands. Although this 'alliance between national government and international science' (Corley Smith, 1984), was early on hailed as a potential 'formula' to 'serve the cause of conservation and science in other key environments' (*ibid* p. 275), the relationship has also been fraught with conflicts and problems over the 50 plus years of its existence (cf. Grenier, 2007 pp. 295 - 300). Over time, as the park has grown in capacity and infrastructure, the division of roles between the two organisations has become less clear. Hence although historically a clear division between science (carried out primarily by the CDF) and management (carried out by the GNP) was envisaged, at least on paper, this distinction is being questioned on various sides, and becoming more difficult to maintain. For example, currently the GNP is running approximately 45 scientific investigation projects (pers. comm. W. Tapia, Head of Science at the Galápagos National Park, 2010) and collaborating with a wide variety of national and international institutions. Added to these new developments, both the science and conservation landscapes are becoming more complex on Galápagos, with an increasing number of organisations and institutions appearing on the scene. Thus while in 1960 there were two institutions involved in scientific and conservation activities on Galápagos (the CDF and GNP), in 2006 there were 16 non-governmental conservation organisations with a physical presence on Galápagos, and at least a further 60 international and national foundations, multilateral and bilateral agencies, and other non-governmental organisations that provide financial assistance to Galápagos but do not maintain a physical presence in the archipelago (Watkins and Martinez, 2008). Organizations present on Galápagos include large international conservation organisations

such as Conservation International and WWF, international campaigning and activist groups such as Sea Shepherd, national Ecuadorian conservation organisations such as Jatun Sacha, and local (i.e. founded by Galápagos residents and carrying out Galápagos-specific work only) sustainable development and conservation organisations such as FUNDAR (Fundación para el Desarrollo Alternativo Responsable). Furthermore, Ecuadorian educational and research institutions such as the University of San Francisco in Quito are rapidly developing their research programmes on the islands, evidenced by for example, the inauguration in 2011 of the University's new multi-million dollar science centre on the island of San Cristobal, part funded by the University of North Carolina at Chapel Hill (US). The increasing complexity of the science and conservation sectors on Galápagos, with a growing number of national and international institutions and individuals involved, and an ever increasing array of disciplinary approaches to research being employed, resonate with what Fairhead and Leach have referred to as the vortex-like quality of the 'growing global co-ordination of science and policy,' in which the 'sheer mass of organisations and the networks (and rivalries) which link them generates a dynamic of its own' (Fairhead and Leach, 2003 p. 26). The growing number of conservation organisations on the islands has also resulted in a certain degree of cynicism about the interests of the sector, and it is not uncommon to find the view expressed by some local residents is that the only reason for the presence of many NGOs on the islands is that the fame of Galápagos, and the strength of the current crisis narrative allows these organisations to tap into a rich vein of international funding (cf. Stacey and Fuks, 2007).

1.6.2 Social conflicts around conservation

The founding of the national park in 1959 is typically summarised in the Galápagos literature by the statement that the new national park boundaries covered 'all the islands, except areas already colonised' (See e.g. Jackson, 1993 p 239). However this description does not capture what was in fact a complicated and conflict-ridden process, made difficult by the fact that the boundaries of farming areas utilized by existing settlers (at the time numbering around 1500) were not clearly delimited. Tensions and conflicts between the new park authorities and the settlers were thus present from the outset, with boundary disputes common, and reports of, for example the burning of native woodland in order to 'compromise a terrain's scientific value' (Black, 1984 p. 267). During this period certain practices, many of which had been part of the daily lives of the early settlers (or *colonos* as they are known in Galápagos) were criminalized. These included the logging of endemic tree species, the use of pesticides, the use of tortoise meat as a source of food, and the fishing of certain species such as marine turtles and sharks (Quiroga, 2009a). *Colonos* who up to that point had been largely self-sufficient and

had had little interference from external authorities, were, for the first time, subjected to the imposition of a top-down management scheme heavily influenced by international scientists and conservation institutions, with the majority of the decisions being made on the continent, in Quito. Andrade suggests that this period, which she refers to as the 'internationalisation' of Galápagos, brought together distinct 'cosmovisions' regarding Galápagos for the first time, and that it was the imposition of ideas from outside Galápagos that generated conflicts between conservationists and local people which have been manifest ever since (Andrade, 2007). In 1973 these tensions were effectively institutionalised when local people persuaded the Ecuadorian government to grant the status of province to Galápagos, which meant that henceforth the islands would function as any other province of Ecuador, with a governor, local ministerial offices and (in the case of Galápagos) three municipal councils. According to Oviedo (1999) the

'park-province duality gave rise to destructive competition in terms of authority and mission, as the mandate of the national park, intended to prevent human intrusion, was seen as blocking the ability of provincial leaders to promote economic development on an equal footing with those in other parts of the country' (p. 167).

Conflicts around conservation intensified during the late 1980s and 1990s, in particular around the Marine Reserve, which has been the site of (ongoing) conflicts between various stakeholder groups. These conflicts have divided Galápagos society along different lines, thus at different times conflicts have emerged between local fishermen and conservationists, between local fishermen and tour operators, and between the cross-section of Galápagos stakeholders with industrial fishing fleets from the Ecuadorian mainland. The 1990s were a particularly volatile period, following the emergence in 1992 of a highly profitable sea cucumber fishery, which led to what has often been referred to as a 'gold rush' to fish these creatures in Galápagos waters for sale to the South Asian market. Protests at the scale of the fishery by international conservationists, particularly in the Charles Darwin Station, triggered conflicts that resulted in street demonstrations and fishermen occupying the Station twice in 1995, and threatening to kill the tortoises in the breeding centre (cf. Heylings and Cruz, 1998, Bremner and Perez, 2002). The situation degenerated over the course of the 1990s, to the point that in 1997 a park guard was shot and wounded in an altercation with a group of fishermen on Isabela island (Ospina, 2004 p. 189).

It was these conflicts, combined with anxieties about immigration to the islands, debates around the distribution of the income resulting from the park entrance fee and other issues, that finally resulted in the drafting of the 'Special Regime Law for the Preservation and Sustainable Development of the Province of Galápagos' (hereafter the Special Law) in 1998.

This law granted special status to the province of Galápagos, and imposed strict migratory regulations in an attempt to curb population growth. It also dictated greater local involvement in decision making, the lack of which up to that point had been identified as one of the root causes of the conflicts (Macdonald, 1997). The Special Law was, according to Gonzalez et al., ‘the first attempt to tackle the complexity of the problems of Galápagos in their entirety’ (González et al., 2008 p. 6). The Galápagos Marine Reserve (GMR) was also extended to its present limits of 40 nautical miles around the islands, and a participatory management system for the reserve, the Junta de Manejo Participativo (JMP) was founded (Heylings and Bravo, 2007). Around the same time an inspection and quarantine service, Agrocalidad (formerly SESA-SICGAL) was founded to limit the entry of non-native species.

In theory the Special Law provided a strong legislative framework for conservation and sustainable development on the islands, but in practice its application was complicated for a number of reasons. Tensions between the GNP and provincial authorities have already been alluded to, however in 1980 following the formation of INGALA (the provincial authority responsible for planning, financing and coordinating development and infrastructure projects on the islands), the institutional framework in Galápagos had become even more complex. The number of institutions working in the archipelago, often with overlapping jurisdictions and mandates, has been growing steadily ever since. Watkins and Martinez (2008) estimate the total number of organizations now operating in Galápagos to be around 400, with more than 50 central government and 9 local government organizations that have responsibilities in Galápagos⁸. It was this situation that prompted UNESCO’s claim that Galápagos suffers from ‘a piecemeal approach to planning... lack of inter-agency coordination...lack of political will, leadership, and authority’, and that there is thus ‘a weakening of institutions, conflicts over jurisdiction and generally a lack of effective governance’ (UNESCO 2007, p 9). As a result of these claims, in 2008 article 258 of the new Ecuadorian Constitution stipulated the fusion of INGALA and the provincial government in Galápagos into one organisation, the ‘Consejo de Gobierno del Regimen Especial de Galápagos’, in an effort to streamline governance on the islands.

⁸ Although an increase in institutions would be expected to be correlated with an increasing population to some degree, Ospina (2001) argues that the proliferation of institutions witnessed on Galápagos is not attributable to population growth alone, but needs to be understood as a direct result of the periods of social and political upheaval that the archipelago has undergone over the past decades, and he highlights the ways in which conflicts have served as catalysts to mobilize collective action and organization.

1.6.3 Changing approaches to science and conservation

Partly as a result of social conflicts around conservation policies, and partly as a result of the growing complexity of conservation problems, there have been a surge in debates about science priorities on Galápagos in recent years, and discussion about whether the traditional means of generating scientific knowledge are now appropriate for meeting the new challenges of conservation, and whether a 'paradigm shift' in Galápagos research is therefore required (Watkins, 2008). In 2006 the first ever strategic plan of the Charles Darwin Foundation was published calling for changes in the way that research was carried out on Galápagos. The plan suggested that as 'research results have begun to affect policy decisions that have increasingly greater impact on the human population... the traditional method of research and management while successful in the early years is no longer appropriate' on Galápagos (CDF, 2006 p. 16). Calls for changes to the nature and focus of research were reiterated again in 2009, in the National Park's publication 'Ciencia para la Sostenibilidad' ('Science for Sustainability'), which highlighted historical tendencies towards the production of 'pure' natural sciences, and called for 'new types of science' (*ibid p.10*) to be produced on Galápagos, and stressed the need for closer links between science and conservation management.

The social nature of most conservation problems have lead to calls for greater contributions from social scientists on Galápagos, and in particular for interdisciplinary studies spanning ecological and social sciences (see for example the PNG Management Plan 2005, p. 255). Currently the vast majority of research on Galápagos is still in natural science fields, for example a 2007 study calculated that of all the Galápagos research published in high impact journals, just 3.8 % of publications were in social science fields (Santander, 2007 p. 82). Despite this, the last 20 years has seen the growth of an important body of academic literature about the wider social, political and economic context of Galápagos (for an overview of this work see the annotated bibliography in Ospina and Falconi, 2007). The critical work of Grenier in particular (first published in French in 2002 and republished in Spanish in 2007 with an additional chapter) has been called the 'point of departure for any other subsequent attempt to understand the social situation in the islands' (Ospina, 2007 p. 27), and offers a wide ranging comprehensive critique of the historical links between conservationists and continental/international business interests in Galápagos. Evidence of the increasing efforts to incorporate social sciences within scientific and conservation institutions and programs on Galápagos can be found in the fact that in 2008 the Charles Darwin Foundation hired its former critic, Grenier, to lead the first ever social sciences department of the organisation.

1.6.4 Academic literature on science and conservation on Galápagos: gaps and contribution

Despite an important body of social scientific knowledge about Galápagos, there is still a tendency within the wider literature on Galápagos towards simplification and stereotyping with regard to descriptions and explanations of social perspectives, and society more broadly. Thus for example the influential 'Biodiversity Vision for the Galápagos Islands' produced by WWF and the Charles Darwin Foundation in 2002 suggests that one of central conflicts in Galápagos society is between 'visionaries, focused on the long term future, and populists, focused on short term ambitions' (Bensted Smith, 2002 p.114). This process of simplification extends into the popular as well as the more critical literature around Galápagos conservation. For example, a recent National Geographic publication paints a conflict between 'brave young volunteers' (Bassett, 2009 p. 89) and nature-loving scientists (p. 65) on one hand, versus drunk fishermen (p 177), corrupt leaders and 'dumb' local people (p. 85) on the other. From the opposite extreme a recent publication entitled 'Ecofascism' paints an equally simplistic picture of conflict between 'ecofascist' international ecologists, versus poor victimized fishermen (Orduna, 2008 p. 116). The account presented here responds to calls for contributions from critical fields such as political ecology on Galápagos (e.g. González et al., 2008), by providing a more nuanced account of the different discourses around conservation, examining the subjective values, assumptions and beliefs that structure these, and exploring some of the political and material impacts of these. Thus while this work builds on several studies that have focused on the social conflicts between different 'stakeholder groups' in Galápagos (e.g. the anthropological work of Ospina, 2004, or the conflict analysis of Macdonald, 1997), and on the critical work of Christophe Grenier (2007), the novelty of the approach taken in this thesis is in the adoption of a discursive focus. Thus the analysis presented in the following chapters moves the focus beyond an examination of 'stakeholders' conceptualised as groups united by common interests or shared identities, to explore the discourses which 'help constitute identities and their associated interests' (Dryzek and Niemeyer, 2008 p. 5).

With regard to science, as well as several attempts to catalogue and classify the scientific work that has been carried out on the islands (e.g. Snell et al., 1996, Santander, 2007, Ospina and Falconi, 2007), there have also been various works documenting the history of science on the islands (Larson, 2001, Bowman, 1984, Quiroga, 2009b), including work focusing on particular scientific achievements and the ways in which scientific work carried out on Galápagos has advanced global knowledge in a given domain (e.g. Weiner, 1994), or focusing on particular iconic species (Nicholls, 2006). While these accounts provide excellent historical background

to science on Galápagos, within this literature, the 'story of science' on Galápagos tends to be told as somewhat of a linear narrative towards greater enlightenment, and the political dimensions of the practice of science on Galápagos are downplayed or largely ignored by these studies. Similarly, although there have been previous attempts to examine local perspectives towards science on Galápagos, in the process of defining their research object, these studies have tended to reinforce 'science' or 'conservation' as absolute, universally understood categories (e.g. Quiroga and Ospina, 2009).

Apart from in a descriptive sense, few studies have turned the lens of investigation onto the scientists themselves to understand the different ways in which scientists view their role and the political implications of these differences. Similarly, aside from a bibliographic analysis by Santander (2007) which produced statistical information about the types of science coming out of Galápagos, there have been very few examinations of disciplinary differences, or of the implications for conservation of the differences *between* scientists⁹.

Other engagements with science have come from GNP-led planning exercises aimed at defining science priorities. In these cases, research has set out to answer the question 'what science is necessary on Galápagos?', or 'what investigations should be prioritised by the Galápagos National Park?' (Tapia et al., 2009c). Aside from calling for 'new types of science' (Tapia et al., 2009a p.10), none of these studies explicitly engages with different conceptions about the nature of science itself, or with alternative perspectives towards the role of scientists in conservation, which, in the latter document was simply summarised in the view that 'scientific knowledge should be present in all the decision making processes for the administration and management of the protected areas of Galápagos' (*ibid* p.142). Science within these studies is still very much conceived of as a pre-requisite to political debate, and there is no engagement with ideas coming out of a more critical political ecology, that there might be a 'need to see the evolution of environmental facts and knowledge as part of the political debate rather than a pre-prepared basis from which to start environmental debate' (Forsyth, 2003 xiii). The use of Q methodology in this thesis (with its focus on subjectivity) means that the work presented here can take into account the fact that the boundary between science and non-science, or science and conservation, is neither fixed nor un-

⁹ An exception is the work of Villavicencio (2007), who examines the differences in policy recommendations generated by studies that were conceived of and carried out within different philosophical frameworks: one employing economic valuation methods, the other framed within the precautionary principle of the unacceptability of the risk of species extinction.

contested, and is thus able to explore the implications of this for both science and conservation.

1.7 Thesis outline structure

This chapter has introduced the thesis, outlined the main research aim and objectives, and introduced the study site.

Chapter 2 situates the thesis within the context of a shift towards more discursive analyses in the field of political ecology, and highlights the ways in which cross fertilization between science studies, policy sciences and political ecology, can provide a sound academic framework from which to explore discourses of conservation and science.

Chapter 3 presents the methodological and philosophical frameworks which inform the research, and introduces Q methodology as the central method of data collection in the thesis. The strengths and weaknesses of the method are outlined, and the rationale for the incorporation of an historical approach and the use of additional ethnographic observation data is given.

Chapter 4 explores the multiple ways in which the Galápagos Islands have been discursively constructed and reconstructed over their history, asking how the archipelago has come to occupy such an iconic position in the western (European and North American) imagination, and examining the ways in which science and conservation have played into these processes. This chapter highlights the fluid and contested nature of the meanings attributed to the islands, and points to the constructed nature of ideas of Galápagos as an 'untouched wilderness' that underpin the current narrative of ecological crisis or of a 'paradise in peril.'

Chapter 5 explores the variety of ways in which contemporary Galápagos society understands the project and ideal of Galápagos conservation. The results of a Q study of the discourses of conservation on the islands are presented. Three distinct discourses are uncovered by the Q process, and have been labelled: A. Conservation as an international concern; B. Conservation with sustainable development; and C. Social welfare and equitable development. The discourses are described in detail with reference to the comments made by participants at the time of carrying out the Q test.

Chapter 6 discusses the discourses that were described in chapter 5, and subjects the values and assumptions on which these are constructed to critical scrutiny in the light of the wider literature around problem framing, environmental discourse and conservation. The discussion

highlights the political nature of apparently apolitical conservationist discourses, and critiques calls to a 'shared vision' of Galápagos conservation.

Chapter 7 presents the results of a second Q study into the discourses of science on Galápagos. This study focuses analysis in on the 'science and conservation community' (the people generating and using scientific knowledge in conservation) on Galápagos, to explore the variety of different discourses about the role of science in conservation. Four distinct discourses are uncovered, and have been labelled: Factor 1: Science for conservation management; Factor 2: Freedom of Science; Factor 3; Limits of Science; and Factor 4: Separation of Science and Conservation. The discourses are described in detail with reference to the comments made by participants at the time of carrying out the Q test.

Chapter 8 discusses and critically analyses the discourses that were described in chapter 7, highlighting the contested nature of the boundary between science and conservation, and exploring some of the values and politics woven into the fabric of the different discourses. This chapter critiques calls to 'more science' as the route to sustainability on Galápagos, and exposes some of the barriers to meaningful interdisciplinary collaboration in conservation on the islands.

Chapter 9 concludes the thesis with a discussion of the main findings of the thesis, and an exploration of some of the potential implications of these, for both conservation and society in Galápagos and elsewhere. The strengths and limitations of the research are discussed and future potential avenues for research are outlined.

Chapter 2. Conservation and science

Chapter outline

This chapter reviews the academic debates around conservation and science to which the thesis contributes, and introduces some of the analytical tools that will be applied in later discussions. The chapter outlines the way in which simplistic notions of scientific objectivity in conservation are problematized by the increasing attention paid by political ecologists to discourse, and a growing overlap between political ecology and science studies. The final section introduces the conceptual framework of ‘co-production’ as a way of theorising the relationship between science and society, and argues that this opens up the necessary analytical space from within which to critically analyse the values and politics woven into the discourses of conservation and science on Galápagos.

2.1 Introduction

Scientific knowledge is widely considered to be one of the key components of successful conservation practice (e.g. Tracy and Brussard, 1996). However there are many divergent opinions as to what exactly this means, and the role that different types of science (or other types of knowledge) should play in conservation is still a matter of some disagreement (Giller et al., 2008). There are in fact, not one, but a number of ongoing debates around this issue each emphasizing different concerns and priorities, and simultaneously highlighting different conceptions of the nature of both science and conservation¹⁰. The following sections will briefly examine the relationship of different scientific disciplines to conservation, and explore calls to (and barriers against) greater collaboration by social scientists in conservation. The field of political ecology will then be introduced as one of the fields in which fruitful engagement between different disciplines is occurring. The increasing overlap between political ecology and science studies will be examined, and it will be argued that this cross-fertilization provides a productive framework for furthering understanding of science in conservation.

¹⁰Given that an examination of the shifting and contested boundary between science and conservation is an intrinsic part of this investigation, no attempt will be made at the outset of the thesis to give a singular definition of either science or conservation. As Fairhead and Leach put it: ‘[t]he practice of a philosophy of “science” becomes part of the social field to be studied’ (Fairhead and Leach, 2003 p. 13).

2.2 Conservation biology: the crisis discipline

The scientific discipline that engages most explicitly with conservation is that of conservation biology. First coined as the title of a 1978 conference organised by biologists Michael Soule and Bruce Wilcox, conservation biology is currently defined as a 'mission-oriented science that focuses on how to protect and restore biodiversity' (SCB, 2009), it is thus, in the words of one of the founders of the concept, a 'crisis discipline' (Soule, 1985 p. 727). As it was originally conceived, it is explicitly multi-disciplinary, drawing from fields as diverse as population biology and eco-philosophy, natural resource management and anthropology, and as such it involves 'a mixture of science and art' and its pursuit 'requires intuition as well as information' (*ibid* p. 727). As well as straddling otherwise disparate disciplines – attempting to cross what has been termed the 'Great Divide' between sciences and humanities (Snow, 1959) - conservation biology thus also explicitly blurs the boundaries of science as a dispassionate provider of objective facts, by incorporating an ethical or normative dimension: namely that biodiversity per se is a *good* thing (cf. Takacs, 1996, Matsuda, 1997). However this 'blurring of the boundaries' of science and values has led to internal tensions, and in particular the issue of advocacy on behalf of these values has long been a thorny topic of ongoing debate within Conservation Biology (See e.g. Scott and Rachlow, 2011, Scott et al., 2007, Marris, 2006, Matsuda, 1997, McCoy, 1996). Although many conservation biologists are comfortable with the ethical underpinnings of their work (e.g. Barry and Oelschlaeger, 1996), others fear that incorporating values into science may risk compromising the status and credibility of the discipline as an 'objective science' (Brussard et al., 1994). Some (e.g. Lackey, 2007) thus seek to maintain a strict distinction between what is referred to as 'policy neutral' science and what he refers to as 'normative science' (*ibid* p.12), the latter being science that is imbued with implicit policy preferences evidenced in the use for example of value-laden words such as 'degradation', 'good' or 'poor' to describe scientific findings. According to Lackey there is a tendency within conservation biology and ecology towards 'normative science' masquerading as 'policy neutral' science, which (he argues) risks corrupting science as an institution (Lackey 2007). However, the validity of drawing this kind of distinction between value-laden and objective science is the subject of critique from science studies disciplines, and the issues related with this kind of thinking in conservation will be returned to in section 2.4.2.

2.3 Social sciences and conservation

Despite the broad way in which multiple disciplines were envisaged to feed into conservation biology, in reality most self professed conservation biologists often have firm groundings in the

biological sciences. Clearly biological sciences are indispensable in providing the theoretical and analytical tools necessary to identify rare and threatened species and ecosystems, and an understanding of the ecological conditions required in order to sustain them, but, as Mascia et al. put it, frequently even when conservation biologists 'get the biology right ... [their] conservation interventions still fail to sustain target species and ecosystems' (Mascia et al., 2003 p. 649). This is, they argue, due to the fact that in many (if not all) cases, social and political factors are the real determinants of success or failure of conservation projects. The perception that the approach of many conservation programmes has been too narrowly focused on ecology, has thus led to calls for a more profoundly interdisciplinary approach to conservation that doesn't treat environmental and social problems from a sectoral point of view (Pennington, 2008, González et al., 2008). Hence the last 30 years has seen a growing emphasis on linking the work of natural and social scientists in inter and trans-disciplinary ways in the search for innovative solutions to conservation problems (Soule, 1985, O'Riordan and Stoll-Kleemann, 2002, Fazey et al., 2006). As well as stressing the need for broader approaches to addressing 'real world problems...that do not come in disciplinary shaped boxes' (Dewulf et al., 2007 p. 15), it is argued that interdisciplinary research may be able to yield new understandings about problems that would not have been possible through traditional disciplinary methods (Bammer, 2006, MacMynowski, 2007).

However in practice interdisciplinarity is not without its difficulties. Some authors point to the 'practical difficulties – in language and in funding and publishing interdisciplinary work' (Balmford and Cowling, 2006 p. 694), while others highlight deeper epistemological and cultural differences between disciplines. As Bauer (1990) puts it:

'[d]isciplines differ in epistemology, in what is viewed as knowledge, and in opinion over what sort of knowledge is possible. They differ over what is interesting and what is valuable. And the practitioners of the various disciplines have characteristically different attitudes and habits and manners – that is, they differ over matters that might at first seem quite unrelated to the practice of their disciplines' (Bauer, 1990 p. 106)

Within the conservation literature, the least problematic types of interdisciplinary collaboration tend to arise between disciplinary groups that share a positivist or realist world view, namely that: 'an objective reality exists that is independent of human behaviour...[and that] science provides the observer with an objective account of the world...separate from human intention and purpose' (Evely et al., 2008 p. 2). This allows a shared understanding of what constitute valid data and method, and even shapes ideas about what might constitute useful or interesting questions (Campbell, 2005). Shared epistemologies and methods make

some collaborations easier than others, hence for example ‘quantitative social scientists (such as economic modellers) use data and methods that ecologists and biologists recognize as similar to their own’ (Welch-Devine and Cambell, 2010 p. 341). On the other hand, interdisciplinary collaborations between disciplines which have divergent philosophical and epistemological underpinnings often encounter difficulties in finding shared ground. As Evans and Randalls point out, even when there is an obvious overlap of interest or topic, scientists from different disciplines can have fundamentally different concepts of what is to be researched and how. They liken the conceptual chasms between disciplines to icebergs, arguing that often ‘superficial differences in approach conceal more bulky epistemological issues beneath the surface’ (Evans and Randalls, 2008 p. 583).

The differential power associated with different disciplines can also affect inter-disciplinary collaboration. MacMynowski points out that:

‘a claim to pure objectivity is a claim to know “the truth” and therefore a claim to authority and power... accordingly, many of the social sciences with their overt recognition of subjectivity on the part of the researcher, bring less social power to the interdisciplinary meeting ground than biophysical sciences’ (MacMynowski, 2007 p. 5).

Epistemological and power differences aside, another issue that can emerge as a barrier to social scientists’ engagement with conservation is the concept of ‘mission’, and its heritage in the project of European colonialism as it was practised between the 18th – 20th centuries (Wolfe, 1999). Twentieth century independence struggles and a growing critique of all forms of western domination and exploitation of others – including a critique of colonial discourses, and social hierarchies as well as the more obvious critiques of power and governance structures (Gilbert and Tompkins, 1996) - have lead to the development of the extensive field of post-colonial studies (Said, 1978, Pels, 1997), whose influence has been profound in a wide range of social sciences (including anthropology, human geography, development studies and many others). Thus for example within anthropology, the traditional/colonial role of the anthropologist as a provider of information and advice to the dominant colonial powers in order to better understand and therefore control the native populations has long been rejected (Lewis, 1973). Unfortunately from a practical conservation viewpoint, this is exactly the sort of information that anthropologists might be expected to provide, i.e. ‘deliverables’ about a given population in order to help conservation biologist achieve their goal of biodiversity protection (cf. Brosius, 2006), a goal which often explicitly involves control of territories and control of local populations.

Although many social scientists might reject purely instrumental roles as facilitators or

managers of conservation programmes and goals, scholars from a range of social science disciplines are still keen to engage more critically with conservation, claiming that 'in planning for conservation it is critical that we understand not only the human impact on the physical and biotic environment, but also how that environment is constructed, represented, claimed and contested' (Brosius and Russell, 2003 p. 53). Furthermore, many social scientists from a range of critical disciplines argue that their contributions may well 'improve both the equity and effectiveness of conservation' (Welch-Devine and Cambell, 2010 p. 341). However, these more critical engagements are not always welcomed by conservation biologists, some of whom deem the perspectives and contributions of some critical social scientists as irrelevant and unhelpful, given the scale and urgency of the problems that they perceive, believing that to carry out this kind of work is analogous to 'fiddling while Rome burns' (Brosius, 2006 p. 684).

2.4 Political ecology and conservation

Political ecology is a field that has been hailed as offering 'some potential to open dialogue between social science-trained critics of conservation and natural science-trained advocates' (Adams and Hutton, 2011 p. 171). The term 'political ecology' was first coined in the 1970s (Wolf, 1972), and has been defined as a field that explores 'the political dimensions of human-environment interactions' (Mulder and Coppolillo, 2005 p. 157), or a topic 'associated with assessing the political linkages between society and environmental change' (Forsyth 2003, Preface). However it has also been argued that political ecology is less a well defined discipline *per se*, and more a 'way to do research' (Robbins, 2004 p. xix), uniting scholars from a diverse range of disciplinary backgrounds (including anthropology, sociology, geography, development studies, environmental history and biology) though a set of common questions and preoccupations. The anthropologist Peter Brosius highlights the high degree of crossover between disciplines involved in critical engagements with environmentalism when he argues that 'in many cases it seems that identifying a particular contribution as "anthropological" or as belonging to another discipline is a product not of content but of where it is published and the institutional affiliation of the author' (Brosius, 1999 p. 280). Arguably the same holds for contributions labelled as political ecology. Broadly speaking however, political ecology as a field encompasses work which aims to understand the ways in which social and political processes at a range of scales, from the local to the global impact on environmental conditions, and (as will be outlined below) scholarship in this area increasingly highlights the fact that not only is the material state of nature the outcome of political and economic processes, but also that '[i]deas about nature, even those that result from formal scientific

experimentation, are formed, shared and applied in ways that are inherently political' (Adams and Hutton, 2011 p. 149).

The field is broad and varied, but research into biodiversity conservation has been called one of the 'four big questions' or theses (Robbins 2004 p.13) with which the political ecologists currently engage.¹¹ Work in this area is diverse, but has tended to highlight the less visible (and often more contentious) aspects of international conservation. Thus some political ecologists examine issues around the politics of resource control, questioning who wins and who loses from the creation of parks and protected areas (e.g. Peluso, 1993), while others examine the social and ecological implications of the imposition of concepts like 'wilderness' (e.g. Neumann 1998). Much work in this vein thus focuses on challenging the view that 'conservation is a non-political activity by showing instead its political dynamics and coercive properties' (Bryant, 2000 p.675). Some work in this field is specifically concerned with exposing what are seen as the colonialist tendencies of the international conservation movement: various scholars have for example, pointed to the strong ties of many conservation organisations to former colonial powers, and the geographical location of many areas of conservation concern within former colonies as evidence of the political or territorial agendas within conservation (cf. Guha, 2003, Crowe and Shryer, 1995, Singh and van Houtum, 2002), or highlighted the legacy of colonial ideas of nature on contemporary conservationist thinking and practice (Adams and Mulligan, 2003). There are ongoing debates between many self identified political ecologists and conservation biologists about whether authoritarian protectionism and the exclusion of people from parks and protected areas can be justified as the only or best way to conserve biodiversity (e.g. Terborgh, 1999) or whether there are unacceptably high social and poverty costs of this 'fortress conservation' model (e.g. Brockington, 2002). Related debates continue about whether local community involvement in, or benefit from conservation and protected areas should be promoted as the key to conservation success (e.g. Saberwal, 2000), or that instrumental benefits aside, communities should be involved in and benefit directly from conservation for ethical reasons (e.g. Brechin et al., 2002). On the other side there are those who argue that parks cannot and should not be burdened with an overwhelming set of social goals outside of their mandate to protect nature (e.g. Redford et al., 1998), or that community-based approaches to conservation have demonstrably failed to protect nature (Oates, 1999, Terborgh, 1999). More recently these

¹¹ The other 'big theses' of political ecology according to Robbins deal with the issues of degradation and marginalization; environmental conflict; and environmental identity and social movement (Robbins, 2004 p.14)

debates have themselves been criticised for their overly simplistic treatment of the category of 'parks' as though all parks were the same, and for the employment of increasingly simplistic discourse by proponents on all sides of the debate. Redford *et al.* point out that participants in these debates tend to 'flatten the range of contradictions always present in conservation,' and argue that this 'point scoring' and 'stereotyping' in the global debate leads to an ultimately destructive 'dialogue of the deaf' which does nothing to further the aims of conservation or the rights of rural peoples (Redford et al., 2006 p. 2).

Another dimension of contemporary conservation that has recently come under the scrutiny of a political ecological analysis, is the trend towards the so called neo-liberalisation of conservation. Neo-liberalism as generally understood, describes both an ideology and a set of processes through which the spread of free markets is facilitated (often visible in processes of deregulation, privatisation and decentralisation). In the context of conservation, neo-liberalism actually entails what Brockington and Igoe refer to as 're-regulation', that is 'the use of states to transform previously un-tradable things into tradable commodities' (Brockington and Igoe, 2007 p. 437). In other words, environmental conservation interventions based on neo-liberal economic models 'move both the environment and social relationships into the realm of commodities' (West, 2006 p. 184), and political ecologists have argued that this can have all sorts of unintended negative social and ecological consequences. For example, there is some evidence to suggest that in some cases neo-liberal approaches to conservation may actually accelerate resource degradation (e.g. Langholz, 2003), that marginal communities may be disenfranchised from their local resources by increasing absorption into capitalist markets (Brockington and Igoe, 2007), or that in many cases although degradation may be halted in one location, it is 'merely displaced elsewhere through so called 'mitigation' measures, resulting not in an overall gain but in a redistribution of the costs and benefits incurred' (Fletcher, 2010 p.172). Neo-liberal trends in conservation are apparent in, for example, the creation of markets for natural resource exchange and consumption, or the growth of private protected areas and the decentralisation of resource governance to local authorities and non-state actors such as NGOs (Fletcher, 2010). Within conservation biology as an academic discipline, Buscher points to the growing emphasis on ecological services and ecological economics as '[c]onservation biology's most obvious acquiescence to neoliberalism', and argues that these trends highlight the ways in which the field 'is busy reinventing itself in order to remain politically acceptable in a neoliberal world' (Buscher, 2008 p. 230).

2.4.1 From 'realist' accounts through the 'discursive turn' in political ecology

The roots of the field of political ecology can be traced back to the radical development geography of the 1980s (Bryant, 1998 p. 80), and to early work linking environmental studies with political economy. Originally much work within political ecology tended to be focused primarily on material struggles over resources, and in particular the ecological and social damage arising from the global forces of industrial capitalism and certain repressive state policies (e.g. Blaikie, 1985, Bryant and Bailey, 1997). These studies, which have been collectively referred to as 'realist' accounts (e.g. Forsyth 2003 p. 13), have provided invaluable insights into the ways in which global forces affect resource depletion and environmental degradation at the local level, and one of the primary strengths of the field has been 'its focus on issues of social inequality and justice at stake in conflicts over natural resources' (Baviskar, 2003 p. 5051). However some authors have raised concerns that what they perceive as an overt 'political agenda and *a priori* judgement can hamper clear and unbiased analysis of ecological and social processes' (Mulder and Coppolillo, 2005 p. 178), while others have suggested that an overly politicized examination of environmental issues has turned into pure 'politics without ecology' (Vayda and Walters, 1999 p. 168). Some political ecology scholars have questioned whether an opposition to capitalism might have affected the production of particular environmental explanations (Forsyth, 2003 p. 7).

In the mid 1990s various scholars began to argue that political ecologists needed to pay greater attention to 'the discourses and practices through which nature is historically produced and known' (Escobar, 1996 p. 325). Thus throughout the 1990s the field underwent what has been described as a 'discursive turn' (cf. Bryant, 2000), or what has also been referred to as the shift towards a 'second generation political ecology' (Biersack and Greenberg, 2006). Drawing on post-structuralist analyses, this work expanded its focus from the material struggles over resources, to include a greater awareness of the importance of discursive struggles and the representation of problems, and in particular the social shaping of environmental knowledge (e.g. Peet and Watts, 1993, Guyer and Richards, 1996, Neumann, 1998, Escobar et al., 1999). Given that one of the critiques of the realist accounts was that they tended to uncritically accept 'existing definitions of environmental degradation derived from positivistic natural science without acknowledging how such terms are constructed' (Forsyth, 2001 p.146), the post-structuralist accounts can be seen to be cautious of both traditional ecological explanations and more structural political-ecological explanations. They suggest that the categories often used un-problematically by analysts from both traditions (such as 'threatened ecosystem' or 'indigenous person') need to be examined further to

expose the ways in which they are constructed by different actors for political ends and with particular consequences (cf. Escobar, 1998, Leach and Mearns, 1996b, Bavisar, 2008).

Thus for example, scholars working in this tradition have highlighted the ways in which different actors (e.g. the state, local people, external agencies) interact, and co-construct narratives and discourses about environmental change. Some work in this vein has focused on de-bunking so called orthodoxies or 'myths' about environmental change, and exposing the way that certain discourses and narratives (such as the idea of the 'tragedy of the commons', or the idea that poor people will exacerbate environmental destruction etc.) become entrenched in policy and international approaches to conservation and development (Leach et al., 2007). Scholarship in this area has shown that not only are these sometimes bio-physically inaccurate representations of the processes at work, but the policies stemming from these representations may also have detrimental consequences on local livelihoods (e.g. Thompson, 2006, Fairhead and Leach, 2003, Leach and Mearns, 1996b, Stott and Sullivan, 2000).

The 'discursive turn' in political ecology has presented some challenges to the field more broadly. For example Robbins has argued that as a result of increasing attention to discourse and post-structuralist analyses, political ecology has developed a 'Jekyll and Hyde persona' (Robbins, 2004 p. 12) whereby it is simultaneously concerned with the structural causes of, and inequalities around, environmental degradation and exploitation, whilst at the same time seeking to critically examine or deconstruct dominant accounts of environmental change. He suggests that there is a need to move beyond these two approaches (i.e. research into the 'destruction of nature' versus research into the 'construction of nature'), and instead utilise a notion of 'environmental production' which:

'takes seriously the normative implications of land degradation, recognizes the socially constructed character of the conceptual apparatus for understanding nature, and is sensitive to the natural system components that participate in socio-environmental change' (Robbins, 2004 p. 90).

2.4.2 Insights and crossover from science studies

The interest of many political ecologists in revealing and critiquing the broader political dimensions of environmental discourses and practices, mean that insights from science studies revealing the politics *within* the science upon which many environmental policies claim to be built, are clearly crucially important. Brosius points out that as a discipline which makes

'a broad effort to theorise the bases upon which we presume to know about nature in the first place... [science studies has] important implications for our thinking about ecology, environmental science, and other fields concerned with the production of scientific knowledge about the planet' (Brosius, 1999 p. 279).

The past decade has thus seen calls for political ecologists to pay (even) greater attention to the insights generated by science studies scholars in order to build a more 'critical political ecology', which incorporates: 'a political philosophy of environmental science that indicates how social and political framings are woven into both the formulation of scientific explanations of environmental problems and the solutions proposed to reduce them' (Forsyth, 2003 p. 1). This section will examine some of the ways in which science studies scholarship has problematized the traditional notion of scientific knowledge as value-neutral, objective truth, before introducing the concept of 'co-production' as framework from within which to examine the discourses of conservation and science in a way that allows for a critical exploration of the values and politics implicit in the different discourses.

The idea of scientific knowledge as an unproblematic source of objectivity and political neutrality, and of the practice of science as separate from its social or institutional context, has been challenged on a number of fronts over the past half a century (Kuhn, 1962, Ravetz, 1971, Bloor, 1976, Barnes and Edge, 1982, Gieryn, 1983, Latour, 1987, Haraway, 1991, Collins et al., 1993, Jasanoff, 1995). These challenges can be traced back to the early 1960s when broader developments in the social sciences began to put increasing emphasis on the ways in which knowledge in general is 'socially constructed' (Berger and Luckmann, 1967). This social-constructivist trend influenced thinking in the philosophy of science and sociology, and scholars in different fields began to ask questions about the social nature of scientific practice and knowledge production. A particularly influential and oft cited figure is Thomas Kuhn, whose 'Structure of Scientific Revolutions' (Kuhn, 1962) first highlighted certain social and cultural dimensions of the production of scientific knowledge by suggesting that this knowledge does not develop in a linear progressive fashion, but in stages or 'paradigms' within which scientists' research is conceptually constrained, and upon which the acceptance or refutation of scientists' results is dependent. Thus individual results that challenge received wisdom (i.e. the dominant paradigm) will be seen as researcher error and ignored by implicit social consensus, and only after a certain critical mass of anomalous results are produced that throw the dominant paradigm into doubt will there be a 'scientific revolution' and the production of a new paradigm.

There is now a large body of scholarship on the nature of scientific knowledge and the relationship between science and society, and a variety of related disciplines such as the Sociology of Scientific Knowledge (SSK) and Science and Technology Studies (STS) working in this area. Central to these fields are a shared interest in exploring and explaining the ways in

which science and the production of scientific knowledge are influenced by social, cultural and other factors, and what the philosophical, social and political implications of this might be. Demeritt stresses that the point of examining the political dimensions of science is not to suggest that 'science is *only* political and thereby collapse entirely the distinction between the two. It is to recognize how problematic this distinction is' (Demeritt, 2001 p.309 emphasis in original). However, any examination of politics or values in science has tended to spark a great deal of controversy and debate, and scientists from a range of disciplines have raised concerns that the field of science studies represents an attack on their hard earned credibility and legitimacy (see e.g. Gross and Levitt, 1994, Holton, 1993). Controversy around the field became so heated in the United States during the 1990s that the series of exchanges between academics in different camps came to be known as the 'science wars' (Seegerstrale, 2000). The application of science studies insights to the analysis of environmental science has been equally controversial, with various authors claiming that this approach amounts to 'anti-science' and anti-environmental rhetoric (Erich and Erlich, 1996) which 'undermines efforts to save wilderness and biodiversity' (Soule, 1995 p. 154). As Adams (2004) explains:

'take away the belief that science tells the truth... [and] scientists fear that all their hard won arguments about extinction, biodiversity, ecological change and sustainable harvest will be swept away. Once admit that nature is socially constructed, and they fear that Pandora's Box will be opened, nothing can ever be the same' (p. 232).

Given the polemic generated by the claims that scientific knowledge is 'socially constructed' it is worth briefly examining what is meant by this claim. While there is a radical school of epistemology that adheres to the idea that reality is actually constituted by social agreement, this is 'not what most social constructivists believe' (Edwards cited in Schneider, 2001 p. 339). Instead, Edwards suggests that when science studies scholars talk of the socially constructed nature of scientific knowledge, they are in fact examining the ways in which 'science and society together have created (and sometimes dismantled) general assent to the effectiveness of particular methods of generating truth' (*ibid.* p. 339). Or in other words, given that truth itself is no guarantee that a particular claim will be accepted or rejected by a given society at a given moment in time, social construction represents an empirical investigation into the 'causes of belief' (*ibid.* p. 339).

Conventional definitions of science often refer to what have become known as the 'Mertonian norms', four key characteristics of science as described by Robert Merton in 1942 in order to define 'science'. Science according to Merton is distinguished by being: universal (open to anyone and judged on the basis of impersonal criteria), communal (the findings of science are a collective good), disinterested (there should be no interest that research findings should be

one way or another), and sceptical (no claim should be immune from doubt) (Merton, 1973). According to Lovbrand, these norms have been crucial in cultivating an 'idealised image of basic science as a disembodied search for knowledge free from social and political influence' (Lovbrand, 2007 p. 40), and the upholding of the ideal of a clear demarcation between science and politics is widely understood as key in the maintenance of the cognitive authority of scientific knowledge. However, science studies scholars have emphasized the ways in which all science involves contingent social relations to a degree, highlighting the disconnect between this ideal image of science, and how scientific knowledge is actually made (cf. Haraway, 1988).

As Demeritt puts it:

'How to conduct this experiment of measurement? Whether to trust that datum or result? Whose interpretation to believe? Such questions are the stuff of everyday scientific practice and they depend on trust and professional judgement. Try as we may to be scrupulously impartial and open-minded, these decisions remain socially saturated' (Demeritt, 2001 p. 309).

Similarly an examination of the practical ways in which the boundary between what is considered 'science', and what is relegated to the domain of 'non-science' or 'pseudo-science', is constructed and maintained by scientists and others, can be revealing of the shifting and socially shaped nature of science itself. Scholarship in this field has argued that in practice rather than Merton's 'set of essential of transcendent characteristics or methods' (Guston, 2001 p. 399), science is at least in part, demarcated through the ideological efforts of scientists who engage in a set of rhetorical strategies that have been labelled as 'boundary work' (Gieryn, 1983). As Gieryn explains, when scientists describe their science to the public or political authorities, it:

'can be made to look empirical or theoretical, pure or applied. However, selection of one or another description depends on which characteristics best achieve the demarcation in a way that justifies scientists' claims to authority or resources. Thus, "science" is no single thing: its boundaries are drawn and redrawn in flexible, historically changing and sometimes ambiguous ways' (Gieryn, 1983 p. 781).

As a result, there is perhaps more overlap between science and politics than conventional views suppose, given that 'the strategies of boundary work (like politics itself) are pre-eminently local, shaped by whatever circumstances – institutions, audiences, issues – prevail in a particular situation' (Bocking, 2004 p. 20). As Jasanoff (1987) points out, this means that 'one's impression of the reliability of scientific knowledge can differ depending on whether one looks as the public language of science or the private language in which scientists communicate their assessments to each other' (Jasanoff, 1987 p. 196).

Another area of science studies scholarship with implications for understanding the role of science in environmental policy, is that of policy controversies involving science, and in particular the interface between the scientific and legal systems (Jasanoff, 1990, Nelkin, 1992, Smith and Wynne, 1989). For example, studies of science in legal contexts have demonstrated that under the scrutiny of court-room cross examination even apparently accepted 'scientific facts' can be undermined. This can come about because while scientists are relatively 'tolerant of the informal craft skills intrinsic to field and laboratory practice' (Bocking, 2004 p. 29), in the context of a public controversy when scientists are called upon to provide expert testimony, the adversarial setting of the court room often casts a much less favourable light on any uncertainty, interpretation or lack of consensus between scientists. Brian Wynne highlights the fundamentally different norms of the scientific and legal institutions, arguing that the legal system:

'does not share science's own informal social norms, presumptions and institutional factors restricting to a socially pragmatic level the questioning of agreed knowledge ... they possess an ethos that runs totally counter to them. Legal processes enshrine scepticism and mistrust: cross examination has a duty to question as fully as possible the adversary's case in front of the judge or jury' (Wynne, 1989 p. 37).

As a result, Jasanoff argues that '[t]he authority of science is seriously jeopardized when scientists are called upon to participate in policy-making' (Jasanoff, 1987 p. 197). However, simultaneously scientific knowledge is widely held to be an important component in policy making: as Pielke puts it, 'if scientists ever had the choice to remain above the fray [of policy making] they no longer have this luxury' (Pielke, 2007 p. 9). This situation presents what Pielke argues to be a paradox, whereby science is expected to be at once apart from but a part of politics and policy making.

The central role often afforded to scientific knowledge in environmental policy making by those on all sides of the debate, can engender the idea that a reduction in scientific uncertainty will necessarily reduce political uncertainty (i.e. will prompt a particular action or the development of a particular policy). This view of policy making has been labelled 'technocracy' or 'scientization' (cf. Jasanoff, 1994, Weingart, 1999), and can be witnessed in 'attempts to turn all policy making into technical exercises that obviate the need for political debate' (Pielke, 2007 p. 34). Ultimately however, in many cases it is not scientific fact that dictates a decision, but existing value systems, political allegiances and particular goals, decided not by data about what the world does or would look like, but convictions about what the world 'should' look like (cf. Sarewitz, 2004). Schon and Rein capture this point by distinguishing between what they call policy disagreements, which refer to situations in which

questions at the heart of the dispute can be resolved by ‘examining the facts of the situation’, and policy controversies (into which category many disputes around conservation would fall) which are ‘immune to resolution by appeal to the facts’ (Schön and Rein, 1995 p. 4). This is because what they refer to as ‘frames’, that is ‘underlying structures of belief, perception and appreciation (*ibid.* p 21), determine that individuals differ as to what facts they deem relevant, and lead different people to interpret the same facts differently.

The relationship between language and discourse, and the building of scientific knowledge has also long been the focus of academic interest from the field of science studies and other fields. As will be outlined further in section 3.1, theorists such as Foucault (Foucault, 1979, Foucault, 1980), social psychologists such as Harré (Harré, 1993), and political scientists such as Hajer (Hajer, 1997) have brought different disciplinary insights to bear on illustrating the ways in which discourse and knowledge are intimately connected and constitutive of one another. As Forsyth explains: “‘facts’ may be identified as meaningful information only in relation to specific pre-defined discourses. Yet once such “facts” have been identified and recorded they then support or create further discourses associated with them’ (Forsyth, 2003 p. 14, cf. Harré et al., 1999). Within the field of science studies, Bruno Latour for example, has shown the ways in which certain words (as well as objects such as machinery) become conceptual ‘black boxes’, whose subsequent use is then unchallenged and used uncritically in the building of facts about the world (Latour, 1987). Demeritt applies these ideas to an analysis of environmental science, pointing to the constructed nature of commonly unquestioned (but on closer inspection, diffuse and sometimes vague) discursive categories within the natural sciences such as ‘ecosystem’ or ‘forest’. He suggests that these categories are in fact metaphorical, given that ‘human knowledge of nature comes to us already socially constructed in powerful and productive ways’ (Demeritt, 1994 p. 177). The fixing of discursive categories and the ‘black boxing’ of certain words and concepts, allow the establishment of a conceptual framework from which subsequent work and the building of knowledge can proceed. However, various authors have pointed out that exactly how and where boundaries are drawn or issues are framed, is neither self-evident nor un-problematic, and could always be done differently given ‘different problem closure, language and social divisions’ (Forsyth, 2003 p. 89).

2.4.3 Co-production

In order to develop a framework within which to analyse the discourses and practices of science beyond recourse to an idealised image of scientific purity built on assumptions of a

straightforward separation between science and politics, science studies scholarship has elaborated the concept of 'co-production' (Latour, 1993, Jasanoff, 2004, Thompson, 2006) which describes the processes by which science and society 'continually shape, constitute and validate one another' (Lovbrand, 2007 p. 41). Scientific knowledge in the idiom of co-production is, 'not a transcendent mirror of reality', but rather '[i]t both embeds and is embedded in social practices, identities, norms, conventions, discourses, instruments and institutions – in short, in all the building blocks of what we term the *social*' (Jasanoff, 2004 p. 3 emphasis in original). However, this is not to imply that science is simply an 'eipiphenomenon of social and political interests' (*ibid.* p.3). The term represents an important departure from previous work in science studies which referred to scientific knowledge as 'socially constructed': as Jasanoff argues, although in reality social constructivism 'does not imply that social reality is ontologically prior to natural reality, nor that social factors alone determine the workings of nature... the rubric "social construction" carries just such connotations' (Jasanoff, 2004 p. 19). The term co-production thus reflects a 'recognition that the production of order in nature and society has to be discussed in an idiom that does not, even accidentally and without intent, give primacy to either' (*ibid.* p.20). Viewed through this lens, knowledge production is linked to the production of social order and scientific knowledge has a role in sustaining and re-making society, in addition to making new discoveries and increasing efficiency etc. This view allows for an explicit recognition of the links between different types of knowledge and power. As Elgert argues: '[i]f knowledge is primarily a product of the social world, then it cannot but reflect the characteristics of the social world. This includes the ways in which structural power is manifest in differential access to resources and decision-making authority' (Elgert, 2010 p. 377).

Referring to the term 'co-production' as 'perhaps the most useful and all encompassing conceptual device for explaining the mutual evolution of science and politics' (Forsyth, 2003 p. 104), Forsyth highlights the fact that the production of social order described by the term 'does not necessarily refer to a state of apparent political stability, but can also describe the struggle for order, or conditions of enforced order' (Forsyth, 2003 p. 104). Analysing science through the lens of coproduction thus reminds us that 'ways of knowing the world are inseparably linked to the ways in which people seek to organize and control it' (St Clair, 2006 p. 66).

Studying scientific co-production can be challenging because 'it is at odds with the way that most experts understand, describe and document the way that knowledge is produced'

opposing a realist view of scientific knowledge in which '[i]deas that have withstood peer review or controversy are qualities of nature, while rejected views are a product of scientific error or misconduct' (Goldstein, 2010 p. 269). Instead, the framework of coproduction necessitates a more nuanced and situated analysis, and opens up an 'analytical space where simplistic demarcations between science and policy, facts and values, knowledge and power can be critically assessed and challenged' (Lovbrand, 2007 p. 41).

2.5 Integrating the debates

While there is now a valuable body of work detailing the science/society interface – there is a notable disconnect between this corpus of knowledge and many practicing scientists attempting to produce policy relevant science (Vogel et al., 2007), as well as a disconnect between academic literatures from different fields (e.g. conservation biology and science studies) dealing with the same topics (e.g. interdisciplinary differences) (MacMynowski, 2007). This disconnect may in part occur due to what has been argued to be the inaccessibility (to those not trained in social scientific disciplines) of much of the literature in science studies (Martin, 1993, Schneider, 2001). Schneider for example argues that what he refers to as 'impenetrable jargon' used by many science studies scholars keeps science studies as a 'marginal intellectual backwater largely ignored by those very scientists who need most to hear the message' (Schneider, 2001 p. 338). He goes on to point out that although 'natural scientists are as guilty of impenetrable jargon as anyone in the S&TS community... when we in science want to reach a popular audience, it is we who must change our language to that of the audience; we cannot expect that they will come to us' (*ibid* p.340). Others have suggested that the longstanding epistemological divide between positivists and post-positivists or between social constructivists and anti-constructivists, is at the root of the disconnect. For example Procter refers to an 'abyss between constructivists and anti-constructivists' (Procter, 1998 p. 353) and argues that he fears that this is 'simply too large to be productive as it fuels little more than misinterpretation and intellectual hostility among scholars of nature' (*ibid* p. 353). Meanwhile however, dealing with this disconnect is argued to be ever more urgent (Fox et al., 2006). For example Adams (2004) argues that one of the first and most important steps towards nature's renewal, and one that is particularly difficult for many conservationists from natural science backgrounds to take, is accepting that 'what we understand by nature is socially constructed' (Adams, 2004 p. 232). Or in other words, that 'nature cannot speak alone' (Fairhead and Leach, 2003 p. 13).

This thesis is premised on the fact that the disconnect between debates occurring in the various fields that share an interest in the discourses and practices of conservation, mean that there is an urgent need for work that bridges the divide in critical yet accessible ways. The material presented here thus aims to contribute to this process. Insights from science studies, (in particular the framework of scientific knowledge as 'co-produced' with social order), and from policy studies (regarding the need for an opening up of policy to multiple perspectives), are applied within a broad political ecology framework in order to open up analytical spaces from which to explore the discourses around conservation and science on Galápagos. By providing empirical evidence of the subjective dimensions of the different discourses around conservation, and the constructed and contested nature of the role of science in conservation, in an accessible way, it is hoped to facilitate productive cross-fertilization between the distinct disciplines. The following chapter will now explore in more detail the central ontological concept of discourse and the particular methodological approach of discourse analysis (combining Q methodology, environmental history and ethnography) that has been applied in this thesis.

Chapter 3. Methodology

Chapter Outline

This chapter is split into three sections. In section 3.1, the concept of discourse and the methodological approach of discourse analysis are outlined. The application of a critical realist philosophy of science as an ethical framework for discourse analysis is explained. In section 3.2 Q methodology is introduced as the primary tool for the analysis of discourse applied in this thesis. A detailed examination of the methodology (including the history, epistemological and theoretical underpinnings of the Q technique) is given. Finally, section 3.3 gives an overview of the phases of data collection carried out for this thesis, and outlines the rationale for a mixed method approach, combining and supplementing the results of the Q studies with additional insights from ethnographic observation and environmental history.

3.1 A discourse approach

Although widely acknowledged within a range of social science fields as being important, the term discourse is nonetheless notoriously 'slippery', and has taken on a vast number of meanings over the last century. As Glynos *et al.* point out, the meanings attributed to the term range from discourse as 'natural language, speech, and writing, to almost anything that acts as a carrier of signification, including social and political practices, to discourse as an ontological horizon' (2009 p. 5). The notion of discourse analysis is similarly complex, and has been referred to as 'both a methodology and a field of study in its own right' (Heinz *et al.*, 2007 p. 19), with some commentators even arguing that the diversity of approaches to discourse analysis mean that the field 'is far from theoretically coherent' (Johnston, 2002 p. 62).

In this thesis the post-Foucauldian theoretical approach to discourse analysis outlined by Hajer (1997) is adopted. Hajer defines discourse as 'a specific ensemble of ideas, concepts, and categorizations that are produced, reproduced, and transformed in a particular set of practices, and through which meaning is given to physical and social realities' (Hajer, 1997 p. 44). Within this framework, rather than simply being a neutral means by which individuals communicate or manipulate the world around them, discourse is itself a 'part of reality, and constitutes the discoursing subject' (Hajer, 1997 p. 51).

As outlined in the previous chapter, the idiom of *co-production* draws attention to the ways in which knowledge and social order are mutually constitutive of one another. Thus within this framework, particular discourses become prominent at particular moments in time

‘not as chance happenings, nor as the results of the most progressive research and thinking, nor as offers of a general consensus about how problems should be addressed. Rather they become powerful because they are both embedded in, and embed, powerful social regimes. They reinforce and are reinforced by the structures of power in society’ (Elgert, 2010 p. 377).

In other words viewed through this lens, certain discourses become dominant as an outcome of the co-production of knowledge and social order. These insights owe much to the earlier ideas of Foucault, for whom discourse, knowledge and power were intimately connected. For Foucault, discourse produces the objects of knowledge, and therefore nothing can have meaning outside of discourse (Foucault, 1972). This is not to infer that there is no material reality independent of discourse, but is to theorise how meaning is given to that reality. With regard to knowledge, within a Foucauldian understanding, ‘since we can only have a knowledge of things if they have a meaning, it is discourse – not the things-in-themselves – which produces knowledge’ (Hall, 2001 p. 73). Understood in this way, discourse is also inextricably bound up with the exercise of power, and insight which Foucault elaborated as what he called ‘power/knowledge’, used to describe the fact that knowledge is always a form of power. Thus for Foucault: ‘the exercise of power perpetually creates knowledge and, conversely, knowledge constantly induces effects of power’ (Foucault, 1980 p. 52). Power thus permeates all levels of society acting as ‘a productive network which runs through the whole social body’ (Foucault, 1980 p. 119).

Discourses in the Foucauldian understanding contain internal rules and thus ‘function as a structure to behaviour’ (Hajer, 1997 p. 48), acting in ways that both enable and constrain behaviour (cf. Giddens, 1984). Although Foucault claimed that his vision of power (and hence of discourse) was not only negative or repressive, but also acted to produce ‘things...pleasure, forms of knowledge’ (Foucault, 1980 p. 119), Hajer argues that Foucault’s analysis ‘is heavy on the constraining workings of discourse, but rather weak on the enabling aspect’ (Hajer, 1997 p. 49). As he summarises:

‘Discourses imply prohibitions since they make it impossible to raise certain questions or argue certain cases; they imply exclusionary systems because they only authorize certain people to participate in a discourse; they come with discursive forms of internal discipline through which a discursive order is maintained; and finally there are also certain rules regarding the conditions under which a discourse can be drawn upon’ (Hajer, 1997 p. 49).

Although discourses understood within this framework are seen as constitutive of political processes, Hajer also affords a central role for human agency, which, he argues ‘remains ambivalent’ (Hajer, 1997 p. 51) within Foucault’s original theory of discourse. Hajer’s conceptualisation draws insights from the field of social psychology and work of authors such as Harre and Billig (Harré, 1993, Davies and Harré, 1990, Billig et al., 1988) in order to correct what he argues to be some of the shortcomings of the way in which the subject is conceived of within a Foucauldian discourse theory. In Hajer’s framework, ‘social action is seen as originating in human agency; however, social structures of various sorts exist that both enable and constrain this agency’ (Ockwell and Rydin, 2006 p. 383). Thus discourses are produced by individual and institutional activities and practices, but simultaneously ‘have structuring capabilities as they provide parameters within which people act, and shape the way actors influence the world around them’ (*ibid* p. 383).

3.1.1 An ethical framework for discourse analysis

The fact that this thesis focuses on discourses of conservation and the role of science which are understood to be subjective interpretations, or ‘constructions’ and thus hard to prove right or wrong in any straightforward way, does not necessarily suggest a slide towards an entirely relativistic worldview where ‘anything goes’, or preclude a normative commitment to what has been called the ‘conservation imperative’ (Wilhusen et al., 2003 p. 3). Although treading the middle ground between the more constructivist accounts and more ‘realist’ accounts can be challenging, as Dryzek argues, attention to the ways in which something is socially interpreted or ‘constructed’ by different people does not have to imply that the phenomenon in question is unreal:

‘[p]ollution does cause illness, species do become extinct, ecosystems cannot absorb stress indefinitely, tropical forests are disappearing. But people can make very different things of these phenomena and – especially – their interconnections, providing grist for political dispute’ (Dryzek, 1997 p. 12).

In line with authors such as Forsyth (2001), in order to take an approach which allows for a realist understanding of environmental change, whilst being critically aware of the ways in which understandings of reality are necessarily partial (i.e. an approach to research that is ontologically realist but epistemologically sceptical), a critical realist philosophical framework is adopted in this thesis (c.f. Bhaskar, 1975). This philosophy holds that there is a ‘real world’ out there, but maintains that our knowledge of that world is constrained by our limited experience, frames of inquiry, and the particular discourses we adhere to. According to Forsyth, a critical realist approach to environmental discourse ‘does not imply the belief that

environmental knowledge is unreal or imagined, but instead indicates an interest in how statements about the real world have been made and with what political impacts' (Forsyth, 2003 p.15-16). In order to explain a critical realist approach to understanding environmental issues, Forsyth (2001) draws on Searle's distinction between what he calls 'brute facts,' or facts about whose existence there is usually little debate (for example freezing points or aridity) and 'institutional facts' which, while they may be constituted by brute facts may be understood differently by different social groups (for example: degradation, climate change or deforestation). Dryzek (1997) also adopts a critical realist framework for his analysis of environmental discourses, arguing that within this framework '[i]t is still possible to engage in critical comparative judgment [of discourses], to apply evidence and argument, and to hope that in so doing we can correct some errors, and so move toward a better overall understanding of environmental issues and problems' (Dryzek, 1997 p. 12).

However, it is important to acknowledge the philosophical challenges posed by a focus on discourse, not least what Schön and Rein refer to as the 'relativist trap' (1995 p. 41). They point out that if one takes a view that knowledge is always partial, influenced by the tacit discourses and frames that particular individuals ascribe to, then there can be no objective, independent set of criteria against which to judge the relative merits of different frames or discourses, and therefore one 'must then reluctantly concede that [one has] no reasonable basis for deciding among policy frames, all of which may be internally consistent and compelling in their own terms and hence equally worthy of choice' (*ibid* p. 41). Although on a theoretical level this appears to be a reasonable concern, the anthropologist Clifford Geertz famously argued that a dread of the supposed consequences of relativism is largely unfounded (Geertz, 1984). Geertz's argument was not a philosophical defense of relativism, but an attack on what he called 'anti-relativism', what he saw as an intellectual trend which uses relativism as 'a specter to scare us away from certain ways of thinking and toward others' (*ibid* p. 263). Geertz argued that not only does the corpus of knowledge generated by the entire field of anthropology act as 'a massive argument against absolutism in thought, morals and esthetic judgment' (*ibid* p. 263), but he also claimed that in practice: 'the moral and intellectual consequences that are commonly supposed to flow from relativism – subjectivism, nihilism, incoherence, Machiavellianism, ethical idiocy, esthetic blindness, and so on – do not in fact do so' (*ibid* p. 263). Outside the field of anthropology this point also holds true, hence in practice, if the work of many analysts of environmental discourse is considered, it emerges that far from demonstrating relativist tendencies, many scholars undertaking discourse analysis show a

strong commitment to the normative ideals of emancipation and social justice¹², as well as to a broad environmental ethic (see e.g. Takacs, 1996 p. xiv).

This belief in the emancipatory dimensions of discourse analysis is a theme that runs through much of the literature. Thus for Foucault, on whose insights (as outlined above) much work on discourse draws, emancipation from the multiple actions of power was a fundamental driver for critical work, and he therefore 'sought to lay bare the workings of power at the level of everyday action and micro-processes' (Fletcher, 2010 p. 178). Many scholars engaging with analysis of environmental discourses have also highlighted the explicitly normative dimensions to this project, both in terms of social justice and better environmental outcomes. For example, some scholars point to the ways in which particular discourses and narratives may act to reinforce power inequalities and perpetuate forms of injustice (such as the removal of communities from protected areas or the denial of resource access to particular groups), with ultimately damaging consequences for livelihoods and in some cases also to the environment (e.g. Neumann, 1998). Brosius thus argues that a critical perspective towards, and analysis of, environmental discourses is 'imperative' in order to show how 'various structures of domination are constituted and perpetuated' (Brosius, 1999 p. 278). Others highlight a commitment to the principles of democracy as the normative rationale for discourse analysis. For example, Dryzek and Niemeyer argue that in a globalizing world where political authority is increasingly diffused into informal networks made up of governmental and non-governmental actors, accountability to any well defined demos, in the standard sense as required in a traditional democracy becomes almost impossible (Dryzek and Niemeyer, 2008). Thus, they suggest that in an ill defined demos (e.g. when networks cross international boundaries as is the case in the governance of many protected areas) an analysis of discourses is critical in order to ensure that a network 'is not dominated by a single discourse whose terms are accepted uncritically by all involved actors in a way that marginalizes other discourses that could claim relevance' (Dryzek and Niemeyer, 2008 p. 13).

3.2 Methods overview

Although the work presented in this thesis falls under the general umbrella description of a discourse analysis, a wide variety of approaches to discourse analysis are possible. In this research the central tool for uncovering and analyzing discourses is Q method which will be

¹² Thus for example the field of 'critical discourse analysis' is described as 'research that primarily studies the way social power abuse, dominance and inequality are enacted, reproduced and resisted by text and talk in the social and political context' (Van Dijk, 2003 p. 352).

described in detail below. In addition to the collection of qualitative and quantitative data through the Q technique, textual analysis of historical (primary and secondary) data sources has been used to contextualise the contemporary discursive landscape of Galápagos, and the interpretation of the discourses emerging from the Q studies has been deepened and extended through reference to ethnographic observations carried out over 12 months in the field. The adoption of a 'mixed method' approach combining Q method with other qualitative or quantitative research methods in order to deepen and contextualise the interpretations of the results of the Q studies, is common practice among researchers using Q method (Brown, 2008, Hutson and Montgomery, 2011). More detail about the additional methodological approaches applied in this thesis, and the rationale and justification for their combination with the Q studies presented here will be discussed in section 3.3.3.

3.2.1 An introduction to Q method

Developed by psychologist and quantum physicist William Stephenson in 1935 (Stephenson, 1935), Q method provides a powerful tool which enables the researcher to explore the volume of discussion about a given topic (the 'communication concourse' in the language of Q research), and search for patterns or underlying discourses ('factors') that are present, without the need for preconceived ideas about the groupings and divisions one expects to find. Q is an intensive method in which a relatively small number of purposively selected participants (usually between 20 and 40 people) are asked to rank order a number of opinion statements that have been sampled from a concourse of opinion about a given topic (see Box 3.1). Outcomes are then statistically analyzed using factor analysis in order to look for patterns in ways of thinking and talking about the topic, i.e. distinct discourses. The resulting discourses ('factors' in the language of Q) are interpreted with the aid of interview data from the participants, and described with reference to additional data regarding the research context (existing literature, ethnographic observation etc).

As its focus is on subjectively held opinions, a Q study can be used to explore viewpoints or discourses about any topic that can be socially contested or debated, and in recent years Q methodology has increasingly been applied to the analysis of environmental discourses around issues such as climate change (Dayton, 2000), sustainable forestry (Swedeen, 2006), conservation conflict (Mattson et al., 2006) and ecosystem management (Ockwell, 2008, Gruber, 2011), as well as being applied to an analysis of the values that underpin conservation science (Sandbrook et al., 2010).

Within the post-Foucauldian discourse framework adopted in this thesis, subjectivity is viewed as multifaceted, i.e. 'most of us will fashion a complex subjectivity from participation in many different discourses' (Harre and Gillett, 1994 p. 25). Q method is ideally suited to researching discourses and subjectivity understood in this way, and the method is built on the assumption the 'the subject may well be constituted multiply, in ways that a priori binary subject categorizations (liberal, conservative, male, female) fail to grasp' (Robbins and Krueger, 2000 p. 643). The method is thus able to incorporate an awareness that people do not draw on comprehensive discursive systems for their cognition but rather make use of 'various discursive categories to give meaning to specific physical or social phenomena' (Hajer, 1997 p. 56).

A Q study does not impose a priori categories onto the data, but allows categories to emerge from the data, and thus it can be classified alongside other inductive methodologies such as 'grounded theory' (Glaser and Strauss, 1968). This property of the method means that it holds the potential to reveal subtle differences between perspectives in situations of conflict, when nuances in the debate may become obscured by simplistic generalisations. Furthermore it can serve to locate elements of consensus (if they exist) that might otherwise 'go unnoticed in the emotional turmoil of political debate' (Gargan and Brown 1993, p. 348 cited in Clarke 2002). Although it has a quantitative basis, the method is also highly interpretive, leading it to be dubbed a 'quali-quantitative' method, or as Watts and Stenner put it: 'Q method's quantitative features render it a highly unusual qualitative research method' (Watts and Stenner, 2005a p. 69). This mix of quantitative and qualitative dimensions has lead proponents of the method to claim that it offers 'a scientific approach to subjectivity which retains the depth, diversity and individuality in more humanistic work' (Eden et al., 2005 p. 413). Q's quantitative basis differentiates it from other textual approaches to discourse analysis, but it is also fundamentally different from some of the other quantitative techniques commonly used to study perspectives or attitudes, such as surveys, questionnaires or opinion polls, and indeed, the invention of Q method by Stephenson in the 1930s was 'in direct opposition to the positivist assumptions underpinning traditional correlational research' (Shemmings, 2006 p. 3). The difference between Q and these methods (known collectively as 'R' techniques after Pearson's r coefficient in statistical analyses), lies in the fact that Q does not use an externally constructed scale against which to measure participants, a practice that renders many 'R' studies vulnerable to constructed effects, that is, by assuming the existence of the trait in question 'the observer elicits his response on the spot, and the subject's response breathes life into it in a way that lends the concept a spurious realization' (Brown, 1980 p. 3). Furthermore,

Q makes no attempt to correlate subjective opinions with other objective factors, such as income, gender or skin colour (which are not considered to make subjective attitudes comprehensible), or to put respondents into pre-conceived categories (such as 'pro' or 'con' a particular idea or position), but instead looks to understand the structure of subjective opinions according to the subjects' own internal frames of reference. Q method thus runs counter to what has been called the 'common social scientific practice of using identity categories or a combination of such categories to infer people's interests' (Agrawal, 2005 p. 167). In a Q study, subjectivity and discourse are not reducible to interests or other traits, but are considered visible and measurable in the behaviour of a subject in a given moment and under certain stimuli, i.e. the active process of rank ordering opinion statements according to subjective or self-referential criteria.

Although Q method provides a powerful tool for the analysis of discourses, the method also entails certain limitations, and has been critiqued on a number of grounds. While some critiques of the method are well founded, others are grounded more in misunderstandings of the method rather than being the result of true weaknesses or faults of the method itself. For example, a valid limitation (as will be outlined in section 3.3.3) is that a single Q study is unable to explore the ways in which discourses change over time, nor examine the wider social context of a study, and in order to overcome this limitation, it is thus common for Q studies to be combined with other methods.

Despite Q's statistical underpinnings, there is clearly an important element of researcher subjectivity (and thus potential for bias) involved in the interpretation of the results of a Q study, and indeed claims that Q method can entirely remove the biases of the researcher are argued to be 'unfounded and epistemologically naïve' (Robbins and Krueger, 2000 p. 636). However accepting the inevitable presence of the researcher in the process of research need not be understood as a limitation. Cross (2005) points out that in a Q study, in common with other qualitative methods, 'to take the analysis beyond the most basic descriptive and counting exercise requires the researcher's analytical skills in moving towards hypotheses or propositions about the data' (Cross, 2005 p. 211). Thus while Q method cannot claim to remove the potential for bias entirely, it offers a structured and rigorous approach to exploring discourse which has the potential to democratize the research process (Robbins and Krueger, 2000)

Other critiques hinge on the observation that the small number of participants in a Q study mean that the results cannot be representative of the population at large. However, this criticism (while statistically correct) is based on a misunderstanding of the aims of the method: generalizing from a Q study about the characteristics of the population at large is not the aim of a Q study, and thus representative sampling is not the aim of participant selection. A Q study aims to understand the structure and differences between discourses, and thus the notion of 'sample size' is more aptly descriptive of the sample of statements to be sorted than the participant group (see Box 3.2). The critique that with a Q study 'you only get out what you put in' is similarly misplaced. This critique is built on an unfounded assumption that the statements which participants sort have just one objective meaning determined by the researcher against which participants are measured (see Box 3.1). In a Q study the statements are imbued with meaning in the process of the Q sort, hence 'Q research always has the power to surprise; no assumption about the way understandings are structured is built into the method' (Cross, 2005 p. 211).

The concourse

A concourse can be defined as ‘the volume of discussion’ on a given topic (Brown, 1986 p. 58), in other words everything that is being said about a particular issue in a given moment in time. The concourse has no established boundaries, and thus it is important to highlight that there is an important dimension of researcher subjectivity in deciding where to draw those boundaries (Eden et al., 2005). A concourse would normally be expected to contain several ‘discourses’ or distinct ‘way[s] of seeing and talking about something’ (Barry and Proops, 1999 p. 338), and a Q study is interested in analysing a concourse and ‘resolving it into its component discourses’ (Dryzek and Berejikian, 1993 p. 87). Although in theory, the number of individual points of view around a topic are infinite, and within a given Q study there are potentially as many discourses as participants, in practice the emerging number of common themes will be limited, a fact that has been referred to as the ‘finite diversity’ of the discourses about a given topic (Stainton Rogers, 1995 p. 180). As Brown (1980) puts it: ‘The number of distinctly different sortings is not expected to be near-infinite ... but is expected to form a more limited number of patterns (factors), and in most Q studies no more than five factors normally emerge’ (p. 62).

Q researchers distinguish between two different approaches to concourse development: the ‘naturalistic’ approach, whereby statements are taken (often verbatim) from interviews with the participants carried out with the sole purpose of generating quotes/opinions for the concourse (Barry and Proops, 1999); or the ‘ready-made’ approach, whereby quotes and opinions are sampled from sources like newspaper articles, academic literature or websites. However, frequently in practice these two approaches are combined into a ‘semi-naturalistic’ approach, allowing for the broadest possible range of opinions on a topic to be compiled into the concourse (e.g. Dryzek and Berejikian, 1993).

In developing a Q concourse it is common practice to include some statements that are ‘deliberately ambiguous’ (Dryzek and Berejikian, 1993 p. 51), or contain ‘excess meaning’ (Brown, 1970, cited in Webler et al., 2009 p. 9). Given that participants are not being measured against an external scale imposed by the researcher, this ambiguity is not problematic as it would be in, for example, a questionnaire design. The statements themselves do not have just one objective meaning with which participants either agree or disagree, rather the participants put meaning into the statements as they sort them, and it is this subjective meaning that is of interest in Q method. Thus statements act as stimuli to reveal the internal frames of reference of the participants, and the ways in which the participants interpret the statements is resolved and made comprehensible by the way they place them in relation to all the others, and by the comments made during sorting.

The researcher needs to make a subjective judgment about when the concourse is complete. Eden et al. suggest that this process is best treated like ‘the grounded analysis of qualitative data’ and suggest that the researcher should ‘stop when “saturation point” is reached’ (Eden et al., 2005 p. 416). In practice this is achieved when the addition of new statements to the concourse is not felt to add to the diversity of opinions present. In highlighting the subjectivity involved in both the delimitation of the boundaries of the concourse in the first instance, (ie. what the study is about) and in the decision of when to stop adding new opinions, Eden et al. draw attention to the important point that ‘the concourse does not exist “out there” to be found, but is constructed in the research process’ (*ibid* p. 416).

3.3 Data collection and analysis

The data collection for this thesis took place during four field trips to Galápagos between March 2009 and May 2011 (see Figure 3.1). Before commencing research activities, the necessary research permit (No. PC-33-09) was obtained from the Galápagos National Park, and all park regulations and Ecuadorian laws were complied with.

Drawing on methodological insights from the 'grounded theory' tradition (Glaser and Strauss, 1968) the data collection and analysis in this research project took place simultaneously, and insights from analysis were applied in an iterative way to inform the development of future phases of fieldwork. Thus for example as Figure 3.1 shows, ethnographic observations and historical analysis informed the development of the first Q study, the results of which informed the development of the second study. Similarly results of both Q studies provided insights that could be further explored through the ethnographic work.

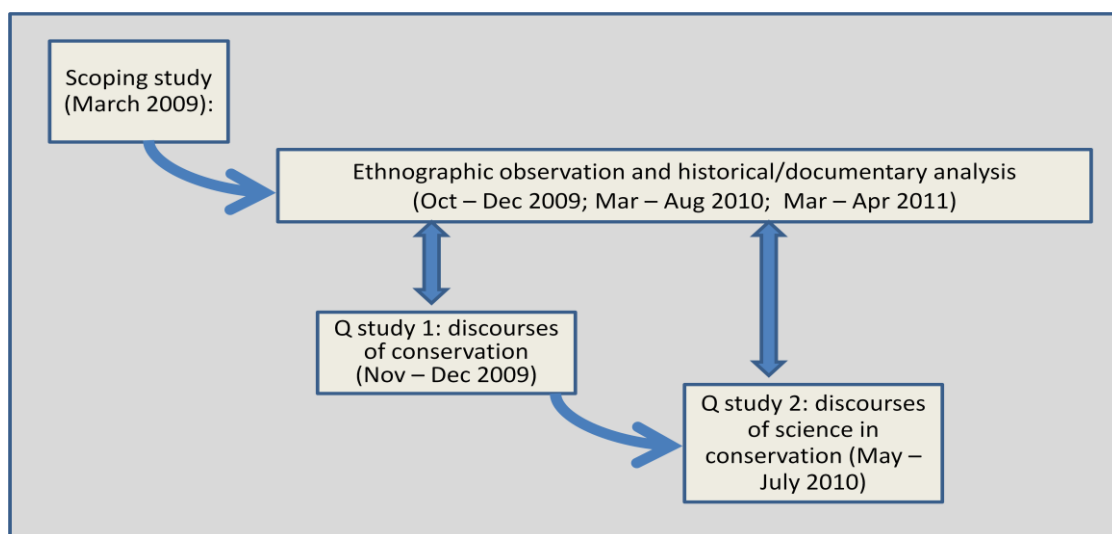


Figure 3.1. Phases of fieldwork

3.3.1 Overview of the data collection phases of the Q studies

The data collection and analysis that was undertaken for the two Q studies presented in chapters 5 – 8 was carried out in five distinct phases: 1. concourse development; 2. development of the 'Q sample'; 3. participant selection and the Q sorting; 4. statistical analysis of Q sort patterns; 5. interpretation. These generic phases will be briefly summarised and

explained below, while the specific details of the data collection and analysis carried out for each individual Q study will be given at the start of the relevant chapters (Chapter 5 and 7).

1. Concourse development

For each study, the first phase of data collection involved the development of a ‘concourse’ of opinion statements (see Box 3.1). In both cases the concourses consisted of a list of opinion statements written in both Spanish and English. Statements were sampled from a wide variety of sources including: academic literature, popular literature, media sources (newspapers, radio, television), the promotional material of NGOs (websites, leaflets etc), ‘grey literature’ (e.g. government reports, management plans, technical reports), and comments recorded from informal interviews and conversations with Galápagos stakeholders which took place during the scoping study and first few weeks of fieldwork.

2. Development of the Q sample

The concourses were then refined down to a manageable number of statements known as the Q sample. The aim with the selection of the Q samples was ‘to provide a miniature which, in major respects, contains the comprehensiveness of the larger process being modelled’ (Brown, 1993 p. 99). There is a tension between the need to incorporate the greatest possible diversity of statements in the concourse while at the same time not overly taxing the abilities and patience of the participants. As a rule of thumb, an appropriate size for a Q sample has been suggested to be between 20 and 60 statements (Webler et al., 2009 p. 15).

3. Participant selection and the Q sort process

Participants were purposively selected for their relevance to the topics and asked to carry out a Q sort. Webler et al. have argued that the process of participant selection in a Q study is equivalent to the selection of survey questions in a traditional ‘R’ type research project: neither survey questions nor participants in a Q study are selected at random, ‘they are intentionally selected because the researcher feels that they will yield interesting insights’ (Webler et al., 2009 p. 9). Q method is an intensive ‘small n’ methodology, and the number of participants in a typical Q study is between 20 – 40 people (Brown 1980). For more details about the concept of sample size in a Q study see Box 3.2.

Q sorting is the process whereby participants sort the statements in the Q sample along a scale according to a particular condition of instruction, which in this case was the following:

“Please sort the cards onto the chart according to how like or unlike your point of view they are, with +4 being most like your point of view, and -4 being least like your point of view”.

Participants were encouraged to think out loud throughout the Q sort, and the entire process was recorded (with participant consent) in order to aid interpretation of the factors. The grid onto which participants are asked to sort the statements may take the form of a quasi-normal distribution, as it is argued that the imposition of a forced distribution shape encourages participants to reveal their preferences more thoughtfully (Webler et al., 2009 p. 19). However the imposition of a forced normal distribution is not necessary for the technique to work (Brown, 1971, Burt, 1972, Barry and Proops, 1999, Watts and Stenner, 2005a). In general, depending on how much or how little respondents wished to say about the topic, in the Q studies presented in this thesis, the Q sorting process took from 30 minutes to one and a half hours, averaging around 45 minutes per interview.

4. Statistical analysis of Q sort patterns

Results of the sorts were statistically analysed in order to allow the extraction of a number of ‘typical’ q sorts or ‘factors’ representing generalised opinions or discourses present in the population. In both cases, results of the individual sorts were correlated and factor analyzed, using the freely available software PQmethod 2.11 (Schmolck, 2002) specifically designed for the analysis of data from Q studies. The software generates a number of factors or patterns present in the data, which ‘lend statistical clarity to the behavioural order implicit in the [correlation] matrix by virtue of similarly (or dissimilarly) performed Q-sorts’ (McKeown and Thomas, 1988 p.50).

5. Analysis and interpretation

The term ‘factor’ refers to the patterns emerging from the statistical analysis of the Q sorts. For each of the factors rotated in the final analysis PQmethod generates an idealized sort in the form of responses along the original response scale, and each participant is given a loading which indicates the degree to which their Q sort was correlated with the general pattern. As well as providing this quantitative data, the Q sort process also generates rich qualitative data in the form of participants’ responses to the statement cards they are sorting. The combination of the quantitative and qualitative data was used to interpret the factors, helping to minimize researcher bias (Gallagher and Porock, 2010). These factors were then described in a narrative form. There has been some discussion and debate about the appropriate use of

terminology in the narrative description of the factors (Stainton Rogers and Stainton Rogers, 1990), and there are a variety of terms employed by different authors. For example the terms 'perspectives' (Rutherford et al., 2009, Webler et al., 2009), 'discourses' (Dryzek and Berejikian, 1993, Ockwell, 2008) and 'viewpoints' (Watts and Stenner, 2005a) are all commonly used in the literature. In this study, as Q is employed as tool for the analysis of discourse (cf. Addams and Proops, 2000, Barry and Proops, 1999), the term 'discourse' is primarily used to describe the factors, however, in line with authors such as Dryzek (1993), Ockwell (2008), and Robbins (2006), the term 'point of view' is also referred to in the narrative, primarily for readability's sake.

The factors were assigned a title that attempted to capture some of the essence of that discourse as an 'abbreviated storyline' (Dryzek, 1997 p. 17). Finally all participants were given the opportunity to opt-in to receive a copy of the results of the study, and were asked to provide a contact address (email or postal address) for this purpose. The draft narratives were emailed to all participants who wished to receive them, and participants were invited to comment on the interpretation of the factors and the Q process in general. These comments were used to test the validity of the interpretations.

Box 3.2

The notion of 'sample size' and generalizability of findings in a Q study

Within traditional quantitative ('R') methods, the term 'sample size' refers to the number of participants, and is ideally as large as possible in order to be statistically representative of the larger population from which participants have been sampled, and thus to make it possible for inferences to be made about that population on the basis of the results of measurements of the sample. In Q methodology, the concept of sample size is more applicable to the concourse of statements, and the notion of representation is relevant in as far as the statements in the concourse should be representative of the total range of statements being made about the topic. Thus participants for a Q study are not randomly sampled from a population, but are deliberately chosen for their relevance to the topic in question (Brown, 1980). The most important principle of participant selection is diversity of opinion, so that ideally if a particular discourse exists, even if is very marginal, the process would hope to reveal it. It is also important that the participants are familiar with the topic and have 'well formed opinions' (Webler et al., 2009 p. 9).

Given that the aim of a Q study is to search for distinct discourses around a given issue, and no claim is made about the proportions of the views uncovered in a wider population, the same need for large sample sizes does not apply in a Q study. Rather as Dryzek & Berejikian point out 'our units of analysis, when it comes to generalization, are not individuals but discourses' (Dryzek and Berejikian, 1993 p. 52). Thus although no claim can be made that the subjects that carried out the Q test are 'statistically representative of some larger population' (Dryzek and Berejikian, 1993 p. 51), this is not the aim of a Q study. Instead in so far as the concourse is 'representative' of the breadth of opinion on the topic each factor described should 'prove a genuine representation of that discourse as it exists within a larger population' (Dryzek and Berejikian, 1993 p. 52). And thus although it cannot be asserted that the factors uncovered by this study are the only viewpoints that exist on the topic, the discovery of factors other than those described (for example through the participation of an additional individual with a unique point of view) will 'in no way influence description' of the existing factors (Brown, 1980 p. 67, cited in Addams and Proops, 2000 p 34).

Furthermore, within a Q study, individual cases are not treated as anomalies, or insignificant, but can provide valuable insights to the topic in question. As Brown explains, given that 'the interest of Q methodology is in the nature of the segments [discourses] and the extent to which they are similar or dissimilar, the issue of large numbers, so fundamental to most social research, is rendered relatively unimportant. In principle as well as practice, single cases can be the focus of significant research' (Brown, 1993 p. 93).

3.3.2 A note about language and translation

Spanish is the official and most widely spoken language among the permanent residents of the Galápagos Islands. However, the primary language of the majority of international tourists to the islands is English (Epler, 2007), and many residents are thus familiar with the language. Similarly, many of the professionals working for NGOs in Galápagos are English speakers. Thus

both languages are widely spoken in the islands. Amongst Q practitioners there is an ongoing debate about the validity of translating Q statements into other languages and cultural contexts, but it has been argued that where both languages are widely used and the discourse thus consists of statement in both languages, translation is not generally considered to pose a problem, and the evident advantages of being able to include speakers of both languages in the study have been argued to 'outweigh concerns about translation reliability' (Webler et al., 2009 p. 17). In the case of both the Q studies presented here, the discourses consisted of statements from both Spanish and English sources, and the participant groups were made up of both native Spanish speakers and native English speakers. The statements in the Q samples were first translated into both English and Spanish by a professional translator, and these were subsequently checked for the accuracy and appropriateness in the Galápagos context by a bilingual Galápagos resident. Q interviews were carried out in both English and Spanish, dependent on the preferences of the participants.

3.3.3 A mixed-methods approach: insights from environmental history and ethnography

While Q method is excellent at uncovering discourses at a given moment in time, and thus providing a 'snap-shot' of the discursive landscape, a single study is unable to examine changes in a discourse over time, or (as a stand-alone method) to explore the wider context in which the discourses are operating. It is thus common for Q studies to be combined with other methods (Brown, 2008), including different types of discourse analysis and literature review (Malan, 2008), case study and ethnographic research building on the differences revealed by the Q factors (Van Eman et al., 2009), or even in some cases 'R' statistical methods such as surveys (Danielson, 2009). In short, an approach to research incorporating Q method does not limit the tools available to the researcher to explore and explain the research context. On the contrary, it has been argued that one of the primary strengths of the method is as an exploratory technique (Watts and Stenner, 2005b), and that Q methodology findings can act 'as a compass to help chart new research directions' (Hutson and Montgomery, 2011 p. 234). Thus in Q scholarship there is no 'set formula for presenting the interpretation and explanation of the factors' (Addams and Proops, 2000 p. 33), and it has been suggested that researchers make use of additional interview data, other socio-economic data, previous research and original theory (*ibid* p.33). In this thesis, in addition to the use of Q method, both historical references, and ethnographic observations are incorporated in order to provide as full a picture of the discourses of science and conservation in the Galápagos context as possible.

3.3.3.1 The historical overview: insights from environmental history

The rationale for the inclusion of a historical account is based on the premise that the past provides crucial insights into the present, and the belief that the contemporary discourses of science and conservation on Galápagos cannot be fully understood in isolation from their historical context. Furthermore, within conservation circles in particular, it has been argued that the historical perspective, although crucial, has frequently been missing. For example, Adams (2004) maintains that conservationists ‘often have little understanding of the ways in which problems have come about, or how their predecessors understood similar problems and tried to tackle them...[they]often know very little of their own history’ (p. *xiii*). A similar point is made by Redford (2011) who claims that ‘[w]e [conservationists] have ignored, forgotten or falsely constructed the historical legacy of conservation and then been puzzled that so many of our actions have been rejected by those who not only remember the history but have been victims of it’ (p. 325). The historical account presented in chapter 4 thus aims to examine the different ways in which people have related to the Galápagos environment through time, and explore the ways in which historical events, ideas and individuals have contributed to the discursive construction and re-construction of Galápagos, and the birth of concept of Galápagos conservation. The account draws insights from the discipline of environmental history, a sub-field of history, with an interest in examining ‘the perceptions and values people have held about the non-human world’ (Worster, 1988p. 302), or more broadly, a field which explores ‘the changing relationships between people and nature over time’ (American Society for Environmental History, 2011). The exact definition of the field is subject to some debate (see e.g. Weiner, 2005), being as it is, both a diverse area of intellectual inquiry, and one with significant overlap both in methodological approach and content with more mainstream history as well as other fields such as anthropology. Environmental historian William Cronon, summarises the approach of the environmental historian as ‘[a]n historical, social-constructionist perspective [that] takes seemingly transparent absolute environmental “facts” and places them in cultural contexts which render them at once more problematic, more interesting, and more instructive’ (Cronon, 1993 p. 16).

The material presented in chapter 4 made use of both primary and secondary data sources, many of them housed in the collection of the library of the Charles Darwin Foundation in Puerto Ayora, Santa Cruz. The range of documents that informed this phase of the research are cited in the body of the text of chapter 4, and referenced in full in the bibliography. Many of the historical documents are also available to view online in the extensive online resource

for research into the human and cartographic history of the Galápagos Islands created by John Woram (<http://www.Galápagos.to/>).

3.3.3.2 Incorporating ethnographic observation: insights from anthropology

Although the work presented in this thesis is not an ethnography in the anthropological sense, ethnographic methods were utilized throughout the extended fieldwork period, and the thesis makes use of ethnographic data and observations in order to contextualise and deepen the interpretations and discussions of the factors emerging from the Q studies (chapters 6 and 8). Ethnography represents an attempt on the part of the researcher to ‘understand the actions and utterances of a given group of people from within their own frames of meaning’ (Fetterman, 2009 p. 11), which is an endeavour that is also at the heart of the Q process (Robbins and Krueger, 2000). The two methodological approaches are thus highly compatible (e.g. Kemnitzer, 1973, Hutson and Montgomery, 2011), even if the use of quantitative methodologies such as Q have generated some debate within interpretive fields such as anthropology (Howe, 1988).

Ethnography has been hailed as having an important role to play in building a greater understanding of conservation and environmental debates more broadly. For example, Sullivan argues that ‘ethnography might play a significant role in introducing the richness and complexity of real experiences into environmental policy debates’ (Sullivan, 2003 p. 70). Furthermore, in recent decades it has been argued that the concept of culture, central to the anthropological tradition of ethnography, needs to be reintroduced into the analysis of environmental politics, and that environmental discourse itself can be understood and studied as a form of ‘cultural politics’ (Baviskar, 2008, Fischer and Hajer, 1999). For example, Fischer and Hajer (1999) argue that ‘the need to return to an analysis of the broader cultural implications of environmental discourse has become increasingly clear’ (p. 7), and suggest that ‘[a]nalyzing both the particular practices in environmental politics and the discourse in which environmental issues are addressed allows us to come to grips with this hidden or implicit cultural dimension of environmental politics’ (*ibid* p. 8). There have thus been increasing numbers of studies linking ethnographic and discourse analytical methods and approaches to the study of environmentalism and conservation (Anderson and Berglund, 2004, West, 2006, Brockington, 2006). These approaches share a degree of crossover with a long tradition in the field of science studies involving the application of ethnographic observation techniques in scientific settings (e.g. Pickering, 1992, Latour, 1987, Lynch, 1993, Traweek, 1988), but differ

fundamentally in that many of the former studies seek to provide a 'cultural critique', that is they question the cultural power effects of environmental discourses, examining:

'how systems of ordering are either maintained or imposed on others, how questions of identity feature within environmental discourse, how social relationships get redefined, or how particular ways of doing things either get reproduced or are changed' (Fischer and Hajer, 1999 p. 8).

Ethnographic techniques themselves often comprise a combination of participant observation, non-participant/naturalistic observation, in-depth and semi-structured interviews and informal conversation, all carried out over extended periods of immersion in the field context under study. The combination of rigorous and structured observation with interpretative analysis and the importance of accurately conveying meaning through writing, has lead some observers to dub the ethnographer as 'both story teller and scientist' (Fetterman, 2009 p. 2).

For the research presented in this thesis, a total of 12 months was spent in Galápagos over four field trips (see Figure 3.1). The aim of ethnographic observation was to gain an insight into the dynamics of conservation and science in Galápagos, to observe and record the discourses and practices of scientists and conservationists, as well as the social context in which they are embedded. These observations fed into the development of the two Q studies both in direct ways (various interview quotes were subsequently used as statements for the Q samples, and ethnographic observation was invaluable in aiding the selection of participants for the Q work), and in indirect ways (insights gained from observations were crucial in aiding the interpretation of the Q factors). The greater part of time in the field (8 months in total) was spent on the island of Santa Cruz, the most populous island and the commercial hub of tourism in the islands. However, all four inhabited islands were visited (San Cristobal for approximately 3 months, Isabela for 2 weeks and Floreana for 4 days). Informal interviews were carried out on all islands with a wide range of Galápagos residents and visitors. Although it would be impractical to list all of the interactions and ethnographic observation that took place over the course of 12 months fieldwork, in order to provide an overview, in addition to daily observation of the quotidian practices in Galápagos society, various events provided particular opportunities for gaining an insight into the discourses and practices of science and conservation on the islands. Opportunities for interviewing and observation occurred during attendance at public conservation-oriented events (campaign promotions, book launches, exhibitions, environmental education workshops), regular seminars organised by the Charles Darwin Foundation for visiting scientists to talk about their work, journal discussion groups and symposia, and attendance and observation of lectures at the GAIAS centre (part of the Universidad San Francisco de Quito) on San Cristobal. In addition, four days were spent

accompanying members of the Charles Darwin Foundation and National Park on an Albatross monitoring field trip to the island of Espanola (8th – 12th November 2009). Throughout the fieldwork period, notebooks were the primary tool for the recording of observations and informal conversations, and notes were subsequently transcribed into Nvivo software to enable them to be kept track of. A digital voice recorder was used to record all of the Q interviews, and where it was deemed not to be disruptive to an interviewee, informal and semi-structured interviews were also recorded.

Chapter 4. From hell to paradise via the laboratory

Chapter outline

This chapter returns to the context of the Galápagos Islands in order to fulfil objective 1. of the thesis, to investigate the changes in the discursive construction of the islands throughout their history. The material presented in this chapter sets the stage for an exploration of contemporary discourses of conservation by first questioning how the islands have come to occupy such an iconic place in the contemporary Western (primarily North American and European) imagination, and examining the key people, events and ideas that have contributed to the now dominant international representation of a ‘paradise in peril’. In examining the social histories that have shaped the islands since the 16th century, this chapter questions the current discourse of ecological crisis, in which the Galápagos islands are constructed as an untouched or pristine natural wilderness into which ‘man’ is only recently incurring and altering. In charting the striking discursive transformation of the archipelago from a desolate and damned place, to being hailed as an ‘Eden’, and humanity’s ‘last chance’ (Bensted-Smith, 2002 p. 1), the chapter highlights the fact that the meanings attributed to the nature of the islands are not fixed, but have always been subject to change and contestation, and suggests how, in the case of the current crisis narrative, particular ideas about the nature of Galápagos as a laboratory and an untouched Eden, have had profound material consequences.

4.1 Introduction

The contemporary fascination with the Galápagos Islands is hard to overstate. They have been called the ‘islands that changed the world’ (Stewart 2007), as well as ‘the most famous islands in the world’ (Eiseley, 1968), an ‘unsurpassed stronghold of inspiration’ (Merlen 2007), a ‘mecca for ecologists’ (Sauer 1969), and a ‘paradise for nature loving tourists’ (De Groot, 1983). One commentator suggests that the ‘Galápagos archipelago is to the naturalist as the Mona Lisa is to the artist’ (Oxford and Watkins, 2009 p. 51). Tour brochures urge visitors to come and experience the joys of snorkelling with sea lions or penguins, trek on active

volcanoes, or witness the mating rituals of the blue-footed boobies, while scientists maintain that 'no other area on earth of comparable size has inspired more fundamental changes in Man's [sic] perspective of himself and his environment' (Bowman, 1984 p.278). Today, conservationists and tour operators alike occasionally refer to Galápagos Islands by the romantic-sounding name bestowed on them by 16th century Spanish sailors: Las Encantadas, the Enchanted isles. However, although the use of the name in the present day is intended to conjure up visions of an exceptional place (conservationists) in which enchanting experiences with nature can be had by visitors (tour operators), it was not always so. When the name first came into use it referred to the islands 'apparent fleetingness and unreality' (Hickman, 1985 p.21), the way in which the islands appeared to move about in treacherous mists and currents, making navigation difficult, and the name conveyed a sense of doom or dread. Indeed early accounts of Galápagos, describe a bleak landscape, far from the Edenic descriptions of tour brochures today. For David Porter, a US navy officer sent to patrol the South seas in 1812 to provide protection for US whaling interests, the Galápagos Islands had 'the most dreary, desolate and inhospitable appearance imaginable', and he condemned them as being 'unsuited for the residence of man' (Porter, 1986 [1815] p.155). A few decades later, Herman Melville whose epic whaling tale, *Moby Dick* was partly inspired by his visits to Galápagos in the 1840s, wrote of the islands:

'It is to be doubted whether any spot on earth can in desolateness, furnish a parallel to this group... ruin itself can work little more upon them... The Encantadas refuse to harbour even the outcasts of the beasts. Man and wolf alike disown them. Little but reptile life is here found: tortoises, lizards, immense spiders, snakes, and the strangest anomaly of all the aguano. No voice, no low, lo howl is heard; the chief sound of life here is a hiss' (Melville, 1856).

This chapter will explore the discursive transformation of the islands, examining the social histories that have contributed to different understandings of the 'nature of nature' in the Galápagos Islands, and charting the rise of the now dominant (international) discourse of ecological crisis, or of a 'paradise in peril'. In revealing the extent of human influence on the islands over the last 500 years, the construction of the islands as 'pristine' or an 'untouched wilderness' will be deconstructed, and the material and political effects of this discourse will be explored. Heeding Adams (2009) warning that it is 'unhelpful to look for clear and simple roots to ideas that in fact relate to each other through time in a complex and fluid way' (Adams, 2009 p. 27), and in order to highlight the fact that these ideas and discourses can, at any given moment, be 'held and articulated in diverse ways by different people' (*ibid* p.27), the chapter is structured around an exploration of three metaphorical discursive representations of the islands, somewhat overlapping in time: Galápagos as 'the infernal

regions' or hell; Galápagos as a 'natural laboratory'; and Galápagos as 'the last Eden' and a 'paradise in peril'. Examining the shifting understandings of Galápagos underscores the insight from environmental history, that nature does not have a single self-evident meaning or value, but that these meanings shift with different social and historical contexts (Cronon, 1996).

4.2 Galápagos: the 'infernal regions'

It was Charles Darwin himself who, on his arrival in Galápagos aboard the HMS Beagle in September 1835, likened the Galápagos Islands to 'what we imagine the cultivated parts of the infernal regions to be' (Darwin, 1839 p. 454), stating that '[n]othing could be less inviting than first appearance' (Darwin, 1839 p. 454), and describing the marine iguanas that today draw thousands of tourists as the 'most disgusting clumsy lizards ... imps of darkness' that 'well become the land they inhabit' (Darwin cited in Keynes, 1988 p. 353). However, Darwin was neither the first traveller to the islands, nor the first to see them in such a bleak light. Originally discovered in 1535 by the Bishop of Panama, Fray Tomas de Berlanga, when his ship drifted off course on route from Panama to Peru, the Galápagos Islands (at the time bereft of both people and mineral wealth) were originally perceived to be of such little value, as to warrant neither naming nor colonising by the Spanish (cf. Von Hagen, 1949). Their earth, the Bishop likened to 'dross' in which one could not even 'sow a bushel of corn' (Fray Tomas de Berlanga 1535 letter, reprinted in Von Hagen, 1949 p. 171). Other early travellers and explorers had similarly low opinions of the islands. Their forbidding appearance coupled with the harshness and aridity of their terrain lead to the descriptions of a 'cursed place', and they acquired the reputation as being among the 'Devil's Islands of the world' (Worster, 1994 p. 115), or as Herman Melville famously described it, theirs was 'evilly enchanted ground' (Melville [1854] reproduced in Lewis, 1962 p. 126). Early colonization attempts in the nineteenth century were blighted by failure, and colonies once established were often characterized by brutality and suffering, replete with descriptions of forced labour, maroonings and murder. Paul Stewart goes as far as to suggest that, historically, '[e]very human venture begun on the Galápagos, virtually without exception, has ended in failure and tragedy' (Stewart, 2007 p. 39). Thus well into the twentieth century, even while representations of the islands were changing elsewhere in the world, the image of the Galápagos as a cursed place was still alive and well, at least in the Ecuadorian imagination. Even in the present day, it is possible to hear the view that people born on the islands have '*sangre maldita*,' cursed blood (Interview, San Cristobal March 2011). As Grenier points out, for many Ecuadorians, Galápagos was a place where only 'the condemned went, and where they lived in frightful misery'; those who went there 'were prisoners of the islands, and felt

abandoned by their country' (Grenier, 2007 p. 92 Translated from Spanish). For some, Darwin's visit initiated the process by which Galápagos would eventually be transformed from a cursed place to something akin to sacred ground, while for others the islands became all the more disturbing through their association with this godless new idea that 'directly challenged traditional notions of purpose and meaning in life' (Larson, 2001 p. 11).

The islands and their name, Galápagos (derived from the old Spanish word 'galápago' meaning 'saddle', and used by the early sailors to refer to the tortoises because of their saddle-backed appearance), first appear on an anonymous vellum chart, following their discovery, in the mid 16th century (Woram, 2005 p. 11), and subsequently on Gerard Mercator's map in 1569, and Abraham Ortelius's map of 1570. However, the individual islands were not charted or named¹³ until more than one hundred years later, when they appeared on buccaneer William Ambrosia Cowley's sketch map of 1684 (Oxford and Watkins, 2009 p. 9).

The scarcity of water on the islands and hence the difficulty of settlement, meant that for more than two and a half centuries after their discovery, the Galápagos remained uninhabited by permanent settlers. However, once mapped they were frequented by a more or less steady stream of visitors, a point which underscores the fact that uninhabited is not functionally equivalent to 'untouched' or 'pristine'. Throughout the 17th and early 18th centuries European piracy – aimed at raiding Spanish ships and ports along the South American pacific coastline - was common, and towards the latter part of this period the Galápagos islands became one of the favoured refuges for these 'buccaneers'. British and North American whalers followed in the footsteps of the pirates from the late 18th century until the demise of the industry in the mid 19th century, during which time 'Galápagos grounds' as the area became known, served as the primary base for pacific whaling operations. Epler (1987) highlights the industrial scale of the whaling operations in this period, and their severe ecological impacts on the islands: both whale and tortoise populations were decimated, with estimates from compiled whaling logs indicating that tens of thousands of whales were hunted and around 100,000 tortoises removed from the islands, their longevity with minimal sustenance making them an ideal source of meat for long sea voyages. To put these losses in perspective, in 1974 estimates put the total remaining tortoise population of Galápagos at around 10,000 (Oxford and Watkins, 2009 p. 13).

¹³ Individual islands have been named and re-named several times over their history. To avoid confusion, and for readability's sake, the current widely used Spanish names are used throughout the thesis. See Appendix I for a comparison of the historical names that have been given to each island.

It was towards the end of this period, in 1805 that there are records of the first semi-permanent settler on the islands: an Irishman named Patrick Watkins, who lived alone on the island of Floreana, growing potatoes, pumpkins and other vegetables and bartering with passing boats. Stories abound about ‘this wretched being’ who ‘lived by himself on this desolate spot without any apparent desire than that of procuring rum in sufficient quantities to keep himself intoxicated’ (1815 description of Watkins cited in Woram, 2005 p. 64). How he came to be there, whether he was marooned or chose to be there, and how he left suddenly in 1809 is also the stuff of legend.¹⁴ Although this episode did not result in permanent settlement on Floreana, Grenier (2007) argues that it was significant nonetheless, because by settling on Floreana for several years and successfully cultivating the land, Watkins had disproved the commonly held notion that the islands were uninhabitable, thus paving the way for future colonisation efforts (*ibid* p. 77). Indeed, 23 years later the first planned colonisation attempts would take place on the same island, taking advantage of the cultivated plants left by Watkins.

In 1830 Ecuador, Galápagos’ nearest continental neighbour, separated from Gran Colombia to become an independent country under the leadership of Juan-José Flores. Two years later the Galápagos were officially annexed as a territory of the new Republic of Ecuador, following a study commissioned by a high ranking general, José Villamil, which suggested there might be economic potential in harvesting Orchil (a common lichen found on the Galápagos) in order to manufacture mauve dye (cf. Latorre, 1999). Thus in 1832 the first colonisers – a group of soldiers who had been sentenced to death for their part in a failed coup attempt - arrived from mainland Ecuador, followed, in 1833 by another group of convicts from the mainland. The settlement in Floreana is described in Darwin’s *Journal of Researches* after his visit in 1835:

‘The inhabitants are between two and three hundred in number; they are nearly all people of colour, who have been banished for political crimes from the Republic of the Equator ... The houses are irregularly scattered over a flat space of ground, which is cultivated with sweet potatoes and bananas ... The inhabitants, although complaining of poverty, obtain, without much trouble, the means of subsistence. In the woods there are many wild pigs and goats; but the staple article of animal food is supplied by the tortoises’ (Darwin, 1839 p. 456 - 457).

This description highlights the fact that the islands were thus far from ‘pristine’ even at the time of Darwin’s visit, and that human impacts on the islands were already significant by that time. Indeed there were approximately double the number of inhabitants on the island of

¹⁴ Records indicate that Watkins left the island suddenly on a boat with 5 other men, but was the only one to reach the mainland (Woram, 2005 pp. 63 - 82).

Floreana at the time of Darwin's visit (2 – 300) than there are today (~120). Stark evidence of the level of human impact on the islands even by this time, can be found in the fact that by 1841 the Floreana tortoise had already been hunted to extinction¹⁵ (cf. Grenier, 2007 p. 83), an occurrence which may well have been an important factor in the ultimate failure of the colony, and the return of the majority of the settlers to the continent.

Further colonisation attempts (another unsuccessful attempt in 1870 on Floreana, and then successful attempts 1879 on San Cristobal and in 1897 on Isabela) followed a similar pattern: businessmen were given free rein by the Ecuadorian state to use convicts as a cheap source of labour in order to attempt to exploit the natural resources of the islands. One colonisation effort in particular (and the first attempt that resulted in continuous settlement up to the present day), serves to illustrate the kinds of social conditions that prevailed in the early colonies, that helped to sustain the existence in some quarters of the idea of the Galápagos as a cursed, amoral place. El Progreso was the name given to a colony founded by the businessman, Manuel J. Cobos on the island of San Cristobal in 1879 (cf. Latorre, 1991). Cobos founded the settlement in order to develop industrial scale production of sugar cane, coffee and tortoise oil. Like previous colonisation attempts his workforce consisted of convicts from the mainland. But what set his efforts apart, and ultimately made the company successful, was his possession of a number of ships that allowed him to export his products with comparative ease. However he was infamously brutal with his workforce: around 400 workers worked 18 hour days and were paid in Cobos own currency, accepted nowhere but Cobos' own store. Beatings, maroonings and death by firing squad were common punishments. As Woram puts it, 'the village of Progreso was little more than a slave labor camp' (Woram, 2005 p. 179). Despite (or because of) the slave-like conditions on the island, the company prospered over the turn of the century, producing and exporting sugar and coffee to the mainland, until finally in 1904 the workers rebelled, assassinated Cobos and managed to seize one of his ships to return to the continent. In the resulting investigations, all but two of the convicts were freed when the conditions on the island came to light (D'Orso, 2002 p. 87). The story of El Progreso, in particular the scale of agricultural production that was taking place at the time, provides a further historical counterweight to the narrative of the islands as 'pristine'.

¹⁵ However the extinct status of the species is now in some doubt following recent genetic studies of the tortoise population on Isabela island which revealed that there is a high probability that some members of the Floreana tortoise population may have survived on Isabela, possibly having been moved from their native Floreana by sailors in the early 19th century (Garrick et al., 2012)

Although the history of El Progreso was extreme, the brutal treatment of convicts on Galápagos was not isolated to the island of San Cristobal. In 1946 the island of Isabela became the site of another infamously brutal penal colony. Here prisoners worked under terrible conditions to construct what has now become known as 'the wall of tears', an immense wall of lava blocks that served no function. According to a famous phrase inscribed on the wall, it was the place where 'los valientes lloran y los cobardes mueren' ('the brave cry and cowards die') (Ospina, 2004 p. 52). The penal colony was closed in 1959 when the National Park was founded, and one of the more poignant illustrations of the transformation of the islands from a damned place to a 'paradise' can be found in the fact that the wall of tears is now a popular tourist attraction.

While the reality of daily life for many on the islands retained many of the qualities of 'the infernal regions' well into the twentieth century, and thus fed into the dark image of the islands at least in the Ecuadorian imagination, elsewhere the situation was changing. In September 1835, several decades before the founding of El Progreso, Charles Darwin's visit aboard the HMS Beagle at the end of his five year round the world voyage, was the event that for many people (particularly those *not* living on the islands) would come to eclipse all other events in the islands history (cf. Perry, 1984). The Beagle spent five weeks exploring the islands (although only stopping at four of them). There is a popular misconception that Darwin had a 'eureka-like' moment and developed his theory of evolution by natural selection the minute he arrived in Galápagos, but in reality although Galápagos played an important part in his thinking, the significance of the things he saw there did not occur to him until after his return to England, and he did not publish his ideas explicitly for another 25 years. Given the huge impact that Darwin's ideas would have in Galápagos and elsewhere, it is worth examining in a little more detail the way in which the peculiarities of the Galápagos flora and fauna affected his thinking. Although it is now the finches that bear Darwin's name, it was in fact the differences between the Mockingbirds ('Mocking thrushes') on each island that first piqued Darwin's curiosity:

'My attention was first thoroughly aroused, by comparing together the numerous specimens, shot by myself and several other parties on board, of the mocking-thrushes, when, to my astonishment, I discovered that all those from Charles Island belonged to one species (*Mimus trifasciatus*) all from Albemarle Island to *M. parvulus*; and all from James and Chatham Islands (between which two other islands are situated, as connecting links) belonged to *M. melanotis* ... The distribution of the tenants of this archipelago would not be nearly so wonderful, if, for instance, one island had a mocking-thrush, and a second island some other quite distinct genus' (Darwin, 1845 p. 475).

Given the closeness of the islands, some within sight of each other, and the basic similarities of the habitats on each island, these differences were perplexing to Darwin. Furthermore, he began to dwell on the question as to why the species found on Galápagos should resemble (but be crucially different) from those found on the South American mainland, rather than similarly arid, volcanic islands such as the Canary islands or Cape Verde, whose species resembled those on the African mainland. Increasingly he found the existing explanation of special creation inadequate.

In the 1845 revised edition of his *Journal of Researches* (now popularly known as *The Voyage of the Beagle*), published some years after his return, but before publication of *The Origin of Species*, the progression of Darwin's thinking about evolution had begun to become apparent.

He wrote of the Galápagos:

‘The natural history of these islands is eminently curious, and well deserves attention. Most of the organic productions are aboriginal creations, found nowhere else; there is even a difference between the inhabitants of the different islands; yet all show a marked relationship with those of America ... The archipelago is a little world within itself, or rather a satellite attached to America, whence it has derived a few stray colonists ... we are led to believe that within a period geologically recent the unbroken ocean was here spread out. Hence, both in space and time, we seem to be brought somewhat near to that great fact—that mystery of mysteries—the first appearance of new beings on this earth’ (Darwin, 1845 p. 392).

In examining the impact of Darwin's ideas, Edward Larson points out that ‘[s]ince medieval times, Europeans had seen the natural world as a vast spiritual allegory created by God to instruct humans – a kind of tangible revelation’ (Larson, 2001 p. 16). Thus for example, in his influential 1802 work, *Natural Theology*, William Paley argued that the essential happiness and goodness of nature demonstrated the goodness of God, the Creator. As Jonathan Weiner explains, ‘[e]very detail of every beetle had a sacred message if we could learn to read it; even the type of the lowliest worm had begun as a thought in the mind of God’ (Weiner, 1994 p. 25). But increasing discoveries from the New World had begun to cast doubts on this view of a moral order in nature, and the Galápagos in particular seemed to present a challenge to this vision of nature. Herman Melville's accounts of Galápagos serve to illustrate this point. Far from the essential goodness of Paley's nature, the nature that presented itself to Melville when he arrived on Galápagos was ‘bleak, depraved and hostile, at least by human standards’ (Worster, 1994 p. 121), leading him to conclude that ‘in no world but a fallen one could such lands exist’ (*ibid* p. 121). The eventual publication of *Origin of Species* with its message that species were not immutable, but had evolved from a common ancestor through the (apparently brutal and undirected) process of natural selection, served as the scientific support

for these new more pessimistic views of nature. Increasingly, henceforth the only intellectually legitimate view was that all species (humans included) were not created by a benevolent creator, but 'were the product of blind physical laws operating without regard for human moral values' (*ibid* p. 122). Furthermore, nature was not a happy place, but the site of constant battle, a war in which the weak were eliminated. Worster calls this shift the 'lesson of the Galápagos', leading to the ultimate constitution of ecology as 'the dismal science' (*ibid* p 113).

The theory of evolution had incalculable influence on the history of science, and far reaching consequences on the way that large parts of humanity understand and relate to nature. On Galápagos the impacts of the publication of the *Origin of Species*, would soon become manifest in the growing number of scientists from around the world that flocked to the archipelago intent on collecting specimens and gathering evidence either to support or repudiate Darwin's theory. Somewhat ironically given the more pessimistic view of nature revealed by a Darwinian vision, according to Edward Larson, it was ultimately '[s]cience, more than any other intellectual force [that] exorcized the curse that seemed to hold the Galápagos Islands spellbound' (Larson, 2001p. 7). The transformation of the archipelago into a 'natural laboratory' had begun.

4.3 Galápagos: 'natural laboratory'

'These biologists, all of them, team after team, year after year, are coming away with gold ... the prison has become a treasure house' (Weiner, 1994 p.14).

Following Darwin, the discursive construction of the Galápagos as a natural laboratory did not occur overnight. Indeed, there was a prolonged period in the latter part of the 19th and early 20th centuries, in which there was little interest in preserving or studying the various island species and ecosystems *in situ*, and scientists and collectors were focused instead on preserving what were considered to be doomed species in zoos and museums. Even before Darwin's visit, there had been several such collecting expeditions to Galápagos, starting as early as 1789. However, following the publication of the *Origin of Species*, interest in the islands grew rapidly, and towards the end of the nineteenth century collecting Galápagos specimens 'for science' had become the predominant motive for visitors. During this period large numbers of specimens were removed from the islands destined for zoos, museums and private collections in the United States and Europe. It was not until the early part of the twentieth century (partly as a result of ongoing evolutionary debates and in line with broader developments in ecological thinking and conservation elsewhere) that there was a shift away

from this large scale collecting of specimens to the idea of setting aside whole areas to be protected as a national parks, and/or (in the case of Galápagos) to be studied as a 'natural laboratory'. This section explores the ideas and processes that contributed to the construction of the archipelago as a 'natural laboratory', and resulted in the founding of the Galápagos National park and the Charles Darwin Research station, institutions which continue to have key impacts on the geopolitical realities of the islands today.

Quiroga argues that the growing strength of the idea of Galápagos as a 'natural laboratory' in the years following the publication of *Origin of Species* was partly due to the fact that the 'controversial and menacing' (Quiroga, 2009b p. 32) ideas of Darwin were not immediately accepted by the Western scientific community, and thus the islands became the site of struggle of opposing scientific worldviews. Thus one of the first expeditions to Galápagos following the Beagle, carried the American scientist and fierce opponent of Darwin's ideas, Louis Aggasiz, who lead an expedition to the islands in 1871. Aggasiz, who believed in 'the power of the Creator exemplified in all flora and fauna' (Larson, 2001 p. 96), opposed Darwin's ideas on both technical and philosophical grounds. Technically, he raised questions about the time spans needed for the generation of new species by natural selection on the Galápagos and elsewhere, and on a philosophical level he resisted the very concept that 'life could result from purely material forces' (Larson, 2001 p. 101). Although by the close of the 19th century Darwin's central premise regarding the transmutation of species had largely been accepted by the scientific establishment, and scientific defenders of creationism like Aggasiz were in the minority, the *mechanisms* by which evolution occurred were still the subject of considerable debate, and Galápagos was seen as providing the perfect conditions in which to gather evidence for various competing hypotheses.

The association of the Galápagos Islands with the ideas of Darwin fundamentally altered their place in the Western imagination, and would play a key part in the construction of the islands as a 'natural laboratory'. However, many apparently scientific expeditions to Galápagos in the footsteps of Darwin contributed little to evolutionary debates, and were tied instead to two related trends: firstly, a growing Western fixation with classifying nature that had emerged in the latter part of the 18th century, and secondly the seemingly insatiable collection of specimens for natural history museums that took place throughout the 19th century.

In the mid 18th century the binomial nomenclature for the classification of plants and animals developed by the Swedish botanist, Linnaeus, had put an end to what Worster refers to as years of 'taxonomic chaos' (Worster, 1994 p. 32), and meant that for the first time, the natural

world could be 'organized into neat rows of shelves and boxes' (*ibid* p. 32). The development of this system, coupled with the increasing numbers of new species being discovered outside Europe, meant that '[c]ollecting and classifying [species] became something of an obsession with professional and amateur naturalists' (Larson, 2001 p. 54), and European museums were busily building up collections of specimens from their colonies, a process that has been argued to have been 'a critical element in the rationalizing gaze of colonialism' (Adams and Mulligan, 2003 p. 27).¹⁶ This drive to collect and name species had particularly strong impacts in Galápagos. Approximately 30 expeditions took place to the islands following the visit of the Beagle up until the second world war (Grenier, 2007 p. 107), and by today's standards, one of the most startling aspects of these expeditions is the sheer size of the collections they removed from the islands. Thus for example, a famous expedition by the California Academy of Sciences in 1905, stayed for over a year in the islands and collected around 76,000 specimens in total (Oxford and Watkins, 2009).

Grenier argues that although new species were discovered, and knowledge regarding the ecology and geology of the islands increased, no new theory was ever built on these huge collections of specimens alone, and he suggests that the prestige of the institutions involved (with bigger collections naturally being better) rather than the needs of science, was therefore their primary driver (Grenier, 2007 p.108). However, as well as the global classifying drive noted above, an important dimension of the motivation for the enormous collections taken from Galápagos around the turn of the century, was a growing sense of urgency among European and American scientists that many species would soon become extinct, and thus their preservation alive in zoos, or dead in museums, was deemed to be the only way to ensure their posterity for future generations. Further evidence of the constructed nature of present day discourses of a pristine natural environment in Galápagos is to be found in the fact that even by the latter part of the nineteenth century the successive impacts of the pirates, whalers and settlers had become increasingly apparent, and the prevailing view of the time was that the tortoises were doomed for extinction. For example a 1877 report of the conditions on the islands suggested that 'with the tortoises, the mischief has all but been accomplished ... Pigs now roam in their haunts, destined to destroy their eggs and young whenever and wherever they can find them' (Salvin, 1877 p. 456). In general there was a sense that impending extinctions would 'ensue in a short time'(Salvin, 1880 p. 757), and in some cases these fears turned out to be well founded. However a fact also often obscured in the

¹⁶ For further discussion about the politics of collecting during the colonial period see (Gosden and Knowles, 2001, Cowie, 2007, Pratt, 2008)

discourse of an intact or pristine nature, is that the impacts of 'science' on the flora and fauna of the islands were also profound by this time, thus as Corley Smith puts it, 'collecting in the name of science may have made a bad situation worse' (Corley Smith, 1990 p. 6). Urgent expeditions were dispatched with orders to collect 'Tortoise[s] live or dead – Every specimen that you can obtain, large and small' (Rothschild instructions to the Webster Harris expedition of 1897, cited in Larson p 117). The fixation with collecting illustrates the fact that at this time there was a much greater concern for expanding museum collections than for preserving species in the wild. Thornton records the fact that '[t]ime and again, scientists, after collecting on an island, declared the tortoises of that island to be extinct, only for some later expedition to discover survivors, which were promptly skinned and carried away as precious specimens of a 'dying' race' (Thornton, 1971 p. 137). Thus the 'last specimens' of the Pinzon tortoise were collected by successive expeditions in 1897, 1898, 1900 and 1901. And when, in 1905 the California Academy of Sciences discovered a further 86 tortoises on the island, these were then killed and removed 'for science' (Thornton 1971 p 137). Similarly, the last known tortoise specimen on Fernandina was killed and removed by the same expedition. As Corley Smith points out, 'conservation was a concept virtually unknown to their generation' (Corley Smith, 1979 p. 5).¹⁷

The massive collection of specimens amassed by the California Academy of Sciences expedition of 1905 meant that there was a more comprehensive natural history collection from the Galápagos than almost anywhere else in the Pacific. However, even today, the cataloguing mission on Galápagos continues, with scientists from the Charles Darwin Foundation claiming that 'there is still a massive amount of work to do to catalogue unknown elements of Galápagos biodiversity', and suggestions that 60 – 80% of the biodiversity of the islands (especially fungi and invertebrates) remains unknown (Pers. comm. F. Bungartz, March 2010).

The expeditions that followed up until the Great Depression in the 1930s, although often officially scientific in name were often lead by people with little or no scientific training, and contributed little to advancing scientific knowledge of the islands. The 1923 expedition lead by William Beebe aboard the *Noma* is the paradigmatic example of such a trip. Funded by a wealthy philanthropist, Harrison Williams, their official mission was the collection of

¹⁷ The importance of the historical and discursive context of a particular act in defining its morality or otherwise is well illustrated by the fact that half a century later, the same act (the killing of the last of a kind of tortoise on one of the Galápagos islands) would be condemned as the work of a 'perverse and evil man' (Peter Pritchard, cited in Nicholls (2006).

specimens for zoos and museums, and the group's official motto was *'It's all for science'*. But the expedition also carried social and business leaders, photographers, film makers, artists and reporters, and in a precursor to modern day cruise tours, spent less than 100 hours on Galápagos soil. Resulting publications such as *'Galápagos - World's end'* (Beebe, 1924) and from a subsequent expedition, the *'Arcturus Adventure'*(Beebe, 1926), rather than advancing scientific understanding of the islands, served more than anything to awaken the international public's interest in the Galápagos, and to romanticize the islands and the daring deeds of these intrepid adventurers. Other similar expeditions followed throughout the 1930s with varying degrees of science involved, and during this period the first private yachts and cruise boats also began to frequent the archipelago purely for sightseeing or fishing (cf. Larson 2002, pp. 145 – 172).

Although as previously stated, there was by this time a broad acceptance of the concept of evolution and the transmutation of species, there were still many outstanding questions that resisted satisfactory explanation. In particular the mechanisms by which speciation was supposed to occur were still controversial, and one group of animals, the Galápagos finches (known today as Darwin's Finches), were particularly perplexing. Darwin himself had been struck by the levels of diversity among these birds, but while the different species of mockingbird were confined to separate islands and thus being isolated from one another provided evidence to support his theory, the various species of finch appeared to happily coexist on the same island. The central problem was that:

'everyone reported finding slightly different types of ever so similar finches living together, yet evolution by natural selection suggested that only the fittest of these species should survive...[no one] could resolve what caused the evolution of so many species from one ancestral type because neither environmental differences nor isolation operated as factors' (Larson, 2001 p. 162).

The centrality of the Galápagos finch problem for providing insights into the processes of evolution, and the growing belief in the need for fieldwork as well as the study of existing collections of specimens, were among the key drivers for the first calls for the protection of the islands as a reserve for science, or a 'natural laboratory'. As P. R. Lowe argued in 1934, the Galápagos finches presented a 'biological problem of first class importance, and that this problem alone would justify the establishment of biological reserves on one or more of the islands' (Lowe, 1934 p. 85).¹⁸ Thus, from the outset, conservation on the islands was

¹⁸ New insights into the finch problem would eventually be generated by an English school teacher and amateur birdwatcher, David Lack, whose findings would become central to the 'neo-Darwinian synthesis' championed by Huxley. Lack's influential work suggested that it was indeed isolation that

inextricably tied to science, and the interests and needs of (primarily North American and European) scientists.

Several prominent institutions took up the call, and as a result of this international pressure, the Ecuadorian government responded in 1934 with the first attempt to legislate for conservation in the Galápagos, when it adopted Executive decree 607, a law aimed at controlling collectors and protecting key species. Two years later the unsettled areas of the islands were officially designated as nature preserves. However Corley-Smith (1990, p 6) points out that the weakness of the Ecuadorian state at this time meant that this designation was more or less meaningless as there was no way of enforcing any laws. At this time the 'London Galápagos Committee' was founded by the American travel writer Victor von Hagen, and the British popular science writer, (and grandson of Thomas Huxley, one of Darwin's main defenders) Julian Huxley, with the aim of collecting funds for a permanent research station on the islands, and for the employment of a game warden to enforce the new regulations. However, six years later, the outbreak of the Second World War intervened to significantly alter Galápagos' development trajectory.

Although conflict itself never reached the islands, the war had massive impacts on Galápagos. Following the bombing of Pearl harbour in 1941, the US government had approached Ecuador to request permission to build an air base in Galápagos in order to protect the strategically important Panama Canal. The base on Baltra Island was constructed in 1942 and housed 2,474 military personnel and 750 civilian labourers, and was, as such the largest single colonisation event up to that moment, drastically increasing the population of the islands which then stood at 810 people (Oxford and Watkins, 2009), as well as stimulating agricultural production to feed them. Another lasting impact of the US presence was the air-strip on Baltra island, which to this day serves as the primary point of entry for the majority of visitors to the archipelago.

Following the war, Julian Huxley, by that time a long time proponent of Galápagos conservation, was elected as the first director general of the newly formed UNESCO (The United Nations Educational, Scientific and Cultural Organization) in 1946. And in 1947 he persuaded the organisation to include conservation in their remit on the basis that 'enjoyment of nature was cultural, and its conservation depended on science' (Adams, 2004 p. 48). Thus, the IUCN (International Union for Conservation of Nature) was formed in 1948. Huxley's

allowed the speciation of the finches, but when two or more species came together they would only persist if they continued to be isolated by either habitat or food preferences (cf. Lack, 1983 [1947]).

thinking was profoundly influenced by Darwinism and the idea of evolution, which he considered the 'greatest of all revolutions in human thought' (Huxley, 1966 p. 3). For Huxley, evolution was more than a scientific theory, it formed the basis of a utopian project he termed 'evolutionary humanism' (See e.g. Huxley, 1961). Huxley was involved in various conservation projects in East Africa and elsewhere, but Galápagos' impacts on Darwin's thinking made the islands particularly important to him, and he felt strongly that as a memorial to Darwin's great achievement, its flora and fauna should be studied, preserved and safeguarded. As a highly influential figure in Galápagos conservation (Huxley would become the first Honorary President of the Charles Darwin Foundation in 1959), Huxley's utopian vision is worth exploring in a little more detail. Indeed Larson argues that '[n]o one can understand the institutional developments in Galápagos science since World War II without appreciating Huxley's view of conservation and its role in promoting evolutionary progress' (Larson, 2001 p. 181). For Huxley, the progressive trend made visible in evolution, provided the guidance necessary in order to help humanity determine its future, and steer its evolution in a desirable direction. To Huxley's mind evolution revealed a hierarchy of lower to higher forms of life, characterised by a 'rising of the upper level of biological efficiency, this being defined as increased control over and independence from the environment (Huxley 1942, cited in Esposito, 2011 p. 46). Humanity represented the pinnacle of this process. But since humanity was now subject to social as well as natural selection, it was incumbent upon humans to gain a deeper understanding of evolution in order to be able to take control and steer an appropriate course into the future. As Huxley put it:

'As an outcome of Darwin's work, we have begun to grasp the central and all-important idea that man is the latest and highest type produced by the evolutionary process, and that his destiny is to guide its future course on this planet...whether he likes it or not he has the responsibility for the whole future course of evolution on this planet, including his own' (Huxley, 1966 p.8).

For Huxley, science was key to his vision, and 'the ability to control or drive the future of humankind through the practical application of scientific knowledge represented the mark of social progress' (Esposito, 2011 p. 45). Most famously, Huxley was a prominent supporter of eugenics, or the use of science to allow the 'preferential breeding of the best' of humankind, in order to allow the species to achieve higher and higher levels of evolutionary perfection. For Huxley, his ideas were not a matter of opinion; rather he felt that biology had shown these judgements to be valid conclusions of empirical science. This belief in the ability and necessity of science to steer humanity into a utopian future has led to his thinking to be labelled as 'technocratic utopianism' (Esposito, 2011), and it will be argued in a later chapter that there are distinct echoes of this vision expressed in certain present day discourses around science

and conservation.¹⁹ For Huxley, conservation was ‘of great value and importance to the human species, and outstandingly so on Galápagos’ (Huxley, 1966 p.9), as not only did it preserve ‘wild life and natural beauty’ (*ibid* p. 9), but also the necessary spaces in which humanity could develop its understanding of evolution and thus better understand how to steer progress in the future.

Thus in 1954, when Huxley (by then the president of the Royal Society) became aware of concerns being raised by visiting scientists regarding the future of the flora and fauna of the Galápagos, he was immediately supportive of calls for increased protection of the islands and for the founding of an international research station. His support resulted in the approval of a UNESCO mission to the islands to review the situation, and to choose an appropriate location for the research station. In 1957 a UNESCO mission composed of American zoologist Robert Bowman and German ethnologist Irenaus Eibl-Eibesfeldt (along with a photographer and journalist from *Life* magazine²⁰) visited Galápagos for four months. The resulting report raised concerns that the human population (by then around 2000 people) were a grave threat to the wildlife, with the main concerns raised about the clearing of forests, uncontrolled hunting and the introduction of domesticated animals (Bowman, 1960). As a result of the report, in 1959, one hundred years after the publication of *Origin of Species* UNESCO created the Charles Darwin Foundation for the Galápagos, with headquarters in Belgium. In the same year, the Ecuadorian government responded to international pressure to officially create the Galápagos National Park, which covered approximately 95% of the islands terrestrial surface. In 1960 the Charles Darwin Foundation initiated construction of a research station on the island of Santa Cruz. Four years later, in 1964 the Charles Darwin Research Station (CDRS) was officially inaugurated, and the Foundation signed a 25-year agreement with the government of Ecuador outlining its roles and responsibilities and making the Charles Darwin Foundation an official advisor to the Ecuadorian government. The founding of the research station and the national park can be seen as marking the moment in which the representation of the islands as a ‘natural laboratory’ gained official institutional support and a physical infrastructure.

¹⁹ Indeed in a recent book with the provocative title of ‘Ecofascism’, the Charles Darwin Foundation in the Galápagos islands has been strongly criticized as offering a paradigmatic example of the Social Darwinist and eugenicist tendencies in contemporary conservation (Orduna, 2008).

²⁰ The inclusion of these journalists in the UNESCO mission can be seen to be a continuation of the trend started by Beebe in 1924, and is arguably illustrative of the early development of the close and ambiguous relationship between conservation and the media that has existed ever since. See (Grenier, 2007), and for a general discussion of the role of celebrity and the media in conservation see (Brockinton, 2009).

Several authors have emphasized the political implications of these occurrences. Thus Quiroga highlights the fact that '[a]lthough there were some Ecuadorians involved, the GNP was largely established through the efforts of European and some North American scientists, all sharing a global vision of the Galápagos and their importance for science' (Quiroga, 2009a p. 126). Christophe Grenier goes as far as to suggest that the founding of the Charles Darwin Foundation, and the creation of the national park signalled the moment in which northern naturalists officially 'took possession' of the Galápagos islands, turning them henceforth into a space exclusively for science, which, while framed as being of universal value and in the common interest, actually justified a territorial organisation that was restrictive and exclusive (cf. Grenier, 2007 pp 107 – 127). In a similar vein, Ospina argues that although the official slogan of the Charles Darwin Foundation is 'Science for Conservation', a more accurate version would more be 'Conservation for Science' (Ospina, 2004).

One of the key arguments that were used as leverage to convince the Ecuadorian state to support the founding of Research Station and to transform nearly all of the Galápagos archipelago into a national park, was the economic potential of developing tourism on the islands. Thus the report from the 1957 UNESCO reconnaissance mission suggested that the Galápagos could become an important asset for the Ecuadorian state by attracting tourists, but only if the islands were 'preserved and protected as national game reserves, like those in Africa' (Bowman, 1960 p. 60). Five years later, after the official inauguration of the CDRS, the Ecuadorian government hired a team of British 'park planners' (including one former director of the Charles Darwin Foundation) to make recommendations for the most appropriate way of developing the park and associated tourist industry. The resulting report, known as the Snow and Grimwood Report (1966), would be hugely influential in steering the course of tourism and development on the islands. One of the central recommendations of the report was the need for a National Park Service. Up to that point (although the national park existed on paper) the park boundaries had not actually been established, and neither were there any means by which regulations could be enforced. Following the report's recommendations in 1968 the first park guards were hired, and by 1969 the boundaries of the park were officially defined (see Figure 4.1).

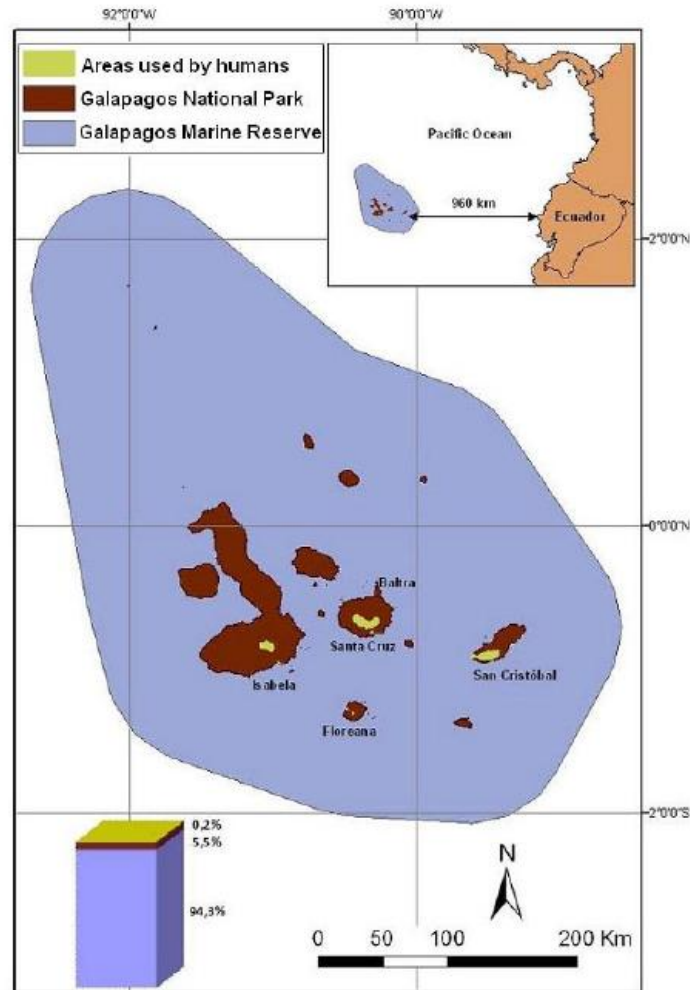


Figure 4.1. Map of the Galápagos Islands illustrating the extent of the national park (in brown), marine reserve (in blue) and 'areas used by humans' (in green). The strict separation of 'human' and 'natural' areas suggested by this type of map serves to obscure the ways in which large areas of the islands have been impacted by humans over the course of their history, and effectively ignores the fact that tourism and science (which occur throughout the archipelago) are also human uses [Source: Gonzalez et al. 2008].

The Snow and Grimwood Report of 1966 also made recommendations about tourism, suggesting that the most appropriate form of tourism for Galápagos was cruise boats 'operated by the Government Corporación Ecuadoreana de Turismo, or by a private company possessing the necessary experience' (p. 13). In essence, as they put it, 'it would be better to leave tourism to the experts' (*ibid* p. 13). However, local people were to be encouraged to develop facilities for 'subsidiary forms of tourism, catering for parties with more specialist requirements' (Snow and Grimwood, 1966 p. 3), including 'climbers, naturalists and big game fisherman' (*ibid* p. 13). There is an irony in the fact that the successful development of exactly these kinds of activities by current residents of the islands has today been labelled by the Charles Darwin Foundation as 'perhaps the greatest threat to tourism in Galápagos', and is

derided as 'opportunistic' reflecting 'an absence of long term planning' (Watkins and Cruz, 2007 p. 9).

A year later, in 1967, a scoping study into the potential of tourism to the islands commissioned by a group of Ecuadorian businessmen calling themselves the 'Galápagos promoters' (consisting of the two founders of Metropolitan Touring, the largest Ecuadorian travel agency, and the co-owner of Aerovias Ecuatorianas, then the largest civilian airline in Ecuador), declared that 'the Galápagos [we]re a potential paradise for those tourists who like wildlife, astonishing scenery, scientific discovery and an unusual trip' (Jennings, 1967 p. 2), and outlined the first plans for organised cruise tourism. Thus from the start, the development of organised tourism was conceived of and driven forward by an allegiance between foreign scientists and conservationists and continental business interests. Subsequently although some local people did convert fishing boats and other smaller vessels into tourism boats, the majority of visitors to Galápagos in the late 1960s and early 1970s were catered for by national and international operators. Charter flights to the islands began in 1967, and the first cruise ships began offering short cruises around the islands from 1968. By 1973 there were three large ships and 10 smaller vessels operating in Galápagos (Oxford and Watkins, 2009 p. 33).

Although the Snow and Grimwood report does state the need for a permit system to control tourist entry to the new park in order to prevent visitors 'either nullifying conservation efforts or destroying the asset on which tourism is founded'(Snow and Grimwood, 1966 p. 9), the numbers of permits, or the exact mechanisms for achieving a balance between tourism and conservation are not specified. In 1973 a 'Master Plan for the protection and use of the Galápagos National Park' was published which suggested a (fairly arbitrary) limit of 12,000 visitors per year, but again did not suggest how this should be implemented. Between 1973 and 1978 visitor numbers remained steady at between 8 – 10,000 people a year (Black, 1984 p. 268), and during these early years of tourism, although the potential for growth in the sector was widely recognized, the industry was generally regarded by conservationists as a positive development. Thus the prevailing view of the early 1970s is captured by a 1972 article in which the author asserts that 'according to the most knowledgeable sources ... tourism is the only thing that can save [the Galápagos]' (Hubley, 1972 p. 9). It was this linking of conservationist goals and tourism that would play a key role in contributing to the discursive construction of the archipelago as a paradise, as well as (ironically) resulting in the economic growth which today is the central concern of the current ecological crisis narrative.

4.4 Galápagos: the 'last Eden'

The association of tropical islands with 'Edens' has a long history and is by no means limited to the Galápagos (Grove, 1996, Gosling, 2003). However in the case of the Galápagos islands the durability of the construction is perhaps more surprising given the disjoint between the realities of the often stark and arid volcanic terrain of the archipelago and those commonly conjured up by the idea of an island 'paradise' (white sand beaches, lush vegetation, plentiful food etc). Much of the construction of the Galápagos as a 'paradise' and subsequently as the 'Last Eden' took place as a direct result of the onslaught of tourist publicity and popular articles about the islands that began to emerge in the late 1960s and 70s following the beginning of organized cruise tourism. However, a separate root to this discursive construction can be traced further back to the early part of the 20th century, when, following publications such as *Galápagos – World's End* (Beebe, 1924), the first sailboats and occasional pleasure cruises began to arrive on the islands. The reports generated by these visits sparked several idealistic colonization attempts by European settlers, whose Robinson Crusoe-like lifestyles attracted the attention of the international press (cf. Grenier, 2007). Despite their limited numbers, these European idealists played an essential part in the processes by which Galápagos became linked to the wider world, and in the generation of different representations of Galápagos internationally. This section will outline the ways in which the separate strands of early 20th century European idealism, and tourist marketing from the 1960s onwards, interplayed with growing conservationist concerns with the protection of 'wilderness' in the latter part of the 20th century to contribute to the representation of Galápagos as 'the last Eden'.

As mentioned, the visit of the *Noma* and the subsequent publication of *Galápagos – World's end*, in 1924 had ignited American and European interest in the Galápagos Islands, not just academically, but through the popularisation of Galápagos as an exotic, romantic and adventurous place to visit. In Norway the publication had particular resonance (cf. Hickman, 1985), and fanned what became known as 'the Galápagos dream'. Thus it was from here that several colonisation attempts would take place in the 1920s by settlers searching for a simple life in what they believed would be an island paradise. As with the Ecuadorian colonisation attempts several decades earlier, the first Norwegian attempt was driven forward by an entrepreneur: August F. Christensen. Christensen obtained permission from the Ecuadorian government to base a Norwegian company on the island of Floreana, with the idea of setting up a colony to raise cattle, and building a whaling station and fish cannery. Although there were a number of settlers on the islands of San Cristobal and Isabela by this time, there had

been few new developments on the islands since the assassination of Manuel J. Cobos two decades earlier, and the Ecuadorian government were apparently enthusiastic for the project to succeed: each settler was to be offered 20 hectares of land, the rights to hunting, fishing and trapping on any colonized island, and tax exemption for the first 10 years. A series of pamphlets were published by Christensen which urged Norwegians to emigrate with the promise that 'The Ecuadorian government welcomes every honest Norwegian' (1923 pamphlet by Aug. F. Christensen, reproduced in Woram, 2005 p. 231). The venture captured the imagination of the Norwegian press, and one reporter described the promised, idyllic lifestyle thus:

'A cabin in which to live, food in unlimited quantities, together with total and infinite freedom to be enjoyed in the world's best climate. Is that not happiness? Could one wish for anything better?... All is arranged by nature so that the industrious and energetic colonist could be happy' (1923 article by Finn Storen cited in Woram, 2005 p. 232).

The company needed little more marketing and indeed, there were reports of 'Galápagos fever' sweeping the country. The idyllic vision of the Galápagos presented to the Norwegian settlers, bears much resemblance to what Cronon refers to as the national 'myth of the frontier' in the United States, in which immigrants 'in moving to the wild unsettled lands of the frontier, shed the trappings of civilization, rediscovered their primitive racial energies... and reinfused themselves with a vigour, an independence, and a creativity that were the source of American democracy and national character' (Cronon, 1996 p. 76). It is worth highlighting the difference between this vision of Galápagos nature as a frontier, offering freedom to those who wished to work it, compared to the current narrative of Galápagos nature as, fragile, pristine and untouchable.

In 1927 the first twenty Norwegian pioneers from all walks of life arrived to start their new lives on the exotic Pacific archipelago. However, the settlers were clearly disappointed at the disparity between the dream and the reality of the islands which were 'so very different from the tropical island we had imagined... grey lava boulders along the entire shoreline... an entwined jungle of thorny ugly bushes' (Norwegian settler, cited in Woram, 2005 p. 239). But regardless of the initial disappointment, back in Norway, the idea of the 'Norwegian paradise on South America's West Coast' (cf. Hoff, 1985) was still strong, and by the following year two further groups of settlers arrived and settled in San Cristobal and the previously uninhabited Santa Cruz. However, as previous attempts had found, settling Galápagos proved to be too difficult for the majority, and by 1929 there were just ten people left, the majority on the island of Santa Cruz.

In the late 1920s and early 1930s other European settlers (particularly from Germany) were also attracted by the allure of building a new life of romantic isolation and self sufficiency, far from industrial civilization. As one of these early settlers, Margaret Wittmer wrote, their plan was ‘to leave the unhealthy conditions of city life, the social and economic insecurity then prevailing in Germany...[and find] the peace of an enchanted island’ (Wittmer, 2010 [1961] p. 14). Thus in 1929 a German couple arrived on (the once again uninhabited) Floreana, and set up a farm which they called ‘Eden’. They were followed by the Wittmers in 1932, and a further group in 1933. All of these early settlers provided ample fodder for the German and international press, especially a series of mysterious occurrences in 1934 that resulted in the disappearance of two of the settlers and the subsequent suspicious deaths of three more (See Treherne, 1983). As Christophe Grenier argues, the publication of *Galápagos – World’s end* had introduced many international readers to the Galápagos, but what would make them *famous* was the decision of a handful of Europeans to settle there (Grenier, 2007 p. 95). Further German settlers arrived and settled on Santa Cruz in the 1930s in order to work with what remained of the Norwegian colony. For the most part, while the Norwegians had made efforts at an organised colonisation, the German settlers were individual idealists seeking to build new lives for themselves. Several decades later, in 1959 an American called Don Harrsch would attempt to combine the two in a short lived utopian project called the Filiate Science Antrorse (‘Together with science we move forward’), which would also become the subject of one of the first sociological studies on the islands (Faris et al., 1964). Although widely derided as an idealistic, unrealistic dreamer, Harrsch’s vision of an ideal society built on science is arguably not so far removed from the utopian vision of Julian Huxley previously outlined.²¹

Although stories about the Galápagos islands had begun to reach a growing international audience following the popular works of Beebe in the 1920s and the subsequent media reports about eccentric European settlers on the islands throughout the 1930s, it was in the 1950s that the number of reporters and film makers visiting the islands began to increase dramatically. The new medium of broadcast television brought the image of Galápagos to an ever growing audience via series like Walt Disney’s ‘True life adventures’ in the 1950s, or later in films such as ‘The Enchanted Isles’ part of Anglia Television’s Survival series, narrated by Prince Philip in 1964. It has been argued that that film and television have had ‘a disproportionate influence on ideas about wildlife and its conservation’ (Adams, 2004 p. 58), and as Larson points out,

²¹ Given the local resistance to conservation that has come about primarily as a result of the imposition of conservation measure by ‘outsiders’ (Macdonald, 1997), it is ironic that Robert Bowman, one of the original architects of the Charles Darwin Foundation, has derided the Filiate Science Antrorse, for failing to ‘take into serious consideration the Ecuadorian residents of the islands’ (Bowman, 1984 p. 305).

'few places could top the Galápagos for easy-to-shoot wild-animal footage' (Larson, 2001 p. 188). Thus, by the late 1960s the Galápagos Islands flora and fauna were already world famous, and the amount of material being produced about the islands was only set to increase as tourism grew. The images generated by these popular television programmes played a key role in the propagation of the idea of the uninhabited, intact and Edenic Galápagos, as well as feeding into the success of tourism to the islands. Central to the success of tourism to Galápagos was the idea that the islands were still 'untouched' and pristine, and the industry relied on perpetuating this construct even though its very existence was evidence to contrary (cf. Hennessy and McCleary, 2011).

The alignment of the interests of the growing tour industry and those of the international conservationists touched upon in the previous section, was accompanied by a discursive blurring of the conservationist discourses with those of the tourist industry. The tour industry borrowed from, and capitalised on the scientific associations of the islands in order to market a visit to the Galápagos as both educational and exciting, offering to provide tourists with 'a better understanding of one of the great scientific revolutions that have shaped the world, but also a mythical encounter with one of the foundations of modern Western world views' (Quiroga, 2009a p. 125) and the conservationist sector fed into the construction of the Galápagos as a tourist 'paradise' through the use of biblical imagery (see for example the reference to Galapagos as an Eden in Bensted-Smith, 2002), or publicity materials that shared much with the tourism marketing .

Unlike the paradise that features in tour brochures, the representation of the islands as a 'scientific paradise' was linked to the idea of the islands as a natural laboratory, and referred to the simplicity of the island ecosystems and thus the ease of discerning ecological processes that elsewhere were more complex and harder to study. As one biologist interviewed by the author, Jonathan Weiner put it: 'That's why we all want to work there. Not because it's nice. Because it's simple' (Weiner, 1994 p. 57). But although simplicity might have been the rational stated scientific reason for scientists' attraction to Galápagos, simplicity doesn't explain the passion with which many scientists believe in the importance of Galápagos conservation, nor the strength and endurance of the concept of Galápagos as a 'paradise'. According to Ospina, an important contributor to this construct is that of romanticism (see Ospina 2004, pp 48 – 51).



Figure 4.2. Typical scenes of social life in Galápagos are often absent from tourist marketing of the islands, reinforcing the idea that they are uninhabited. Above: a child plays with a sculpture of a fisherman on the island of San Cristobal.

As Ospina points out, scientists (for the most part) ‘live in cities, are worried about environmental crisis, and are upset by unnecessary destruction’, and furthermore, many experience what he refers to as the ‘infinite longing’ for nature typical of romanticism (*ibid* p. 48). Furthermore, this essentially modern urban cultural milieu is shared by the majority of tourists arriving in Galápagos, and thus, as well as an alignment of interests, there is an important degree of ‘natural’ mutual reinforcement of the discourses of the tourist industry and that of conservationists and scientists. Ospina has pointed out however, that the maintenance of the construct of Galápagos as a ‘paradise’ requires careful effort on the part of tour operators, given that there is very little in what we know of natural selection (the constant struggles for survival, high infant mortality rates in most species, daily fight against hunger) that concords with commonly held notions of ‘paradise’. Thus notions of ‘harmony’, ‘equilibrium’ and ‘order’ are imposed on what can appear as the cruelty and pitilessness of nature, and that it is only from the comfort of a well equipped tourist boat ‘perfectly humanized’ that these ‘laws of nature’ can appear ‘beautiful’ and ‘harmonious’ (Ospina, 2004 p. 57).

West and Carrier have argued that ‘ecotourism can be seen as an exercise in power that can shape the natural world and the people who live in it’ (West and Carrier, 2004 p. 483). In Galápagos, the routine presentation of the image of the islands as a paradise, namely as

pristine, untouched and crucially, *uninhabited* is a clear example of this process. Thus for example, an analysis of the photographs in tourist guides and other illustrated books by Grenier (1996) revealed that 98% of these are of nature, and just 2% of people, in general other tourists, with typical scenes of social life on Galápagos rarely presented (see Figure 4.2). They go on to argue that ecotourism can be seen as a form of ‘virtualism’ whereby particular landscapes and experiences are packaged and presented in line with what tourists expect to see and feel rather than in line with the particularities of a given place. This then acts as a positive feedback in order to produce the very landscapes and experiences that were marketed. In the case of Galápagos, tourist expectations are of a wilderness experience in uninhabited islands, thus this is what they are sold. Despite the fact that certain realities of the islands (large number of tourists, a growing number of inhabitants, the brevity of typical cruise tours etc.) contradict this (see Figure 4.3). Arguably then, ignorance is one of the crucial preconditions for the maintenance of the wilderness/ paradise myth which the tour companies sell.

As well as generating a positive feedback loop wherein the tourist industry produces and packages the tourist experiences of Galápagos in line with tourist expectations, the discourse of ‘uninhabited’ or ‘pristine’ ecosystems underpinning many conservation discourses, generates a further positive feedback loop as conservation actions are thus geared towards the removal of past traces of human impacts (for example the removal of non-native species from islands etc). Ironically this constant effort to ‘re-wild the islands’ which is framed as protecting their pristine nature, actually means that the islands become all the more profoundly ‘humanised’ (Grenier, 2007 p. 339).

As previously alluded to in the mention of romanticism, the growth of both tourism and conservation on Galápagos at this time, need to be understood in terms of the backdrop of rapidly changing attitudes towards the environment that were taking place (in particular in the US and Europe) throughout the 1960s and 1970s. During this period, environmentalism solidified as an international movement and discourse, embodied in publications such as Rachel Carson’s *Silent Spring* and others. The first iconic photographs of the world from space taken by the US space missions acted as a rallying symbol for the new environmental movement – no longer could the world be conceived of as an unlimited place, but for the first time, the idea appeared of earth as a ‘spaceship’ within which all life was travelling, and upon whose maintenance all life depended.



Figure 4.3. Experiencing the 'wilderness'? Tourist congestion on a trail on Española.

In the shrinking world of anxieties about industrial pollution and the depletion of natural resources, the concept of the need for wilderness preservation grew ever stronger, and there was a simultaneous growth in the numbers of people willing to pay to travel to these areas, or supporting organisations dedicated to conservation (cf. Adams, 2004).

The idea and marketing of Galápagos as a tourist paradise thus dovetailed with this growing awareness of the finite planet, and belief that remaining areas of 'wilderness' or 'pristine nature' represented nature's last refuges, and humanity's last bulwark against the ills of industrial development. The idea that in a sense these areas thus 'belonged' to the world rather than any particular country was formally acknowledged and institutionalised through the invention of the category of World Heritage Site by UNESCO in 1978, and Galápagos was one of the first sites to be given this status.

Over the course of the 1970s, the island of Santa Cruz in the centre of the archipelago had emerged as the hub of economic activity on the islands (being situated close to the air strip at Baltra, as well as being the site of the headquarters of the National Park and the Charles Darwin Research Station). In 1980 the Instituto Nacional Galápagos (INGALA) was created as the provincial authority for the coordination of planning, financing and coordinating development and infrastructure projects on the islands (an event which has been referred to

as the start of the 'bureaucratization of Galápagos' (Epler, 2007 p. 4). The founding of INGALA signalled the start of improvements in the infrastructure of the islands, which, coupled with the increasing economic growth as a result of tourism, and an increase in government spending in the province as a result of Ecuador's oil boom (1972 – 83) made the islands an increasingly attractive place to live for Ecuadorians. As Epler puts it, people 'who for 130 years had associated Galápagos with the horrors of being confined to one of the infamous penal colonies, now perceived the islands as a land of opportunity' (*ibid.* p 5).

The economic success of tourism is clearly illustrated by the visitor numbers: there were approximately 18,000 visitors in 1985, 41,000 in 1990 and 72,000 by 2000, and by the end of the 1990s approximately two out of every three economically active people were working (directly or indirectly) in tourism (Oviedo, 1999 p. 170). Although much thought had gone into the designation and management of particular visitor sites in order to minimise environmental impacts, little thought had been given to the likely impacts of economic growth triggered by the birth of a successful tourist industry. Throughout the 1980s the economic growth caused by the influx of tourist dollars to Galápagos fuelled immigration to the province, which was further compounded by the severe economic crisis that affected the Ecuadorian mainland throughout the 1990s, as people moved in search of work²². Thus between 1974 and 1998 the population of Galápagos more than tripled from 4,071 to 15,311 (Epler, 2007 p. 7). Ospina argues that many Galápagos residents are not 'searching to escape from a suffocating civilization, but to reach a civilisation that they consider to be still distant' (Ospina 2004 p.69). Although in some senses the 'land of opportunity' offered to Ecuadorians by the growing economy of Galápagos in the 1980s and 1990s fed into the construction of the islands as a 'paradise', it was, as Larson points out 'a very different view of paradise than the ecological one envisioned for them by UNESCO' (Larson, 2001 p. 233).

4.5 Crisis in paradise?

The population growth triggered by the success of the tourist industry, began to cause anxiety among conservationists from the 1980s onwards. Particular concerns were raised about the ever increasing demands being placed on scarce resources such as water, the increasing impacts of developments in infrastructure, increasing waste generation, and the increasing movement of goods and people to and between the islands, bringing with it increased risks of the introduction of new and potentially harmful organisms to the islands. On the other hand,

²² Collapsing oil prices throughout the 1980s had resulted in hyper-inflation of the Sucre, massive unemployment, and accompanying political turmoil. Finally the Ecuadorian government adopted the dollar as its national currency in 2000.

the imposition of certain regulations triggered resentment among parts of the settler population, in particular the fishing sector. Finally, in the 1990s these resentments degenerated into more open conflict and political turmoil (see section 1.6.2). The degenerating situation gained international attention, and popular articles began to appear with titles like 'Last look at paradise?' (Thurston, 1997) and 'Galápagos: paradise in peril' (Benchley, 1999).

The sense of crisis came to a head in 2007 with the temporary addition of the Galápagos to UNESCO's list of World Heritage Sites in Danger, and the appearance of a series of articles and reports all emphasizing both the novelty and urgency of what was framed as a rapidly degenerating situation. Thus the Galápagos National Park argued that 'we don't have much time' (Tapia et al., 2009a p. 11) to fix the problems facing the islands, and the Charles Darwin Foundation referred to the 'narrow window of opportunity' (Lopez, 2010, p.4), 'perhaps the last' (Tapia et al., 2009b p. 128) for conservation organisations to implement effective conservation. Without denying the existence of important challenges for the conservation of the archipelago, including a number of serious threats to flora and fauna (some of them novel, some with longer histories), insights from political ecology, and environmental history, suggest that narratives of 'crisis' cannot simply be taken at face value, and there is a body of critical literature that illustrates that these crisis narratives, far from apolitical objective accounts of reality, are actually powerful devices by which certain interests (often the 'convergent interests of governments, aid agencies and scientists' (Swift, 1996 p. 89)) are advanced, while others (often rural land users) are suppressed (cf. Roe, 1995). Viewing 'ecological crisis' on Galápagos through this lens illustrates the ways in which the narrative acts to legitimate the actions, ideas and continued presence on Galápagos of certain powerful players, while 'closing down' the spaces for productive deliberation about desired futures. Thus for example, following the removal of the Galápagos from UNESCO's list of World Heritage Sites in Danger in 2010, the executive director of the Charles Darwin Foundation drew on the power of the crisis narrative in order to assert that the Galápagos 'will *always* be at risk' (Lopez, 2010 p.4, emphasis in original), and to argue that the role of the CDF will therefore remain 'fundamental to creating a sustainable future for this global treasure' (*ibid.* p.4). In the case of the Galápagos, the narrative of crisis builds an assumption of a recent past in which the islands were 'pristine', and acts to blur out past human impacts on the islands, despite the fairly widespread acceptance of the idea that the state of conservation of the islands today 'is arguably better than a century ago' (Watkins and Cruz, 2007 p. 3). Ironically, in addition as Hennessey and McCleary point out, the crisis narrative may well have served to increase the

pressures on the islands as people rush to visit before it is 'too late' (Hennessy and McCleary, 2011 p. 149).



Figure 4.4. Simplistic human/nature divides are regularly confounded by the realities of the islands. Upper two images: One of the largest sea lion colonies in the archipelago is located not in the park but in the town of Puerto Baquerizo Moreno. Lower two images from left to right: most of the remaining giant tortoises on Santa Cruz are now found on privately owned farmlands. Sea lions are frequent visitors to the fish market in the largest town on the islands, Puerto Ayora.

4.6 Conclusion

This chapter has explored the changing representations of the islands, charting the historical events that fed into their metamorphosis from a damned, worthless place, to a natural laboratory, an Eden or paradise for naturalists and tourists, and finally to a paradise in peril. It has highlighted the fact that rather than a self-evident objective truth about the nature of the islands, the idea of pristine nature underpinning the narrative of a 'paradise in peril' is in fact a historically specific construction. Despite the discourse of 'pristine nature' which emphasizes the untouched nature of the Galápagos Islands, and maps such as Figure 4.1, which depict a strict separation between human and natural areas, the everyday realities of the islands confound easy categorization (see Figure 4.4). Approaching history through an examination of the shifting construction of the islands has highlighted the ways in which the meanings

attributed to the nature of Galápagos are multiple and contested. Different representations of the islands have co-existed, and have been manipulated by different actors for different ends at different times throughout the archipelago's history. These representations have played a key part in institutional developments on the islands (as in the case of the natural laboratory and the national park), as well as being powerful devices by which perceptions of the archipelago have been shaped both internationally and locally. In particular the framing of the nature of the islands as 'pristine' and the islands themselves as essentially uninhabited have had important material and political effects on the islands.

While an examination of the history of Galápagos is essential to developing an understanding of the issues in contemporary conservation, it is not possible to infer solely from a historical analysis, the ways in which these 'accumulated constructions' (Quiroga, 2009a) or historical representations of Galápagos will find expression in the current discourses around science and conservation on the islands. Thus in the following chapters Q methodology will be applied in order to explore the current discursive landscape of the Galápagos Islands, to examine the structure of the different discourses around science and conservation, and to explore the implications of these contemporary divisions for conservation and society.

Chapter 5. A Q study of conservation discourses on Galápagos

Chapter Outline

In fulfilment of objective 2 of the thesis, this chapter now turns to an examination of the discourses of conservation currently present on Galápagos. The data collection, analysis and results of a Q study carried out on Galápagos between November and December 2009 are presented. Three distinct discourses emerged from the analysis, and have been labelled: 'Conservation of Galápagos as an international/global concern'; 'Conservation with sustainable development'; and 'Social welfare and equitable development'. In keeping with the 'verstehen' approach of Q methodology (Focht and Lawler, 2000 p. 116), this chapter will examine the discourses 'from within' with reference to participant comments made during the sorting process. In the following chapter these different discourses will be subjected to more critical scrutiny with reference to wider theoretical debates.

5.1 Introduction

Calls for Galápagos society to come together around a 'shared vision' of Galápagos or to build consensus around a crisis narrative of Galápagos conservation are premised on the understanding that the crisis narrative itself is a self-evident truth proven by science, and that the range of different perspectives towards conservation and the islands themselves represent a barrier to conservation efforts. There has however been little effort to systematically examine the discourses that inform different people's understandings of the project of conservation, or to question the subjective values, assumptions and ideals upon which different discourses are based, and the politics implicit in these discourses. Similarly there has been little critique of the idea that a 'shared vision' is either achievable or desirable. The research presented in this chapter and the next, seeks to address this shortcoming. Q methodology is used to explore the contemporary discourses of conservation to which individuals on Galápagos subscribe.

5.2 Data collection

Data collection and analysis for this study followed the generic phases outlined in the Methodology Chapter (section 3.3.1), starting with the development of the concourse:

Concourse development:

Due to the fact that 'environmental issues do not present themselves in well defined boxes...[but are] interconnected in all kinds of ways' (Dryzek, 1997 p. 8), the concourse in this study was kept deliberately broad in order to encompass as many dimensions of the discourses around conservation as possible, and not delimit the areas for potential consensus or conflict. The concourse in this study was thus defined as '*opinion related to Galápagos conservation*'.

Given the breadth of the topic, in order to guide the development of the concourse and its subsequent narrowing down to the Q sample, a theoretical sampling structure was adapted from Dayton (2000 p. 76). Statements were collected using a semi-naturalistic approach (Robbins and Krueger, 2000) which involved a combination of document review and informal interviews. Sources for the statements included recent academic and popular literature about Galápagos, grey literature (including reports produced by NGOs such as Bensted-Smith (2002) or Watkins and Cruz (2007)), the Galápagos Park Management Plan (2005), the Galápagos Regional Plan (2007), the websites of various local institutions (e.g. local and regional councils, NGOs, tour operators, fishing cooperatives etc), and comments made by speakers at an event organised by the Galápagos Conservation Trust (attended on 15/09/2009). Finally a series of approximately 20 informal interviews were carried out with local people in Puerto Ayora, Santa Cruz Island, Galápagos, during October 2009. A total of 200 opinions statements made up the original concourse, written in both English and Spanish. At this point the concourse was considered complete as the addition of extra statements did not appear to add any new opinions.

Development of the Q sample

In this study a structured approach to developing the Q sample was adopted, and the matrix adapted from Dayton (2000) was used again, in order to minimize bias in the selection of statements, and to facilitate the selection of the full range of statement types in the Q sample (see Table 5.1). Although the use of a matrix design such as this, is considered good practice in Q studies, Brown (1993) warns against placing too much importance on the 'proper categorization of Q statements - as if, as in scaling, they could have only one meaning' (p. 101).

He cites the founder of Q methodology, Stephenson, who argues that ‘it is a mistake to regard a sample as a standardized set or test of statements, any more than one can hope to regard a particular set of children as a standard sample...’ (Stephenson, 1953 p. 77). As Brown points out, the meanings of the statements are not fixed, and thus not to be found solely in the categorizations of the researcher, but ‘more importantly in the reflections of the individual as he or she sorts the statements in the context of a singular situation’ (Brown, 1993 p. 101).

A pilot study was carried out with 4 participants in order to ensure the clarity of the statements and the sorting instruction. Following the pilot, several statements were replaced or re-worded as they were confusing to participants. Fifty two statements made up the final Q sample, which is close to the upper end of what is considered a reasonable number of statements for participants to sort (Webler et al., 2009 p. 109). For a list of the final statements in the Q sample see Table 5.4.

Table 5.1 Matrix used for selecting statements from the conservation Q concourse (adapted from Dayton 2000)

Category	Number of statements in the final Q sample
Environmental ethics, beliefs and visions of Galápagos	10
Causes and definitions of existing problems	14
Social actors	9
Policy prescriptions/ solutions	11
The role of science and scientific knowledge	8
Total:	52

Selection of participants

The aim of participant selection was to incorporate as broad a range of stakeholders as possible²³. Participant selection did not take place until several weeks of fieldwork had passed. This time was spent gaining an insight into the main divisions within Galápagos society through informal interviews, observations, and attendance at seminars, workshops and other formal and informal public social events. This knowledge of the social landscape was supplemented with a close reading of the stakeholder analyses of Oviedo (1999) and the ethnography of Ospina (2004), as well as the work of Grenier (2007), in order to draw up a list of stakeholder groups and potential participants. It is common practice in Q studies to include a range of

²³ Although the term ‘stakeholder’ is itself contentious and contested (cf. Roe, 1995 p.1066), in this instance it was interpreted broadly to include anyone with experience of the Galápagos context who considered themselves to have a stake in the conservation of the islands, and thus with the proviso of the need for participants to be familiar with the issue (see Box 3.2 on p. 58) the participant group was to include residents and non-residents.

'decision-makers and opinion leaders' (Webler et al., 2009 p. 21), as these people are likely to have an important role in the production of different discourses. A conscious effort was therefore made to seek out participants that were influential in some way (thus for example the heads of various NGOs, local government and national park decision makers, heads of fishing cooperatives, a teacher and other influential local figures were included). In order to ensure that local knowledge of the social landscape was appropriately incorporated into the selection of participants, once the Q process had started, a snowballing approach was also adopted whereby participants were asked to identify other potential recruits with opinions different from theirs. In total 33 individuals completed Q sorts on the main inhabited islands of Santa Cruz (14 individuals), San Cristobal (13 individuals), and Isabela (6 individuals), between November and December 2009. Twenty-four of the participants were Ecuadorian nationals, of whom nine were born on Galápagos. The remaining nine participants were international visitors or long-term residents of the islands. The institutional affiliations (where applicable) of the participants are listed in Table 5.2.

Completion of the Q sorts

In this study, given that the aim was to involve as wide as possible a range of stakeholders, pragmatic considerations (regarding the familiarity or otherwise of participants with taking part in research, and their levels of formal education) determined that a forced distribution shape was not used. Before starting the Q sort process, the aims of the study were explained to participants both verbally and in an information sheet, participant anonymity was assured, and participant consent for the interviews to be recorded was obtained (information sheets and participant instructions for carrying out the Q sort are reproduced in Appendix II).

Participants were asked to place the statement cards onto a board with the categories -4 to +4 marked out according to the following instruction:

"Please sort the cards onto the chart according to how like or unlike your point of view they are, with +4 being most like your point of view and -4 being least like your point of view"

Although there was no forced distribution, participants were encouraged to take their time, and to consider each statement in the light of all the others.

Table 5.2 List of institutions and organisations with which participants were affiliated

Institution	Type of institution	Number of participants
CAPTURGAL	Chamber of Tourism	1
Casa Rosada	Hotel	1
Charles Darwin Foundation	International Conservation NGO	3
Colegio Adventista Loma Linda	School	1
CometoGalápagos Tours	Tour Operator	1
Consejo de Gobierno	Regional Government	1
COPAHISA	Fishing cooperative	1
COPESAN	Fishing Cooperative	1
COPROPAG	Fishing Cooperative	1
Ecocabinas Don Jorge	Hotel	1
El Colono	Newspaper	1
GAIAS (Galápagos Academic Institute for the Arts and Sciences)	Academic Institute	1
Galápagos National Park	National Park Authority	2
Hotel Albermarle	Hotel	1
Hotel Casa del Lago	Hotel	1
MAGAP (Ministerio de Agricultura, Ganadería, Acuacultura y Pesca)	Government Ministry (Agriculture, Farming and Fisheries)	1
Municipio de Isabela	Local government of Isabela	1
Municipio de Santa Cruz	Local government of Santa Cruz	2
Patagonia Tours	Tour operator	1
Sea Shepherd Conservation Society	International Environmental Campaigning NGO	1
WWF	International Conservation NGO	1
No institutional affiliation	-	8
	Total	33

Statistical analysis

Principal Components Analysis was carried out on the 33 x 33 matrix of statement responses, and the resulting factors were rotated using a varimax rotation that aimed to find the simplest structure in the data that explained the greatest amount of variance, and to rotate the factors such that each individual tended to be associated with just one factor. Sorts loading at $> \pm 0.36$ on a given factor were considered significant at the $p < 0.01$ level. This was based on the equation: $2.58(1/\sqrt{n})$, where n = the number of statements in the Q sample: $2.58(1/\sqrt{52}) = 0.36$ (for statistical details see Brown (1980 p. 283)).

Within Q method there is not necessarily one ‘objectively correct’ or ‘mathematically superior’ final solution regarding the number of factors that emerge from the analysis (Watts & Stenner, 2005a p.80) and the final solution also needs to consider the criteria of simplicity, clarity, distinctness and stability (Webler *et al.* 2009 p.31). In this study a solution was sought which would maximise the variance explained, and the number of participants loading significantly on just one factor, minimise the number of ‘confounders’ (participants loading on more than one factor) or ‘non-loaders’ (participants not loading on any factor), and ensure that each factor contained at least 2 sorts that loaded on that factor alone (Watts and Stenner, 2005a p. 81). See Table 5.3 for a comparison of different factor solutions. Based on these criteria, a 3 factor solution was selected as the optimum.

Table 5.3. Comparison of different factor solutions (1)

No. of factors rotated	% variance explained	Participants loading on just one factor (± 0.36)	Confounders (participants loading on more than one factor)	Non-loaders (participants not loading on any factor)	Minimum no. of participants loading uniquely on each factor
2	41	24	8	1	8
3	49	25	8	0	6
4	53	25	8	0	1
5	58	18	15	0	1

Analysis and interpretation of the factors

For each of the factors rotated in the final analysis, the PQ method software generates an idealized sort in the form of scores for the statements in the Q sample along the original response scale (see Table 5.4). This enables an examination of the way in which hypothetical individuals loading 100% on each factor would sort the statements. The participants’ sorts are correlated with these idealized discourses and thus it is possible to see to what degree different participants’ views (as embodied in their Q sorts) are correlated with the factors. Participants whose sorts were significantly correlated with the idealised sorts are called ‘loaders’ and the comments from these individuals were used to aid analysis and interpretation of the discourse.

5.3 Presentation of the results

Table 5.4 shows the original statements of the Q sample and illustrates the different factors (discourses) by giving each statement a number along the original scale of -4 to +4. Table 5.5 is a table of the 33 participants and shows the degree to which each participant’s particular sort

pattern is correlated with these generalised factors. It should be noted that the different participants will often share elements of all three discourses, as evidenced by the fact that their sorts are often correlated to a degree with all three. To preserve participant anonymity code numbers are given in place of names. The professional self-identification and birthplace of the individuals loading on each factor are also given in Table 5.5. These details may provide to provide additional contextual information that might aid interpretation of the factors (cf. McKeown and Thomas, 1988), however it is important to note that it is not possible to generalize about the characteristics of the people loading on each factor from this information. Thus if certain patterns appear to emerge regarding the particular groups that load on particular discourses this can only be treated as a 'working hypothesis' (Ockwell, 2008 p. 278), potentially suggesting avenues for future research. The degree of correlation between the three factors, the percentage variance explained by each factor, and the number of participants that loaded on that factor alone are given in Table 5.7.

Table 5.4. Statements that made up the Conservation Q sample with idealized scores for each factor

Statement	Ideal factor score		
	A	B	C
1. The growth in new activities like kayaking and surfing and the move away from specialist nature tourism is the greatest threat to the future of tourism and conservation in the islands	-1	-2	-4
2. People living on Galápagos should accept certain restrictions and responsibilities as a result of living in such a unique place	3	3	1
3. Stopping foreign species entering the Galápagos ecosystems needs to a priority of the Galápagos authorities.	2	3	0
4. More holistic technical/ scientific analysis is required to fully understand the challenges facing Galápagos and point to appropriate solutions	0	2	-1
5. Living on Galápagos is a privilege	3	3	2
6. Some people are interested in keeping conflict over resources alive in Galápagos as the image of a threatened protected area attracts more funding	-1	0	2
7. On Galápagos, the practice of science and the furthering of human understanding of evolution should be the main priority	-2	0	0
8. Local people and especially children need to be educated in order to develop a 'conservation consciousness' and learn how to live in harmony with the natural environment	3	4	0
9. Scientists are more interested in publishing papers than in the Galápagos people and environment	0	0	1
10. The Galápagos Islands have not yet reached carrying capacity in terms of the number of tourists that visit each year.	-4	-2	0
11. More funds are needed to establish effective patrols to protect the park	0	1	-3
12. The only route to a really sustainable situation on Galápagos is to partially disconnect the islands from the rest of the world.	1	-1	-2
13. Lack of understanding and coordination among the different institutions is a big problem on Galápagos, and has serious consequences for the fragile ecosystems and the quality of life of all inhabitants	2	1	2
14. The Galápagos belongs first and foremost to its original inhabitants - the turtles, the iguanas, the birds, the sharks and the sea lions.	2	-1	-1
15. The often quoted figures for illegal shark fishing are overestimates and simply don't fit the realities of Galápagos	-3	-2	-1
16. There has been a fairly irresponsible use of information (approximations, use of scarce data etc) on the part of conservation NGOs and international organisations with regard to the Galápagos environment.	-1	-1	2

Statement	Ideal factor score		
	A	B	C
17. Artesanal fishing tours would be a successful way of increasing the livelihoods of local fishermen and decreasing fishing pressure - a win- win outcome.	0	2	3
18. In nature populations exist at a certain size because there is a balance between the availability of food and the number of consumers - this applies throughout nature and must extend to humans.	1	0	1
19. Research priorities of science on Galápagos should be beyond the research interests of individuals or institutions and favour investigations that are directed to solving the most urgent management and conservation problems.	1	2	2
20. Tourist companies reinforce the myth of untouched, uninhabited islands in order to better sell 'the product' of Galápagos.	2	0	0
21. It is already too late for Galápagos.	-2	-4	-2
22. Animals are our friends and equals.	0	1	1
23. If you have money you can get away with anything on Galápagos.	0	-3	-1
24. Sport fishing is morally wrong.	1	0	-3
25. In general many fishermen in Galápagos have a total disregard for any kind of laws and regulations to protect the islands.	1	-1	-2
26. There is no future in the Galápagos fisheries.	-1	-2	-1
27. The park and all those non-profit foundations are more interested in 'floating hotel' tourism than supporting the local population and teaching them about conservation.	-2	-3	1
28. I do not think that there is a conflict between being a national park guide, and believing in God and the creation.	-2	1	1
29. All that the big tour boats really leave behind for Galápagos is their rubbish.	-1	0	3
30. I am worried about what will happen to Galápagos.	4	2	1
31. The main problem is that sanctions against law-breakers aren't enforced - people break the rules and then corruption or weak policing means that they aren't punished.	2	0	0
32. I hope that Galápagos stays on the UNESCO 'World Heritage in danger' list as that is the best way to ensure that it is protected and we don't forget how vulnerable and fragile the islands are.	1	-2	-2
33. We need to try and restore the Floreana ecosystems to how they were 200 years ago.	-2	0	-2
34. We need policies that limit the growth in tourism - we need high value, low numbers tourism, not cheap mass tourism.	1	1	0

Table 5.4 (cont.)

Statement	Ideal factor score		
	A	B	C
35. Conservationists and tourists romanticise 'nature'.	-1	-2	0
36. The future of the Galápagos environment shouldn't be decided by local people alone.	3	0	-2
37. Conservation and development are mutually beneficial.	-2	2	-1
38. The presence of fishermen is not only a constant in marine ecosystems, but it is also normal and desirable.	-2	1	1
39. Most of the recent immigrants to Galápagos have come from places that are already totally destroyed so they don't see how Galápagos is different, or understand how or why they should protect it.	0	1	-2
40. Many Galápagos residents don't have access to, and so don't really know the environment of Galápagos. How can they love what they don't know?	2	1	1
41. Every part of nature is of benefit to us - the animals, plants, water - God made them all so that we could be happy.	-3	2	3
42. Instead of just prohibiting everything we need a more rational management - less bureaucracy and more rational management.	0	1	2
43. All extremes are bad. In other words if you want to do only conservation, you're going to fail.	0	2	3
44. Here we have the problem of mediocrity: you have to bring people from the continent to do a good job because a lot of the time the professionals coming out of Galápagos aren't any good.	1	-2	-1
45. Most people living in the towns on Galápagos simply aren't interested in nature.	0	-1	-3
46. Natural population growth is a massive problem here; they should raise awareness and encourage contraception.	2	-1	-1
47. This isn't a paradise! How can it be when we have such problems with our health, with education? So much money is spent of every part of the environment and yet we still have no clean water...	-1	-1	4
48. Today we have filled ourselves up with lots of laws and prohibitions. Everything is prohibited here, everything! And I think that a serious problem here, for the conservation of Galápagos, and one of the worst things we have done to Galápagos, is prohibit everything.	-3	-3	2
49. Ancestral activities like fishing and agriculture should be those that are maintained on the islands, given that, in my opinion, tourism is an activity that in the long run brings lots of social problems and the destruction of nature.	-1	-1	0
50. Galápagos has become just one more place on a long 'checklist' of places (like Machu Picchu in Peru) that tourists feel they must see. The people who come here don't really want to see or understand Galápagos, they just want to tick off certain charismatic species and be able to say that they went to Galápagos.	1	-1	0
51. The participatory management system implemented in the Galápagos Marine Reserve is a good example of successful conservation practice	-3	3	-3
52. The tourist industry does not rely on the ecological integrity of the islands.	-1	-3	-1

Table 5.5. Participant list and degree of correlation of participants' sorts with each factor

Interviewee code and professional self-identification of participants	Birthplace (Galápagos/ Ecuadorian mainland/ elsewhere)	Degree of correlation of participants' sorts with each factor		
		A	B	C
Factor A				
A01. Professional environmental activist, INGO	Elsewhere	0.739*	0.076	-0.050
A03. Social scientist, conservation INGO	Elsewhere	0.712*	-0.058	-0.060
A27. Tour operator	Elsewhere	0.528*	0.332	0.023
A05. Artist	Mainland	0.396*	0.091	0.353
A06. Social scientist, Ecuadorian university	Mainland	0.656*	0.222	-0.001
A14. Director, conservation INGO	Elsewhere	0.589*	0.353	0.226
A15. Biologist and conservation professional	Elsewhere	0.723*	0.141	-0.017
Factor B				
A25. Tour industry professional	Mainland	0.033	0.708*	0.233
A21. Education professional	Galápagos	0.196	0.548*	0.296
A23. Business/development professional	Mainland	0.325	0.690*	0.059
A12. Journalist	Galápagos	0.288	0.421*	0.120
A10. Hotel manager	Elsewhere	0.286	0.531*	0.139
A26. Head of fishing cooperative	Mainland	-0.183	0.651*	0.351
A28. Local government planning official	Mainland	-0.258	0.534*	0.320
A16. Ministry of Agriculture official	Mainland	0.095	0.534*	0.280
A32. Tour guide and restaurant owner	Galápagos	0.279	0.730*	0.169
A07. GNP conservation manager	Mainland	0.140	0.734*	0.000
A31. GNP conservation manager	Galápagos	0.329	0.592*	0.298
A09. Director, conservation INGO	Galápagos	0.248	0.620*	-0.199
Factor C				
A33. Mother and community activist	Galápagos	-0.077	0.139	0.818*
A30. Local government official	Mainland	-0.111	0.357	0.572*
A17. Lawyer	Elsewhere	-0.206	-0.007	0.636*
A18. Coffee farmer	Galápagos	0.013	0.145	0.378*
A04. Fisherman and naturalist guide	Galápagos	0.284	0.207	0.430*
A20. Head of fishing cooperative	Mainland	0.283	-0.121	0.671*
Participants loading on more than one factor				
A29. Teacher and church minister	Mainland	0.391*	0.274	0.503*
A13. Research field assistant/biologist	Elsewhere	0.066	0.378*	0.491*
A08. Hotel owner and singer	Mainland	0.198	0.525*	0.376*
A19. Regional manager, conservation INGO	Mainland	0.471*	0.005	0.626*
A22. Tour operator	Mainland	0.054	0.665*	0.397*
A11. Head of fishing cooperative	Mainland	-0.143	0.383*	0.632*
A02. Local government official	Galápagos	-0.012	0.442*	0.614*
A24. Hotel owner	Elsewhere	0.475*	0.538*	-0.079

* indicates that a sort loads significantly at the $p < 0.01$ level.

5.4 Interpretation of the factor narratives

What follows is an interpretation of the three factors based on the information presented in Table 5.4 and Table 5.5, with reference to the comments made by participants during the sorting process. Although the three factors outlined cannot claim to represent all of the possible discourses about conservation and the Galápagos environment, they can at least claim to be present and to a degree influential (based on the inclusion of various decision makers within the Q sample) in Galápagos at the current time. Thus, as outlined in the methodology chapter, although from the data presented there is no way of saying what proportion of a given population subscribes to a given discourse, each discourse uncovered 'will generally prove a genuine representation of that discourse as it exists within a larger population of persons' (Dryzek and Berejikian, 1993 p. 52).

There is 'no set formula for presenting the interpretation and explanation of factors' (Addams and Proops, 2000 p. 33), but Brown cautions that '[i]n interpreting Q factors (as well as individual Q sorts), it is important not only to zoom in on details, but also to take a step back and view the scores as a patterned whole' (Brown, 2009). In the narrative descriptions, the numbers in square brackets refer to the number of the statement on which the analysis is based (see Table 5.4) and the score assigned to that statement by each of the three factors is given in brackets following the statement. Quotes in italics are comments regarding the statement in question, made by individuals whose sorts correlated significantly with the factor being described. The interviewee code is given in brackets following the quote and these correspond to the participants listed in Table 5.5. Quotes marked with an asterisk (*) have been translated from Spanish. Salient features from the factor interpretations are highlighted in Table 5.6.

The names given to the 3 discourses: 'Conservation of Galápagos as an international/global concern'; 'Conservation with sustainable development'; and 'Social welfare and equitable development', are intended to act as an abbreviated 'storyline', capturing some essence of the larger narrative. However, the choice of which element of each discourse to highlight is, of course, a subjective judgement and could well have been done differently. Finally, it is worth mentioning that although this chapter attempts to give equivalent weight to all three of the discourses that emerged from this study, in reality these discourses 'speak at totally different volumes' (Frost and Wrangham, 2004 p. 57) due to the balance of power of the actors and the discourses they ascribe to. This is an issue that will be returned to in the critical discussion of the discourses in Chapter 6.

Table 5.6. Summary of salient features of the 3 factor interpretations

	Factor A	Factor B	Factor C
Name:	“Conservation as an international/global concern”	“Conservation with sustainable development”	“Social welfare and equitable development”
Central focus:	Conservation of unique biodiversity and ecosystems of Galápagos	Scientifically sound management for sustainable development	Equitable sharing of benefits from tourism
Causes/blame	Capitalism and globalisation (uncontrolled growth in tourism), population growth, local corruption and institutional failure	Institutional and financial barriers, ineffective control of growth in tourism and lack of adequate data for management	‘Outsiders’ looking to gain from Galápagos: large tour operators, international fishing vessels, international NGOs/environmentalists, continental bureaucrats.
Outlook for the future:	Pessimistic: conservationists fighting a losing battle against globalising forces of development	Cautiously optimistic: conservation and development are compatible with appropriate scientifically informed management	Pessimistic: local people fighting a losing battle against powerful outsider interests in Galápagos
Role of science	Key in defining the meaning (and worth) of Galápagos internationally as the ‘cradle of evolution’	Pivotal – need for more science to develop technical fixes to pressing problems	Suspect – interests of scientists and institutions questioned
International involvement	Crucial	Helpful and necessary	Suspect

Table 5.7. Factor correlations, % variance explained by each factor and number of sorts loading on each factor alone at p<0.01

Factor correlations						
	A	B	C	% variance explained	Number of sorts loading on this factor alone	
A	1.000	0.395	0.072	13	7	
B		1.000	0.367	20	12	
C			1.000	15	6	

5.4.1 Factor A: 'Conservation of Galápagos as an international/global concern'.

Seven individuals loaded on this factor alone, and it explains 13% of the study variance (see Table 5.7). Four of these individuals were associated with international NGOs, one with an international tour operator, one academic at an Ecuadorian university and one local artist not affiliated to any institution (see Table 5.5).

Within this discourse Galápagos is conceived of in global terms as an extraordinary and unique place and one of the last of a dwindling number of natural areas in the world. For proponents of this view, the needs of the native and endemic flora and fauna of the Galápagos should be the primary concern:

[14] The Galápagos belongs first and foremost to its original inhabitants - the turtles, the iguanas, the birds, the sharks and the sea lions. (+2, -1, -1)

This means, as one participant commented, *"that their right to exist and to reproduce as species should be paramount"* and that maintaining the native and endemic biodiversity should be *"absolutely primary"* (A14). On the other hand, the current human population of Galápagos should consider it a 'privilege' to live in such a unique place:

[5] Living on Galápagos is a privilege (+3, +3, +2)

One participant commented *"it's an extraordinary place so, yes, I feel privileged to live here. And the people feel very proud to be Galapagueños"* (A03). Another expressed the view that if people don't like what they have in Galápagos they should *"go move to the continent"* (A01).

Viewed through this lens there is serious cause for concern in Galápagos as evidenced by the highest score awarded to statement [30]:

[30] I am worried about what will happen to Galápagos (+ 4, +2, +1)

As one participant commented: *"Absolutely, very worried. All trends are going in the wrong direction"* (A14). The worrying situation is related to the perceived incompatibility of economic development and conservation:

[37] Conservation and development are mutually beneficial. (-2, +2, -1)

One comment about this statement was that: *"there can't be indefinite development even if we call it sustainable"* (A03). Another argued that *"in the long run and in general, more people caused by more development creates more problems"* (A15).

In addition to these kinds of views about the links between development and population growth through immigration, anxiety about natural population growth is also a feature of this discourse:

[46] Natural population growth is a massive problem here; they should raise awareness and encourage contraception. (+2, -1, -1)

One participant, the head of an international conservation NGO, commented for example, that Galápagos has a *“very worrisome demographic profile in terms of a very young population, having children”* (A14).

One of the drivers of what are considered the unsustainable levels of development on Galápagos is understood to be the ongoing growth in tourism (and its associated immigration) beyond the ‘carrying capacity’ of the islands. Hence statement [10] received the lowest score for this factor:

[10] The Galápagos Islands have not yet reached carrying capacity in terms of the number of tourists that visit each year. (-4, -2, 0)

One participant commented: *“I totally disagree, I think we've surpassed the carrying capacity”* (A01). Others were more wary of the term ‘carrying capacity’ for various reasons: one commented that it was *“a bit subjective”* (A03), while on the other hand another commented that the term was *“too mathematical, it doesn't take into consideration the impact that different populations have...it depends how people are behaving”* (A06). Nonetheless in general participants loading on this factor believed that there was (however calculated) *“too much”* tourism on Galápagos (A01). As well as the outright number of tourists, the changing nature of tourism and the types of tourists visiting Galápagos is also becoming a concern for this factor, hence the relatively higher score awarded to statement [50]:

[50] Galápagos has become just one more place on a long 'checklist' of places (like Machu Picchu in Peru) that tourists feel they must see. The people who come here don't really want to see or understand Galápagos, they just want to tick off certain charismatic species and be able to say that they went to Galápagos. (+1,-1, 0)

In terms of solutions to the problems facing Galápagos, this factor appears pessimistic about the success of conservation initiatives such as the participatory management system implemented in the Marine reserve:

[51] The participatory management system implemented in the marine reserve is a good example of successful conservation practice. (-3, +3, -3)

One participant raised his frustrations with the process: *“It’s not working because the fishermen, when they want something, they occupy the park buildings, they threaten to kill Lonesome George [the last surviving Pinta tortoise and famous resident of the Charles Darwin Station], so... it’s not a good example of how it works”* (A01). Another participant critiqued the *“soft negotiating position”* that conservationists took *“for fear of more conflicts”* and commented that *“there’s ever more tourists and pollution, so neither in fishing nor tourism was it successful”* (A03).

To a degree, the attitudes of the local fishermen in particular are felt to be a barrier to effective conservation:

[25] In general many fishermen in Galápagos have a total disregard for any kind of laws and regulations to protect the islands. (+1, -1, -2)

As one participant put it: *“they feel that because they’ve been fishing all their life they understand the ocean better than anyone else and therefore nobody’s supposed to tell them what to do”* (A01).

Education, strong regulation, and control of the population, are seen as the keys to the effective conservation of the islands (views that are for the most part shared with Factor B: conservation and sustainable development), and evidenced by the scores for the following statements:

[8] Local people and especially children need to be educated in order to develop a 'conservation consciousness' and learn how to live in harmony with the natural environment. (+3, +4, 0)

[2] People living on Galápagos should accept certain restrictions and responsibilities as a result of living in such a unique place. (+3, +3, +1)

[48] Today we have filled ourselves up with lots of laws and prohibitions. Everything is prohibited here, everything! And I think that a serious problem here, for the conservation of Galápagos, and one of the worst things we have done to Galápagos, is prohibit everything. (-3, -3, +2)

As one commented about statement [48]: *“controls are absolutely essential here... I think this is ridiculous”* (A14). In fact, at present there is a sense that this control is inadequate due to ineffective/inconsistent policing and/or corruption:

[31] The main problem is that sanctions against law-breakers aren't enforced - people break the rules and then corruption or weak policing means that they aren't punished. (+2, 0, 0)

Given the global importance of Galápagos wildlife, the involvement of the international community in the protection of Galápagos is seen as being absolutely crucial:

[36] The future of the Galápagos environment shouldn't be decided by local people alone. (+3, 0, -2)

As one participant put it, local people should *“have a significant say, but obviously they need assistance”* (A15). To this end, the use of conceptually powerful international tools such as the UNESCO 'World Heritage in Danger' category in order to raise awareness and funds for conservation is considered necessary, but, as the comments for statement [32] illustrate, there is a tension felt between the perceived need for the islands to have the extra protection which is felt to come from their being 'on the international radar', and the desire for the islands not to need that protection, and to be in a sense 'disconnected' from the world:

[32] I hope that Galápagos stays on the UNESCO 'World heritage in danger' list as this is the best way to ensure that it is protected and we don't forget how vulnerable and fragile the islands are. (+1, -2, -2)

As one director of an international NGO working on Galápagos commented:

“In the short term I would say yes...it's a good way to keep pressure on the Ecuadorian government, though we're doing everything possible, this is my official view [laughs] to ensure that all the necessary actions are implemented, and enacted to have Galápagos come off of the list. But it actually does keep a bright light on the major issues that exist and are increasing on Galápagos... it's a good way to ensure greater protection. I think it would be a very negative thing if it came off the list next year...” (A14).

Compounding the need for international involvement on Galápagos is the perception of a degree of 'mediocrity' of the professionals from Galápagos:

[44] Here we have the problem of mediocrity: you have to bring people from the continent to do a good job because a lot of the time the professionals coming out of Galápagos aren't any good. (+1, -2, -1)

As one participant commented: *“the system supports them getting jobs, so why would they go that extra mile, they're going to get the job anyway?”* (A01)²⁴

While on the one hand international links and involvement are thus crucial, on the other hand, this viewpoint maintains that the increasing number international linkages and the decreasing geographical isolation of Galápagos are ecologically unsustainable, and hence is mildly in agreement that:

[12]The only really sustainable situation on Galápagos is to partially disconnect the islands from the rest of the world. (+1, -1, -2)

This is understood to mean that as one participant commented: *“there needs to be improved controls and quarantine systems and a reduction of all kinds of transport flows into the archipelago ... basically a reduction in tourism”**(A03).

With regard to the role of science on Galápagos, although on the surface there appears to be a broad consensus between the three discourses that science is important to conservation and should be steered by management needs, factor A agrees less strongly than the others that:

[19] Research priorities of science on Galápagos should be beyond the research interests of individuals or institutions and favour investigations that are directed to solving the most urgent management and conservation problems. (+1, +2, +2)

Participant comments about the statement suggest that there may be a disagreement beneath this apparent consensus. As one participant put it: *“to be perfectly honest I think there's a role for science beyond the immediate management and conservation problems... I think there's a role for science to look beyond the horizon”* (A14). Another commented: *“I think that we should allow pure science, pure science is good for humanity, I believe in pure science, and pure science in the end will help us with conservation”* (A06).

However this factor disagreed with the idea that:

[7] On Galápagos, the practice of science and the furthering of human understanding of evolution should be the main priority. (-2, 0, 0)

And indeed, this factor is neutral regarding the need for more science to address conservation challenges:

²⁴ The 'system' referred to is the 1998 Special Law for Galápagos, which (in a bid to halt immigration) favoured local employment and had the unintended consequence of decreasing competition.

[4] More holistic technical/scientific analysis is required to fully understand the challenges facing Galápagos and point to appropriate solutions. (0, +2, -1)

One participant commented: *“they know what the problems are, they know more or less what the solutions are, it’s just a matter of doing it, that’s the problem”* (A06).

There is however, evidence that an acceptance of the findings of science, especially with regard to the theory of evolution, should be pre-requisites for working as a guide in the National Park, and thus that holding creationist beliefs is incompatible with this office:

[28] I do not think that there is a conflict between being a National Park guide and believing in God and the creation. (-2, +1, +1)

“You should be able to answer the questions that people ask you about evolution and if you don’t believe in evolution then it makes it very difficult” (A01). In general this view disagrees with the idea that:

[41] Every part of nature is of benefit to us, the animals the plants, water, God made them all so that we could be happy. (-3, +2, +3)

5.4.2 Factor B: ‘Conservation with sustainable development’

This discourse shares many elements of the International Conservation concern discourse (and indeed the factors are relatively highly correlated at 0.395 (see Table 5.7), but there are some key differences. Twelve individuals loaded significantly on this factor alone, and it explains 20% of the study variance. Individuals loading on this factor were associated with a wide cross section of local stakeholders including the National Park (two individuals), local tour operators (three individuals), local government (two individuals), agriculture (one individual), fishing (one individual), an international NGO (one individual), and others (see Table 5.5).

One of the key difference between factors A and B is the latter’s agreement with the idea that ‘development’ (left deliberately undefined in the concourse) and conservation can be mutually beneficial:

[37] Conservation and development are mutually beneficial. (-2, +2, -1)

Statements from participants underlined that what was required was ‘sustainable development’ or as one participant put it: *“development in terms of an improvement in people’s quality of life, not just in terms of growth”* (A25), but in principle at least, this type of development was believed to be both possible, and compatible with conservation’s aims.

From this point of view, the primary route to sustainability is through the development of a sustainable tourist industry, as one participant commented:

*“either you manage tourism properly and allow the economy to move, or you evict the population. The second option isn’t possible, you have to manage tourism... [it’s] the only non-extractive activity that, properly managed could become sustainable”** (A31).

The tourist industry is itself considered to be dependent upon the ‘ecological integrity of the islands’:

[52] The tourist industry does not rely on the ecological integrity of the islands (-1, -3, -1)

‘Ecological integrity’ is interpreted quite broadly from this point of view, as one participant commented: *“if all this goes to trash then of course it’s going to affect tourism”* (A10), or as another put it: *“if ecological integrity is taken to mean a balance between human and natural systems, then of course tourism relies on it”* (A07).

Given the centrality of tourism to sustainability, from this point of view therefore, ‘partially disconnecting’ Galápagos through limiting travel to the islands for example, is not appropriate:

[12] The only route to a really sustainable situation on Galápagos is to partially disconnect the islands from the rest of the world. (+1, -1,-2)

As one participant said: *“transforming Galápagos into a ‘ghetto’ isn’t going to solve anything”** (A25).

Within this discourse the conservation of Galápagos is framed in terms of a management challenge, in which both practical/technical conservation measures, and education are considered to be crucial:

[8] Local people and especially children need to be educated in order to develop a ‘conservation consciousness’ and learn how to live in harmony with the natural environment, (+3,+4, 0)

[3] Stopping foreign species entering the Galápagos ecosystems needs to a priority of the Galápagos authorities. (+2, +3, 0)

Similarly, science has a key role to play:

[4] More holistic technical/scientific analysis is required to fully understand the challenges facing Galápagos and point to appropriate solutions. (0, +2, -1)

Hence:

[19] Research priorities of science on Galápagos should be beyond the research interests of individuals or institutions and favour investigations that are directed to solving the most urgent management and conservation problems. (+1, +2, +2)

Despite the key role of science for proponents of this view, there is considered to be no conflict between holding creationist beliefs and being a park guide:

[28] I do not think that there is a conflict between being a National Park guide and believing in God and the creation. (-2, +1, +1)

And in fact this discourse is in agreement with the possibility of creation of all nature by God in order to benefit humanity:

[41] Every part of nature is of benefit to us – the animals, plants, water – God made them all so that we could be happy. (-3, +2, +3)

In line with factor A, this discourse maintains that restrictions and responsibilities are felt to be necessary and reasonable:

[2] People living on Galápagos should accept certain restrictions and responsibilities as a result of living in such a unique place. (+3, +3, +1)

[48] Today we have filled ourselves up with lots of laws and prohibitions. Everything is prohibited here, everything! And I think that a serious problem here, for the conservation of Galápagos, and one of the worst things we have done to Galápagos, is prohibit everything. (-3, -3, +2)

But unlike factor A, it is not felt that fishermen disregard the legislation:

[25] In general many fishermen in Galápagos have a total disregard for any kind of laws and regulations to protect the islands. (+1, -1, -2)

This factor is also more optimistic about participatory conservation management strategies like the participatory management system of the marine reserve, and of the prospects for Galápagos conservation in general:

[51] The participatory management system implemented in the Galápagos Marine Reserve is a good example of successful conservation practice. (-3, +3, -3)

[21] It is already too late for Galápagos. (-2, -4, -2)

In agreement with the other factors, this discourse maintains that:

[5] Living on Galápagos is a privilege (+3, +3, +2).

However, where factor A highlights the 'extraordinary' nature of the place, participant comments on this statement highlight more practical considerations: "*the peace, the security*"* (A16), compared with continental Ecuador.

The integrity and independence of local institutions is maintained, and there is thus disagreement with the idea of widespread corruption on the islands, or of close links between conservation organisations and the tour industry:

[23] If you have money you can get away with anything on Galápagos (0, -3, -1)

[27] The park and all those non-profit foundations are more interested in 'floating hotel' tourism than supporting the local population and teaching them about conservation (-2, -3, +1)

Unlike the more international viewpoint of factor A, factor B is more ambivalent about international involvement in Galápagos as evidenced by the zero score awarded to statement [36]:

[36] The future of the Galápagos environment shouldn't be decided by local people alone. (+3, 0, -2)

As one participant commented, conservation required a degree of international input from "*scientists and other experts,*" but he voiced frustration with the stream of outsiders giving views on Galápagos conservation: "*people from outside always think they are right, that they know how to manage Galápagos*"* (A12). Tied to this, within this discourse local professionals are not perceived of as any less able than internationals:

[44] Here we have the problem of mediocrity: you have to bring people from the continent to do a good job because a lot of the time the professionals coming out of Galápagos aren't any good (+1, -2, -1)

This factor is uncomfortable with the idea of maintaining an international image of 'threatened Galápagos' in order to raise awareness and funds:

[32] I hope that Galápagos stays on the UNESCO 'in danger' list as that is the best way to ensure that it is protected and we don't forget how vulnerable and fragile the islands are. (+1, -2, -2)

One participant commented that this *“really harms conservation efforts”** (A31).

5.4.3 Factor C: ‘Social welfare and equitable development’

Six individuals load significantly on this factor, and it explains 15% of the study variance. The individuals loading on this factor are: a local coffee farmer, a member of one of the fishing cooperatives, a local tour guide, a community activist, a local government official and an international lawyer. This discourse is the least like the ‘Galápagos conservation as an international/global concern’ discourse, showing a weak correlation of just 0.072.

Within this discourse Galápagos is viewed very much through a local lens, rather than in the light of global environmental changes. Conservation is understood less in terms of concepts such as biodiversity or endemism, more in terms of personal ties to Galápagos. As one participant put it: *“we understand what conservation is, we know because we love the place where we grew up, where we are, and we want our children to enjoy this”** (A33).

The statements awarded the highest and lowest scores by this discourse concern the issues of social welfare and changes in tourism:

[47] This isn't a paradise! How can it be when we have such problems with our health, with education? So much money is spent of every part of the environment and yet we still have no clean water! (-1, -1, +4)

[1] The growth in new activities like kayaking and surfing and the move away from specialist nature tourism is the greatest threat to the future of tourism and conservation in the islands. (-1, -2, -4)

Participant comments highlighted the notion of equity in the benefits gained from different types of tourism: *“these small activities have helped lots of families – this is tourism with a local base”** (A33). The big tour operators and cruise ships (the so-called ‘floating hotel’ model) are felt to be supported by the science and conservation sectors, and yet this model of tourism does little social or environmental good:

[29] All that the big tour boats really leave behind in Galápagos is their rubbish. (-1, 0, +3)

[27] The park and all those non-profit foundations are more interested in ‘floating hotel’ tourism than supporting the local population and teaching them about conservation. (-2, -3, +1)

As one participant commented:

“some of them have some small projects to give back to the community, but it pretty much comes down to building an information centre here or there every 3 years, or giving a few local students a week on board their ships. But in reality all they do is come here drop tourists off and leave the rubbish behind, and all the money goes back to the continent...” (A04).

Thus new activities such as kayaking and surfing [1] or artesanal fishing tours could provide much needed redistribution of benefits:

[17] Artesanal fishing tours would be a successful way of increasing the livelihoods of local fishermen and decreasing fishing pressure - a win- win outcome. (0, +2, +3)

Thus from this point of view continued growth in tourism could *potentially* be a positive thing, as the more neutral scores for statements [10] and [34] seem to suggest:

[10] The Galápagos Islands have not yet reached carrying capacity in terms of the number of tourists that visit each year. (-4, -2, 0)

[34] We need policies that limit the growth in tourism - we need high value, low numbers tourism, not cheap mass tourism. (+1, +1, 0)

One participant explicitly questioned the environmental credentials of the traditional model of Galápagos tourism (high-end, exclusive tourism):

“The backpackers, the sailboats, the students, the people who come on low budget actually have far less impact than the guys who come here with million dollar yachts and require huge expensive hotels to be staying in... high value low numbers tourism benefits a handful of people at the expense of the entire population of Galápagos, and the ecosystems” (A17).

This factor appeared to be in line with factor A in disagreeing with the statement:

[37] Conservation and development are mutually beneficial. (-2, 2, -1)

However, participant comments suggest that this is because conservation is felt not to provide benefits for development not vice-versa. One participant commented: *“right now conservation has the advantage”** (A33), while another simply said: *“conservation is not beneficial”** (A30).

There is a sense that local people should be deciding on the development direction taken by Galápagos:

[36] The future of the Galápagos environment shouldn't be decided by local people alone. (+3, 0, -2)

And in line with factor B, this factor disagrees with the pragmatic use of the UNESCO 'World Heritage in Danger' category for international awareness and fundraising purposes:

[32] I hope that Galápagos stays on the UNESCO 'in danger' list as that is the best way to ensure that it is protected and we don't forget how vulnerable and fragile the islands are. (+1, -2, -2)

One participant comment suggested that this disagreement is born out of a fear of being blamed for the apparent 'at risk' state of the islands : *"someone who doesn't know Galápagos, who just reads what they publish on the internet, that person's going to say 'what is going on in Galápagos? Those people are destroying everything!'"** (A33).

From this perspective the motives and actions of some conservation organisations and individual scientists are somewhat suspect:

[16] There has been a fairly irresponsible use of information (approximations, use of scarce data etc) on the part of conservation NGOs and international organisations with regard to the Galápagos environment. (-1, -1, +2)

[9] Scientists are more interested in publishing papers than in the Galápagos people and environment. (0, 0, +1)

Neither more science to steer conservation strategies, nor more money for conservation management are felt to be really necessary:

[4] More holistic technical/ scientific analysis is required to fully understand the challenges facing Galápagos and point to appropriate solutions. (0, +2, -1)

One participant commented: *"nobody's doing any meaningful work that furthers the quality of our existence... I've had enough of scientists coming here to study the turtles, study the marine iguanas..."* (A17).

[11]: More funds are needed to establish effective patrols to protect the park. (0, +1, -3)

The same participant commented: *"there's plenty of money available, they're just doing the wrong thing with it"* (A17).

Perhaps linked to the suspicion about international organisations, there is also ambivalence toward the idea and project of environmental education to generate a 'conservation consciousness' as evidenced by the zero score awarded to statement [8]:

[8]: Local people and especially children need to be educated in order to develop a 'conservation consciousness' and learn how to live in harmony with the natural environment. (+3, +4, 0)

As one participant commented: "*nobody can come here to give me consciousness*"* (A30)

In general this factor is in agreement with the others that :

[5] Living on Galápagos is a privilege (+3, +3, +2),

and that a certain restrictions and responsibilities are necessary to a degree:

[2] People living on Galápagos should accept certain restrictions and responsibilities as a result of living in such a unique place (+3, +3, +1).

However, the scores illustrate that this agreement is less pronounced than for the other two discourses. Indeed many of the prohibitions and restrictions are felt to be excessive and to a degree irrational:

[42] Instead of just prohibiting everything we need a more rational management - less bureaucracy and more rational management. (0, +1, +2)

[48] Today we have filled ourselves up with lots of laws and prohibitions. Everything is prohibited here, everything! And I think that a serious problem here, for the conservation of Galápagos, and one of the worst things we have done to Galápagos, is prohibit everything. (-3, -3, +2)

As one participant commented: "*they restrict you but they don't give you opportunities, they don't offer you anything*"* (A33).

Where legislation exists (for example in the case of fishing regulations) it is not felt that many people disregard these laws:

[25] In general many fishermen in Galápagos have a total disregard for any kind of laws and regulations to protect the islands. (+1, -1, -2)

This view strongly disagrees that:

[45] Most people living in the towns on Galápagos simply aren't interested in nature (0, -1, -3),

and in fact maintains that

[41] Every part of nature is of benefit to us - the animals, plants, water - God made them all so that we could be happy. (-3, +2, +3)

As one participant put it: *"God gave us the authority to administer his creation... we also have to look after it, but look after it for everybody. And also look after his people"* (A33).*

In line with this belief, holding creationist beliefs is not felt to be contradictory for a National Park guide, and there is thus mild agreement with the statement that:

[28] I do not think that there is a conflict between being a National Park guide, and believing in God and the creation. (-2, +1, +1)

Chapter 6. Critical analysis of conservation discourses

Chapter Outline

This chapter subjects the three discourses described in the previous chapter, to critical scrutiny, highlighting ways in which theoretical insights and critique from the wider literature on conservation and environmental discourse can inform an analysis of the Galápagos situation. Where relevant, this chapter also draws on primary data gathered from ethnographic observation in order to deepen and contextualise the analyses of the Q factors. The final section highlights preliminary conclusions and additional questions emerging from the results.

6.1 Introduction

The results of the Q study presented in the previous chapter revealed the existence and structure of at least three distinct discourses about conservation in Galápagos. This chapter will now discuss the tensions between and within the different discourses and examine and some of the (often hidden) value judgements, assumptions and politics that are woven into the fabric of the different subjective points of view. The chapter is split into three sections: the first examines divergent ideas around the conservation/development balance, exploring the different views about if and how ‘sustainable development’ can be achieved on the islands, and discussing the dominant ecotourism-based model of development. The second section explores the range of views about the ‘nature of Galápagos’ (the ‘what’ of conservation) and asks how these ideas about the fundamental qualities of the islands tie into ideas about conservation. The final section looks at the ‘why and how?’ of conservation, examining different ideas about why conservation is important, and exploring some of the divergent views about the tools that conservationists employ, in particular ideas around environmental education and scientific research for management.

In the discussions that follow, original quotes from Q sort interviews are indicated by the use of italics and double quotes (“”), and the interviewee code is given in brackets following the quotation. Quotations from secondary sources are indicated by the use of single quotes (‘) and are not italicized. Where reference is made to interviews that took place outside of the Q

process, the date and place of the interview are given. In all cases, original quotes that have been translated from Spanish are marked with an asterisk (*).

Finally, it is important to stress that, (as has been argued with regard to critiques of development) 'no side in these tussles has a monopoly of virtue, and all have something to gain by a more introspective, contingent view of the terrain upon which these battles have taken place' (Cooper and Packard, 1997 p. 4).

6.2 The conservation/development balance

One of the concepts around which the discourses of conservation on Galápagos are divided is the idea of 'development', or how to balance the needs of conservation and development. In fact, as in many other locations of conservation interest around the world, conservation discourses are arguably inseparable from debates and discussions around so-called 'sustainable development'. However the global discourse of sustainable development has itself been the subject of a great deal of critique over recent years. Sachs argues for example, that 'since 'development' is a conceptually empty shell which may cover anything from the rate of capital accumulation to the number of latrines, it becomes eternally unclear and contestable just what exactly should be kept sustainable' (Sachs, 1999 p. 33), while Thompson goes as far as to suggest that the two words should be 'consigned to oblivion' (Thompson, 1999 p. 143) due to the inherently false 'unidirectional assumptions that are built into the world "development" and the stable and harmonious Never Never Land that is promised by the word "sustainable"' (*ibid.* p143). However, the popularity and lasting appeal of the concept is undeniable due, according to Hajer and Fischer, to the way in which it provides a 'generative metaphor' – or story line – around which different key economic and environmental interests could converge' (Hajer and Fischer, 1999p. 2). It suggests the possibility of a 'win-win' situation in which the maintenance of economic growth, ecological protection and social justice are all possible in perpetuity and on a global scale, whilst glossing over differences of opinion as to 'what human needs count, what is to be sustained, for how long, for whom and in what terms' (Dryzek, 1997 p. 146). Globally, the meaning and worth of the concept is a matter of a great deal of dispute (e.g. Torgerson, 1995), and it is thus unsurprising that disagreement around the concept should also be very much in evidence in Galápagos. On one side of the spectrum, factor A (Conservation as an international/global concern) expresses the view that conservation and development (left deliberately undefined in the discourse) are fundamentally incompatible. Although some factor A participants attempted to re-define development in ways that would make it compatible with conservation

(for example some evoked the concept of “*sumak kawsay*” the kichwa term meaning ‘good living’ recently enshrined in the Ecuadorian constitution as the goal of sustainable development), others were more straightforward in their views that “*more people caused by development creates more problems*” (A15). Or as another put it “*I think that a sustainable future for Galápagos means sustainable ‘de-growth’ rather than sustainable development*”* (A03). This view of development and conservation as contradictory is very much in evidence in contemporary and historical conservationist discourses that define the ideal state of Galápagos as the ecological state that existed prior to human discovery of the islands. For example, a report published by the Charles Darwin Foundation in 2002 outlines a ‘Biodiversity Vision’ for Galápagos which states that: ‘[t]he baseline (what was Galápagos like prior to 1535) ... provides both a benchmark and the basis for the ultimate long-term aspiration for biodiversity conservation’ (Bensted-Smith, 2002 p. 8, parentheses in original). It is perhaps unsurprising therefore that within this framework, development (of any sort) should be considered largely antithetical to conservationist aims.

Likewise for proponents of Factor C, the two concepts are viewed as similarly incompatible, but it would appear that from this perspective it is conservation rather than development that is considered damaging. Evidence for the conflict between the two concepts can be found in the metaphors of struggle and battle still commonly expressed in the academic literature on Galápagos. Thus for example a 1995 Report published in the journal *Trends in Ecology and Evolution* claims that ‘on balance we feel that the conservation battle is being slowly lost in Galápagos’ (Powell and Gibbs, 1995 p. 354), while on the other hand a Factor C participant in this study felt that “*right now... for me conservation has the advantage*”* (A33).

In contrast, the idea of ‘sustainable development’ as compatible or even beneficial for conservation appears to be a central and defining feature of factor B, which has hence been labelled ‘Conservation with sustainable development’. To a degree this discourse can be read as the ‘official’ discourse of the Ecuadorian government with regard to the conservation of Galápagos. Indeed, the main legislative framework for Galápagos, the 1998 the law popularly known simply as the ‘Special Law’, is officially the ‘Special Law for the Conservation *and Sustainable Development* of the province of Galápagos’ (emphasis added). Likewise the Galápagos Regional Plan produced by the Ecuadorian government in 2002 enshrines these ideas, stating its central aim being:

‘[t]o conserve the biological diversity of the Galápagos...through the equitable sharing of the social and economic benefits that this generates, as the fundamental basis for

the sustainable development of the province' (Galápagos Regional Plan, 2002 p. 94 Translated from Spanish²⁵)

Proponents of factor B appear optimistic that given appropriate scientifically informed management sustainable development can be achieved. Hence it can be seen that for factor B in particular, more scientific analysis in order to develop appropriate technical solutions to these management challenges is considered important (statement 4). Likewise, 'applied' scientific research on Galápagos should be prioritised over other types of research (statement 19). However, despite a reliance on science for the means of achieving 'sustainable development', there is clearly no scientific definition as to exactly what this means. The following comment from a factor B participant responding to statement 37 highlights the difficulties faced by most participants when attempting to pin down the concept of the type of development that would be 'mutually beneficial' with conservation:

"What we need to achieve is sustainable development, development in terms of improvements to people's quality of life, not just in terms of growth... That people understand that development isn't having a car or cars, or, I don't know, that development is also cultural, scientific, it's about appreciating other things. More understanding about the reality of Galápagos" (A25).*

Clearly cultural development, 'quality of life', or 'understanding the reality of Galápagos' are contestable concepts, and extremely difficult to define, let alone build. But despite the illusive nature of the desired state of sustainability, factor B considers that appropriate management, in particular of tourism, is the key to achieving it: *"You have to manage tourism properly. Tourism moves the economy, and fishing, agriculture and everything else turns around the only non-extractive activity that, properly managed could become sustainable"* (A31).* Thus the problem is framed as a management challenge. This focus on appropriate management of tourism is not new, and can be traced back to a historical vision in which tourism was considered the only really benign activity on Galápagos.

6.2.1 The 'ecotourism' model of development

In the late 1960s the response to the question of how protection of the Galápagos' ecology could be balanced with economic growth was clear: Galápagos needed to 'halt attempts to make the islands agriculturally profitable' (Mariscal, 1969 p. 46), and instead develop through focusing on 'what makes them so special in the first place...through encouraging constructive tourism' (*ibid* p. 46). For many years this idea of tourism as 'non-extractive' and thus

²⁵ Original Spanish version: "Conservar la diversidad biológica de las Islas Galápagos desde una perspectiva integral y a largo plazo conforme a un manejo integrado de los ecosistemas terrestres y marinos, mediante la participación equitativa de los beneficios sociales y económicos que esta genera como base."

essentially harmless to conservation goals held sway, and subsequently tourism became and continues to be the main driver of the Galápagos economy. Tourism revenues were estimated at more than \$143 million in 2006 (Epler, 2007 p. 20), and tourism directly provides an important source of income for most of the main public institutions on Galápagos in the form of the \$100 tourism entry fee. The National Park for example, earned \$4.8 million from this fee in 2008, while \$3 million went directly to the municipal governments (figures published by the Galápagos National Park and available from their website <http://Galapagospark.org>). Although the impacts of tourism have traditionally been tightly controlled, monitoring has tended to focus solely at the level of visitor sites. As Oxford and Watkins put it, tourism management on Galápagos has focused 'on the minutiae and, thus, lost sight of broader holistic changes occurring in the Galápagos – it has focused on the direct impacts but not addressed the pervasive indirect impacts' (Oxford and Watkins, 2009 p. 34). However the economic growth experienced by the Galápagos over recent decades - an estimated increase of 78% in gross domestic product, or total income between 1999 and 2005 (Taylor et al., 2006) - has put the spotlight on the indirect effects of tourism, highlighting the links between economic growth driven by tourism, population growth, decreasing social welfare and environmental degradation of the Galápagos (Taylor et al., 2006, Epler, 2007). Thus in 2007 Bruce Epler wrote that, largely as a result of tourism:

'[i]t is obvious that economic growth has resulted in unsustainable population growth, socioeconomic stratification, civil unrest, strained public services and infrastructure, an increase in the number of invasive species, and a number of conflicts with conservation goals and authorities'(Epler, 2007 p. 3).

The tension between Galápagos' economic reliance on tourism and ecological reliance on isolation means that many observers suggest that the Galápagos is living a fundamental contradiction (e.g. Ospina, 2004), caught between two apparently opposing currents, a state which presents a serious challenge to 'appropriate management'. But from the point of view of factor B, it is not the basic model of an economy built on tourism that is inherently unsustainable on Galápagos, but the exact way in which tourism is carried out and managed that needs to be addressed, along with discrete 'technical' challenges such as dealing with the ecological consequences of increased movement to the islands in the form of the arrival of non-native species. Factor B appears therefore to be a fairly typical example of the policy discourse that has been labelled 'ecological modernization'. This discourse maintains 'that environmental problems can be solved in accordance with the workings of the main institutional arrangements of society' (Hajer, 1997 p. 3), and although it has found widespread acceptance among policy makers and institutions worldwide, this kind of thinking about

development challenges has been broadly critiqued by many authors. Douglas Torgerson for example, argues that what he calls the 'administrative mind' of government agencies and policy makers is limited by the fact that they can only direct attention to problems in as far as they are framed as solvable through administrative and technological means. Thus the 'administrative mind' cannot admit that there may be a flaw in the entire pattern of industrial development, it sees environmental problems in isolation, to be dealt with by particular departments or ministries within the existing structures of government and administration. As Torgerson puts it with reference to the global 'ecological crisis':

'To be dealt with, the 'crisis' had to be viewed and treated not comprehensively as the product of a basic flaw in the whole project of industrialization, but in a manner which identified *manageable* problems. Although the problems could be regarded as somehow commonly 'environmental', they had to be defined, in operational terms, as primarily separate, capable of being solved in a manner which matched the functional differentiation of the administrative apparatus' (Torgerson 1999, p 115. Cited in Connelly and Smith, 2003 p. 135)

In factor B's view in the case of Galápagos it is a question of formulating and implementing policies that control tourism and limit numbers of tourists, maintaining 'high value, low numbers tourism, not cheap mass tourism' (statement 34), and focusing efforts on the control and eradication of non-native species (statement 3). And arguably, as proponents of this view would argue, this is simply a pragmatic approach to an intractable problem. As John Dryzek puts it, with reference to the global discourse of ecological modernization in general: 'without such an analysis, we are reduced to wishful thinking about how things might be different' (Dryzek, 1997 p. 232). However, even aside from more abstract critiques such as Torgerson's, factor B's vision of the problem and its solution is not universally accepted in Galápagos either in academic circles or in the other discourses revealed by this study. For example Christophe Grenier (2007), questions the ways in which the current and historical models of tourism and development on the islands, were promoted by governments and supported by the conservation sector. He argues that the policies that have attempted to control the impacts of tourism through the promotion of 'selective tourism' have actually resulted in the increasing 'geographical opening' of the islands to international flows and influences – reinforcing their absorption into the capitalist world system, thereby threatening their isolation (and hence their unique ecosystems). Policies in the early 1970s that promoted this type of tourism thus had, Grenier argues, negative consequences for both conservation and development of the archipelago by encouraging the involvement of international and continental tour operators to the detriment of local operations who were unable to compete with the levels of luxury and comfort demanded by the high end tourists (*ibid* p 177). Others have countered that:

‘the main goal of [the traditional model of tourism promoted in Galápagos] was not to develop an economic activity designed for local residents, but rather, as a mechanism to support the economic development of the Galápagos as a part of Ecuador and as an environmentally-friendly option for the new National Park’ (Oxford and Watkins, 2009 p. 34).

Regardless of the motivations of the original instigators of the tourist industry in Galápagos, the consequences of those decisions are apparent today, both in the structure of the industry (with for example non-residents owning 60% of the vessels operating in Galápagos, and land-based tourism receiving only 10% of the gross revenue from tourism (Oxford and Watkins, 2009 p. 35)), and in the discourses around conservation and tourism as revealed by this study. Thus one of the defining characteristics of factor C (‘Social welfare and equitable development’), is a sense of frustration and injustice at the distribution of the wealth resulting from tourism, and several of the statements distinguishing this discourse deal with this issue (statements 29, 17, 1, 27 & 34). As one participant complained of the current tour operators, *“they’re just using Galápagos as an economic site...they are exploiting Galápagos”** (A33).

The factor C view highlights the fact that debates around tourism and conservation are also inescapably about social order and notions of social justice, and are thus inherently political, a dimension that is downplayed by factor B with its calls for more science to steer appropriate technical solutions (statement 4).

Aside from highlighting the political dimensions of the debate, doubts about the ecological credentials of the high-end luxury tourism and their compatibility with conservation goals were also evident in the views expressed by factor C participants. Several participants pointed to the high energy usage and waste production of the apparently ecologically benign luxury tourists compared to (for example), *“the backpackers, the sailboats, the students, the people who come on low budget”* (A17). This participant levelled the following critique at the ‘high end’ tourism model:

“A vacation here probably has the greatest carbon footprint of any vacation on earth. The vast majority of visitors that come to Galápagos expand this footprint still further by choosing cruise tours. These are ships that drive around the Galápagos islands, dumping raw sewage into the ocean, ripping up reefs with their anchors, leaving their trash in our dumps, burning fossil fuels 24/7 which need to be imported to the Galápagos and the majority of these ships are owned by people whose only connection to the Galápagos is as a place to make money” (A17).

This critique resonates with certain voices in the academic literature around ecotourism, who point to the fact that while many so called ecotourists are interested in ‘experiencing nature’, this is fundamentally different from being interested in ‘protecting the environment’, and thus

for example the environmental impacts of travel to and around the destination are not taken into account in many considerations of the impacts of tourism, while the visual impacts of litter, or path erosion are (cf. Gossling, 1999, West and Carrier, 2004).

6.2.2 Selling the Galápagos to save the Galápagos?

A speaker at a recent sustainability symposium organized by the Charles Darwin Foundation, referred to 'the globally recognized brand that is Galápagos', and argued that only by 'creatively capitalizing on this cachet through the development of select high quality goods and services rather than an abundance of common place offerings, could Galápagos assure its path to a sustainable future' (CDF press release 19/10/2010²⁶). This corporate vision of Galápagos as a brand that needs to be capitalized upon in order to safeguard its future, is a paradigmatic example of what has been referred to as a neo-liberal conservation strategy, or the 'commodity road to stabilization' (Schroeder, 1995). Views such as this can be seen as a continuation or corollary of earlier strategies (such as the 1974 Master Plan for the Protection and Use of the Galápagos National Park) that promoted tourism, largely in the hands of international or continental operators, as the only viable route to conservation and sustainability in Galápagos. Neo-liberalism broadly speaking refers to ongoing processes whereby the world is restructured to facilitate the spread of free markets, and implicit within so-called neo-liberal conservationist strategies are 'putative synergies between conservation and sustainability on the one hand, and investment-driven economic growth on the other' (Brockington and Igoe, 2007 p. 438). 'Win-win' arguments such as those commonly made about 'ecotourism' in Galápagos are typical of these strategies, for example a 2002 Biodiversity vision for Galápagos claims that:

'[F]or all biodiversity, tourism has the advantages of providing a non-extractive livelihood for residents, linking local economic development to the existence of abundant flora and fauna, and financing most conservation work in the islands' (Bensted-Smith, 2002 p. 110).

The willingness of conservationists to adopt neo-liberal strategies (as well as discourses and corporate models of organisation) is currently the subject of a growing body of critical literature. For example Buscher, notes that 'increasingly conservation biologists are too eager to realign their field with seductive neo-liberal win-win visions, [and] as a consequence, discourses are created that ultimately reinforce an ideological system that is inherently unsustainable' (Buscher, 2008 p. 229).

²⁶ Downloaded from Charles Darwin Foundation website
<http://www.darwinfoundation.org/english/pages/noticias.php?txtCodiNoti=73&txtCodiCate=1>

Critiques of neo-liberal conservation represent a challenge to the traditional (and perhaps more intuitive) view of international biodiversity conservation a 'bulwark against neo-liberalism' (Brockington and Igoe, 2007 p. 433) in the sense that it is often assumed (both by those working within it, and by outside observers) that conservation is working to 'protect our planet's ecosystems from the advance of free-market capitalism' (*ibid* p.433). This new strand of critical literature suggests that increasingly the operation of large international conservation agencies can be seen to be a part of (rather than acting against) the neo-liberal agenda.

The win-win discourse which suggests that since the Galápagos economy relies on nature tourism, the market will somehow act to protect nature, is still widespread. Thus for example an analysis of the Galápagos tourism industry by Cordero, Gonzalez *et al.* (2004), argues that : 'If the individuals who make up the ecotourism market grant healthy ecosystems an economic value, it will be the market that will drive all the operators to improve the level of their environmental management' (*ibid*, p. 29 Translated from Spanish). This belief in the market working to improve environmental performance is closely related to what has been called the 'stakeholder theory' (Honey, 1999 p.14, Fletcher, 2009) whereby it is expected that people will work to protect what they receive a value from, and both form an intrinsic part of neo-liberal conservation ideology. However, critics argue that these ideas are largely built on assumptions and are generally empirically untested,²⁷ and in the Galápagos context the studies of Epler (2007), Taylor (2006) and others highlight the limitations and overly simplistic nature of the win-win discourse around ecotourism.

While there is clearly a link between the unique biodiversity of the Galápagos islands and the economic potential of tourism to the islands, the degree to which tourism would be affected by environmental degradation in Galápagos, or to which the tourism market would act to protect the biodiversity of the island is a central and highly divisive debate, and one that is partly captured in the differences between factor A and B in this study. For example, it would appear that in Galápagos, factor A is tending away from economic arguments and justifications for conservation. One participant (who loaded on factor A, Conservation as an international concern) admitted that he no longer believed in the validity of win-win arguments around ecotourism and conservation, as he put it: "*I used to use that argument a lot ... I'd say: 'we*

²⁷ For example, research into the social and economic effects of an ecotourism project in the Peruvian Amazon, highlighted the use of increased revenue gained from ecotourism to buy equipment (chainsaws etc) that was then used to increase resource consumption rather than support conservation (Stronza, 2007). Another study of tourism and conservation around Komodo National Park failed to find any link between receipt of tourism benefits and support for conservation among the local population (Walpole and Goodwin, 2001).

have to conserve Galápagos if we want to maintain permanent tourism here, if we want economic activity on the islands, we have to conserve the islands', but it's not true" (A14).*

Other factor A participants' comments similarly appear to question the validity of the neo-liberal or market driven approaches to conservation. One put the matter in deceptively simple terms by arguing that: *"money is generally a cause of concern in any ecosystem"* (A01). Another participant echoed this view by suggesting in response to statement 11, that *"money isn't the problem on Galápagos... unless it's too much money!"* (A27).

Although various authors have argued that the tight linkages between the environment and tourism in Galápagos, mean that the industry faces imminent collapse if visitor sites do not continue to 'meet the high biological value' of the current offerings (Watkins and Cruz, 2007 p. 11) evidence for the premise that the market will be negatively affected by ecological decline is in fact scarce. Thus for example, although no data exists to investigate whether or not for example higher levels of invasive or non-native species on Galápagos would deter tourists, the very fact that tourist numbers continue to rise despite concurrent increases in the numbers of non-native species, suggests that decreasing 'ecological integrity' would not deter the majority. As one participant put it:

"You can eliminate the sharks, the penguins could die, disappear. You could get rid of half or more of the finches, lots of species. And many problems, many illnesses... many things could disappear. But you would have the landscapes, you have the sea...and few travellers really understand ecological integrity and functioning, the imbalances etc..." (A14).*

Another factor A participant saw tourism as similarly separate from conservationist concerns, saying simply that: *"tourism relies on money, not on the ecological integrity of the islands"* (A03).

6.3 The 'nature of Galápagos'

The 'nature of Galápagos' refers simultaneously to natural environment of the Galápagos (its flora, fauna and landscapes etc) but also carries the weight of a 'moral imperative' (Cronon, 1996 p. 36), i.e. to refer to the nature of Galápagos is in some sense to refer to the way the Galápagos Islands *ought* to be. These two meanings are closely related on Galápagos, and different perspectives on both are apparent in the factors emerging from this study.

The discourse of 'international conservation concern' (Factor A) for example, is characterised by a focus on the historical fact of Galápagos being originally uninhabited (see Chapter 4), which becomes the defining feature of the ideal imagined state of the islands, how the islands

ought to be, and the guiding principle for conservation priorities (statement 14). Although many factor A participants were long term residents of the islands, this principle was still influential in discourses and views expressed. As one participant put it *“Galápagos wasn't meant for human population; Galápagos is one of the few places that was meant not to have any human interference”* (A01). The view is widespread in popular representations of the islands, for example a recent BBC documentary that effectively removed all human history from the islands when it referred to the archipelago as ‘a mysterious prehistoric world’ (BBC documentary, ‘Born of Fire’, 2007).

Galápagos then, for proponents of this discourse, is a quintessential ‘wilderness’, or ‘an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain’ (1964 US National Preservation Act cited by Nash, 2001 p. 5). And in this wilderness, the human population has long been the cause of considerable anxiety. Hence in the 1970s when there were just 2000 residents, a 1972 Science Conference listed as its top conservation research priority ‘human population dynamics and the feasibility of introducing population control methods’ (Simkin, 1972 p. 42). The concept of the Galápagos environment as fundamentally ‘people-free’ is the ordering principle for a widespread environmental ethic that characterizes much of the conservation literature as well as being the driving principle behind many conservation interventions, and the dominant image of the Galápagos as a ‘pristine natural area’ in its presentations in nature documentaries and photographs. Thus despite the permanent presence of people on Galápagos since the 19th century, and widespread alteration of the ‘pristine nature’ of the islands since their discovery, it is still not uncommon to find tourists on Galápagos who are shocked and dismayed to discover that people live on the islands. One such tourist’s response to this realisation was to comment: *“I don’t really understand what the problem is, couldn’t the international community just raise enough money to move everyone back to the mainland?”* (Informal conversation, Puerto Ayora, Dec 2009). Comments made by a visitor to the website of the Galápagos Conservancy Trust reveal similar sentiments:

‘If a population of 120 people [on the island of Floreana] can impact negatively this small island, then we might as well take all them out. The same can be said about the other three islands. I know, it sounds extreme and unfair to the islanders but if we want the Galápagos to be as pristine as when Charles Darwin visited them, then there is no other choice. President Correa could apply his plan to save the Amazon basin in the Galápagos. Have the world pay Ecuador to revert the islands to its natural state

and keep them like that for centuries to come.’²⁸

Reference to ‘*the international community*’ in the former quote, and ‘*the world*’ in the latter resonate with what Elgert (2009) describes as one of the results of the increasing globalization of environmental problems over the past few decades, namely an increasing focus on globalized management responses in which local ‘issues of ownership and control are often viewed as petty, or at least of diminished importance, in light of grand-scale environmental threat’ (p. 380). In this way, Elgert argues, the globalization of environmental discourses legitimates ‘the absconding of power and control over resources by the so-called ‘international community’ – despite that this control may be highly contested in more local fora’ (Elgert, 2010 p. 380).

Within a discourse (A) that adheres to the idea of an ideally people-free Galápagos then, interactions between humans and the environment that are not purely observational and non-consumptive are almost by definition, disruptive and damaging. Thus tourism and scientific research are the only really acceptable activities (although as the preceding discussion of tourism has highlighted, the non-consumptive or non-damaging nature of tourism is also becoming more widely questioned/ questionable). Thus for example there is currently an ongoing debate around the acceptability or otherwise of sports fishing in the Galápagos Marine Reserve which hinges around whether it is ‘consistent with non-extractive appreciation of nature’ which is, according to some, ‘the basis of a national park’ (Merlen, 2007 p. 176).

A corollary of the notion that Galápagos is fundamentally ‘people free’ is the idea that the most appropriate way for people on Galápagos to see themselves in order to act in the most environmentally benign way is as an ‘invasive species’. As Oxford and Watkins put it: ‘[w]e can conserve the Galápagos, but only through the concerted actions of all actors. The first step is, perhaps, to recognize that the most invasive of all the invasive species in the islands is the human’ (Oxford and Watkins, 2009 p. 51). Whether or not seeing one’s self in such negative terms is the basis for a positive transformation of environmental practices might be questionable, but the point is that on a fundamental level, to proponents of this discourse the Galápagos are considered a basically non-human zone into which humans have ‘invaded’, and although human presence is now unavoidable, it is in many ways regrettable, and something

²⁸ Comment lifted from <http://www.Galápagos.org/2008/index.php?id=225> (downloaded 17 Nov 2010). Ironically the speaker is clearly unaware of the fact that at the time of Darwin’s visit there were in fact more inhabitants on the island of Floreana (200 – 300 people) than there are today (~120 people).

to be grudgingly tolerated in as limited a way as possible rather than embraced. Thus the 2002 Biodiversity Vision for Galápagos developed by the Charles Darwin Foundation gathered a group of 'world-class biologists' together who defined an ideal future in which a:

'[S]mall, well educated, healthy human population co-exists with nature, uses resources sparingly and works constantly to control alien species. The people would have their own distinctive way of life, appropriate to ocean islands that evolved in isolation from man and are consequently so vulnerable to human presence. They would accept restrictions and responsibilities and enjoy the full privilege of living in one of the most special natural environments on Earth' (Bensted-Smith, 2002 General Conclusion).

Given that within this discourse people are cast as essentially 'invasive' on Galápagos, it follows that (as would be the case for any other species labelled as invasive) natural population growth is considered a big problem (statement 46). Indeed, at one extreme, it is possible to find people working in the conservation sector in Galápagos who express the view that the human population should be forcibly controlled: for example, one factor A participant joked that: *"we have a spay and neuter programme for the cats and dogs, I think we need to implement it for the human population"* (A01). The political and ethical implications of such a view are stark, and contrast sharply with those of factor C participants (Social welfare and equitable development), as this response to statement 46 reveals:

*"No! Oh please, we need more people in the world, let's not de-populate the planet... We're not going to educate about contraception and tell people that having children is the big problem. Galápagos' problem isn't here, Galápagos' problem is outside, in the big companies, the big decisions the big ministries. Here, is the fact that my neighbour has three kids a problem for Galápagos? No! She should have two more, as long as she's got the ability to educate them and bring them up well... None of this contraception, Forward! Keep populating the world!"** (A30).

Or as another factor C participant puts it: *"If you try to keep the place the same as it is, you end up banging your head against the wall, and walking down and seeing babies playing on the beach and saying 'look at this problem!'"* (A17).

The widespread conservationist preoccupation with population growth as a causal factor of environmental destruction and related social strife has a long history and is by no means limited to Galápagos. Drawing on the writings of early figures such as Thomas Malthus and his 'Essay on the Principle of Population' (1999 [1798]) as well as the work of more recent authors such as Garrett Hardin's 'Tragedy of the commons' (1968) and Paul Erlich's 'The Population Bomb' (Erlich, 1968), the basic issue, (re-stated in various ways and with varying emphases) is that increased population growth will eventually outstrip food production leading to an inevitable disastrous population crash and environmental ruin. In Galápagos these ideas are clearly articulated in conservation texts and popular literature, and in evidence in the views

expressed by factor A participants. For example the following quote from a recent 'coffee-table' book about Galápagos:

'If there is no water, plants will die. If there are no plants the animals that feed on them will die too. In nature populations exist at a certain size because there is a balance between the availability of food and the number of consumers (not forgetting predators). This applies throughout nature and must extend to humans' (Stewart, 2007 p. 163).

This argument appeals to an intuitive logic, and arguably represents an important counterweight to what Dryzek has called the 'promethean' discourse associated with industrialism which adheres to a belief in the possibility of un-ending growth aided by technology and 'the ability of humans and their technologies to overcome any problems – including environmental problems' (Dryzek, 1997 p. 51). However, arguments pointing to population growth as the source of all environmental problems although influential²⁹, have been broadly critiqued from a number of angles. It has been argued for instance, that these discourses far from being the apolitical self-evident truths they claim to be, often have hidden racist (Chock, 1995), sexist (Diamond, 1994, Sandilands, 1999) and authoritarian (Seager, 2000) undertones, as well as being built on unfounded assumptions about both people and nature. Adams for instance, suggests that the lasting popularity of population control ideas (largely in more developed nations) was because these ideas proposed action 'where rates of growth were highest, in developing countries, and hence did not threaten the lives of people in the developed world, or fabric of advanced capitalist countries' (Adams, 2009 p. 134).

Duden (1992) highlights the constructed nature of the term 'population' (rather than referring to people) and the way in which this acts to remove all social and cultural characteristics from the people in question, denying the possibilities for cooperation or other creative solutions to scarcity. Or as Andy Lockhart puts it:

'Aggregates of both human beings and resource stocks are interpreted as statistics to be monitored and controlled by strong, centralised administration. Elites – especially scientists (particularly biologists, demographers and systems modellers) and governments – are given crucial roles as rational and authoritative actors in the narrative' (Lockhart, 2009 p. 22)

The concept of 'carrying capacity' (which has also been influential on Galápagos, see statement 10) whereby people are functionally equated with cattle has been critiqued on similar grounds (e.g. Thompson 1999).

One of the fundamental assumptions of population discourses on Galápagos is the need for a functional separation of 'natural' from 'human' areas, again based on the idea of the ideal

²⁹ See for example the work of the Optimum Population Trust www.optimumpopulation.org

'wilderness' or supposedly 'pristine' state of the islands. In the Galápagos, with 97% of its land area officially designated national park any movement of the national park boundaries is hugely controversial, even if, ultimately this might prove a more environmentally benign use of the land. For example a 1970s symposium on science in Galápagos suggested a need to increase agricultural productivity by employing 'methods for improving yields without increasing the land area utilized and unfavourably affecting the preserved areas' (Simkin, 1972 p. 42). The debate between the relative merits of intensive versus organic, or extensive agriculture are noticeably absent from these discussions revealing a preference for a strict division between human and non-human or more authentically 'natural' areas that continues very much in evidence today. The anthropologist Andrada captured the fascination with the authentically natural when he wrote of what he called the 'test of purity' that all living beings on Galápagos must undergo:

'From the biggest tree to the most insignificant insect, from birds to flowers ... dogs to iguanas, human beings to sea lions. All are classified according to their origin: introduced? Endemic? Native? With these variables a hierarchy of the living is created which stigmatizes the introduced – especially if it is 'a plague' – and legitimizes the indigenous, proclaiming a caste of the chosen: the endemics, and a cohort of companions: the natives' (Andrada et al., 2010 p. 69, Translated from Spanish).

In a case which bears many parallels to the Galápagos context, Joseph Keulartz has critiqued what he refers to as an obsession with the truly autochthonous and authentic apparent within what he has labelled the 'nature development' discourse in the Netherlands, which maintains that only legitimate reference for 'real nature' is an ecological reference of what the areas would have been like in the absence of people. According to Keulartz, 'a social dispute is constantly in danger of being smothered by scientific argumentation, with the result that all positions and considerations not based on ecology are systematically brushed aside' (Keulartz, 1999, p.95). In particular, people who 'advocate or have an interest in functional integration rather than segregation' are disempowered by this discourse (*ibid.* p96).

An alternative view is expressed by one factor C participant, who suggests that the issue is not population per se, but the fact that agriculture and fisheries have not been sufficiently developed in the islands:

"There are just twenty-five thousand people here, some say thirty, okay let's say we're thirty thousand people, it's okay, there's very few of us, we're half a football stadium, we don't eat much fish, we don't eat much rice... we don't eat much. And we bring things from the continent; why? Because we haven't developed agriculture and fisheries, we haven't been able to develop in an environmentally friendly way. And it is possible. We need to believe in the idea that human beings can live in environmentally friendly ways. That is sustainable development" (A30).*

Arguably following this discourse, it is the strict separation between the human and non-human zones that has propelled the current un-sustainable state through limiting the space for the development of sustainable agriculture and fishing practices and increasing reliance on outside connections and imports.

6.3.1 The power of fragility

Another area of difference highlighted by the discourses emerging from this study can be seen in the fragility (or otherwise) ascribed to the Galápagos environment, illustrated by, for example the divergent scores awarded to, and distinct comments made about statement 3 (“Stopping foreign species entering the Galápagos ecosystems needs to a priority of the Galápagos authorities”).

Both Factor A and B consider that exotic species management one of the key conservation challenges of Galápagos, and can be seen to ascribe to a broadly scientific definition of island ecosystems as inherently ‘fragile’ or vulnerable as exemplified by the following definition:

‘Biotas of islands, especially oceanic islands...[a]re relatively impoverished, unsaturated and disharmonic, and they harbor a disproportionately high number of endemic species. This last trait – high endemism - means that island species are crucially important to global biodiversity, while the first three traits are often seen as causing island species and communities to be particularly fragile’ (Simberloff, 2000 p.1).

This scientific definition can be seen to have entered popular discourse on Galápagos, and the notion of the Galápagos being inherently ‘fragile’ is widespread, and has become a powerful device for justifying particular management practices, as well as for raising funds for conservation (see Figure 6.1). On the other hand, factor C appears to ascribe to a somewhat different understanding of the nature of the islands. Thus statement 3 received a neutral response for factor C, and the following comments were made by individuals loading on this factor:

“You can’t change it, it’s nature. There could be nobody here and seeds would carry on arriving as they arrived in the past. It’s not possible, life has to go on” (A30).

“The Galápagos were colonised by invasive species, there’s thousands arriving every day, through the currents and the winds and whatnot... I mean you can’t stop evolution with your mind” (A17).

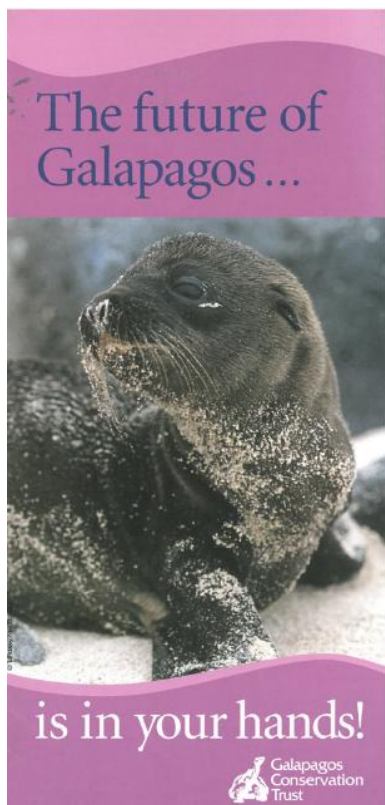


Figure 6.1. The notion of 'fragility' here exemplified by the use of a sea lion pup, is also a powerful tool for generating resources and support for particular types of management activities and policies.

Certain elements of this discourse might appear somewhat exaggerated: for example, according to a study by Porter (1983) rather than 'thousands of species' arriving every day, the 'natural' rate of colonisation by new species in Galápagos is approximately one every 7000 – 12,000 years, leading Snell et al. to estimate that since the discovery of the Galápagos by humans in 1535, the rate of colonisation has been about 10,000 times the 'natural' rate (Snell et al., 2002 p. 39). Nonetheless, these views need to be understood as stemming from more than just ignorance of the facts. Holling (1979) developed a schema to illustrate different kinds of ecosystem dynamics under disturbance, which has subsequently been used as a simple typology to illustrate the ways in which different people understand the vulnerability (or otherwise) of nature to human impacts. Thus Van Asselt and Rotmans (1996) argue that on a basic level people subscribe to particular 'myths of nature', that structure their understanding of the need for particular conservation

interventions. Depending on the particular myth ascribed to, nature is perceived of as being either benign (nature is resilient and disturbances will do little harm), ephemeral (nature is fragile, small disturbances have catastrophic results), perverse/tolerant (nature is tolerant within limits and then retributive) or capricious (nature is basically random and unpredictable, so the results of disturbance cannot be known) (*ibid.* p. 128). Although this is no doubt an oversimplification, the typology is instructive in drawing attention to one of the differences between discourses A and B, which ascribe to an understanding of the nature of Galápagos as ephemeral or fragile, and discourse C, which appears not to. Thus as another discourse C participant says:

"Nature is changing whether we like it or not. And we are going to have to adapt, and nature has to adapt. And nature will easily adapt. If we make a whole system so that nothing comes into Galápagos... if we succeed we will be fragile, in the future we will be very fragile. We need to adapt... It's part of nature" (A30).*

Here the idea that 'nature will easily adapt' is in line with a myth of nature as 'benign' rather than fragile, and it is humans who 'need to adapt' to conditions of constant change that are

'part of nature'. In fact, this discourse goes further to claim that by working to control movement of species humanity *makes* itself and nature 'fragile'. This discourse can be seen to be influenced by elements of the scientific concepts such as adaptation, but have built this concept into a different understanding of nature.

Interestingly beyond the straightforward discourse of a 'fragile Galápagos', comments made by a Factor A participant highlight the ways in which individual understandings of nature are more complex and sometimes contradictory:

"We have volcanic eruptions and they wipe out populations of animals and knock out forests and all the rest of it. But it's extraordinary how, how nature has that regenerative power, absolutely extraordinary. .. So we have those events which are dramatic and violent, and yet it's almost like there's this give and take between the physical and biological worlds they know how to deal with it. But you add in on top of that the technological innovations of man and his invasiveness, and you bring in elements which are very, very tricky to deal with" (A15).

Here then nature is simultaneously powerful, violent and hugely resilient, but at the same time vulnerable to 'man and his invasiveness'.

Clearly the differences outlined just scratch the surface of what is a fundamentally complex area, but they do serve to highlight that developing an understanding how individuals differ in their understandings of nature is a crucial step to understanding different perspectives towards the project of conservation, as well as signalling the fact that particular understandings of nature rather than being universally shared, are in fact culturally specific.

6.4 The 'why and how' of conservation

In his thesis on identities and social conflict on Galápagos, the anthropologist Pablo Ospina suggested that in the period in which he was researching (the latter part of the 1990s) conservationist language had become a 'source of cultural legitimacy' for a broad range of actors in the islands all of whom strived to present themselves as 'defenders of nature' while seeking to cast aspersions on the motives and actions of individuals and groups with whom they were in conflict (Ospina, 2004 p.42). Although there was evidence of this sentiment, for example one respondent who refused to be interviewed due to frustrations at his previous encounters with researchers simply said: *"We [the fishermen] are the real conservationists, we are the ones that look after the marine reserve, not these people with their big pay checks sitting behind their desks...."** (Informal conversation, Puerto Baquerizo Moreno, Nov 2009).

However, there was also evidence of negativity toward the language of conservation itself, expressed primarily by factor C participants. Thus one participant simply said that he didn't 'believe in conservation'* (A30). Another took issue with the word itself, claiming that:

"I don't think the term 'conservation' is one that we can buy into as an operative term. Conservation means 'no change' 'conserve the status quo at all costs' which you simply can't do, you can't do in life... To conserve something means to put it into cryonic deep freeze, you know, to conserve it, to preserve it, to make it so that it simply doesn't change at all" (A17).

Another factor C participant echoed the sentiments expressed by the fisherman quoted above in her view framing the typical conservationist as distant, powerful but hypocritical:

"They are in their comfortable offices in their mansions on the continent, and they just want the people here to look after Galápagos, to do more patrols... they tell the people 'don't touch this, don't touch that'. Ok, so let's see them leave their financial power, and come and conserve Galápagos without having an income, let's see if they could last one day in Galápagos!" (A33).*

Negativity towards the projects and ideas of conservation is complex. While some would argue that resistance to conservation is a straightforward result of 'anger over the restricted use of resources' (Merlen, 2007 p.173) others point out that 'struggles over conservation are not isolated struggles but are part of a wider political landscape and must be considered as such' (Holmes, 2007 p.195), and there is a wide range of social science literature that looks to create a more detailed understanding of conservation conflicts and resistance (e.g. Bryant, 1993, Neumann, 1998, Jacoby, 2003, Anderson and Berglund, 2004, and for analyses of conflict in the Galapagos context see Macdonald, 1997, Oviedo, 1999, Ospina, 2004, Grenier, 2007).

Although during the period of this study (2009/10), open conflict of the sort experienced in the previous decade was not apparent, it is still widely recognised that there appears to be some fundamental disagreements about exactly what it is that conservation is trying to achieve, or as Tapia et al. call it, the 'why, how and what for', of Galápagos Conservation (Tapia et al., 2009a p. 127 translated from the Spanish), and conflict at the discursive level is still very much in evidence as this study has shown.

For example, in outlining her understanding of 'the why' of conservation, in particular the reasons why conservationists needed to concern themselves with social issues, one park official who loaded positively on factor B, argued that: *"If we talk about social problems, why is that? It's not because we want everyone to have a nice life in Galápagos, it's because we want to conserve Galápagos"* (A07).*

From this perspective then, social welfares issues are important only in as far as they will have an impact on conservationist aims, but the motivating drive of conservation is not social welfare per se, but conservation for its own sake. On the other hand, an alternative vision of conservation foregrounds the question of ‘conserve for whom?’, as the following quote from a factor C participant illustrates:

*“Conservation is outdated, it’s not of this time. What does conservation mean? To conserve for conservation’s sake? What gets conserved? A tin of tuna is conserved. The thing, you keep it, you look at it, you have it but you don’t use it. That kind of conservation is no use. Conserve for whom? They told me to conserve for future generations, I am the future generation, my parents already worked, I am the future generation and now they’re coming to tell me that I have to conserve for future generations. And my daughter, she’s 21, now they’re going to tell her that she has to conserve for future generations. And in the meantime what? You can’t visit the beach, you can’t dive, you can’t do anything without them giving you authorisation, permissions”** (A30).

For influential historical figures such as Julian Huxley (the first honorary president of the Charles Darwin Foundation) there was no question about the importance of conservation having a human orientation. For Huxley the original vision of the National Park and conservation on the islands was not ‘merely preservation, but conservation of resources *for present* and future use and enjoyment’ (Huxley cited in Larson p 181, emphasis added). Unlike the contemporary conservationist discourses revealed by this study, there was a strong spiritual dimension to Huxley’s writings about the importance of conservation. Conservation served what he considered a basic and profound human need, namely providing humanity with the experience of being in nature and serving to educate humanity about evolution and what he called ‘evolutionary humanism’ (cf. Chapter 4). Thus contra to the perspective outlined above whereby social concerns are dealt with purely because of their potential to impact negatively on conservation, for Huxley, conservation had a decidedly human orientation, in which use and enjoyment of the protected areas was key. Thus for him, a central part of conservation was about:

‘the preservation of all sources of pure wonder and delight, like fine scenery, wild animals in freedom, or unspoiled nature; the attainment of inner peace and harmony; the feeling of active participation in embracing enduring projects, including the cosmic project of evolution’ (Huxley, *The Humanist Frame*, cited in Larson p181).

6.4.1 Education

In the discourses that emerged from this study, environmental education is considered a key tool for conservation in both discourses A and B, as evidenced by the positive scores for statement 8. Education is likewise a motif that runs throughout the conservation literature on Galápagos. Thus Graham Watkins (former director of the Charles Darwin Foundation between

2005 – 2008) suggests that of all the changes that need to occur in the building of a sustainable Galápagos educational reform is the key, and suggests the need for education that ‘would teach students how to live in the Galápagos by instilling key values, including an understanding of how to live appropriately on islands...’ (Oxford and Watkins, 2009 p. 50). Similarly Godfrey Merlen (veteran Galápagos conservationist) suggests that ‘first and most importantly, an island culture with conservation goals - and conservation pride – needs to be generated,’ and argues that this will be ‘brought about primarily through education and awareness’ (Merlen, 2007 p.175).

While environmental education is popularly regarded as a benign and positive activity, it has also been criticized on a number of fronts, and in the discourses that emerged from this study, the concept was divisive. One critique is that the project is built on, and reinforces stereotypes about the population in need of education. For example, a 2009 National Geographic book about Galápagos by Carol Ann Bassett bears a dedication that reads: ‘To the children of Galápagos. May you teach your parents well.’ This dedication (and indeed the rest of the text) exemplifies a conservationist discourse within which the (adult) population of Galápagos feature as essentially short sighted, greedy and foolish, and therefore in need of education – in this particular case by their own children, but more often by international conservation agencies. Throughout the text, this stereotype of a very limited population is reinforced, thus in a later chapter, Bassett cites Felipe Cruz, a Galápagos-born conservationist employed by the Charles Darwin Foundation, as saying: ‘Let’s be honest about it. Most of the Galapagueños are totally dumb in that regard. They don’t see the problems. They just see greed and want to have more access to business’ (Felipe Cruz cited by Bassett, 2009 p. 85). It is not difficult to imagine that if this is the starting point for the education interventions in international NGOs that there might be some resistance and resentment towards the project. As one factor C participant put it: *“No one can come here to give me consciousness or donate me consciousness”** (A30).

On another level, critics have also argued that environmental education in general could be described as a paradigmatic example of what has been termed ‘environmentality’ (Luke, 1995, Agrawal, 2005, Fletcher, 2010). Drawing on the work of Foucault, Luke for example argues that new ‘disciplinary articulations of “eco-knowledge” might be reinterpreted as efforts to generate systems of “geo-power” over, but also within and through, Nature for the governance of modern economies and societies’ (Luke, 1995 p. 57), and he questions the ‘apparently benign intentions of environmental actions given the disciplinary propensities of

the practices embedded in this new regime of environmentality' (Luke, 1995 p. 58). Environmental education viewed from this perspective can be read as a form of 'subject making' by the state, whereby 'environmental subjects – people who care about the environment' (Agrawal, 2005 p. 162) are produced in line with the 'environmentalizing regime's' conception of 'the right disposition of things (Luke, 1995 p. 69) Within Foucault's original ideas about 'governmentality', disciplinary techniques are used to 'compel individuals to internalize the social values and norms by means of which they will self regulate their behaviour in ways that are consistent with the state's goals vis a vis the overarching population' (*ibid* p. 69). On Galápagos, references such as those quoted above regarding the need for education to instil 'conservation consciousness' or 'key values' in the population seem to resonate with this understanding. However, given the negativity felt by certain sectors towards the project of conservation (and especially if a Foucaultian understanding of environmental education is adopted) it is perhaps unsurprising that environmental education is not welcomed by all. There is thus some evidence of resistance to this process of 'subject making' in the neutral score awarded by factor C to statement 8 about the need for education of the local population. One interviewee (a young man working in a restaurant in Puerto Baquerizo Moreno) commented that *"people all use the same words, like robots: Galápagos, conservation, conservation, conservation, unique, unique, unique, I never want to hear those words again, it's starting to make me feel sick..."* (Informal conversation, Puerto Baquerizo Moreno, Dec 2009).

Furthermore, the subject of exactly who is telling whom, what to conserve, how, and for whom, is also a highly charged issue:

"Don't pretend and confuse people by throwing around bullshit terms: conservation consciousness? No! ... My question is, who the hell is the western world, particularly the United States and England, you know, to come over here and pretend to teach anybody about that? The United States with 6% of the population uses 25% of the world's resources. The US that has paved 25% of its arable land, give me a break!" (A17).

6.4.2 Science for conservation

As outlined in the introduction and in chapter 4, the entwined histories of science and conservation on Galápagos have been hugely influential in the wider history of Galápagos. Although science and conservation have not always gone hand in hand, in contemporary Galápagos society, science is widely felt to be the foundation of sound conservation practice. Thus the Charles Darwin Foundation claims to carry out 'Science for Galápagos', and the Galápagos National Park management plan (2005) stresses that 'science and technology are called to play a key role in the implementation of the Management plan' (p. 254) and that 'the

management objectives of the Management plan are most likely to be successfully met, if based in scientific knowledge...'(p. 254 translated from Spanish). It is thus perhaps unsurprising that in the discourses that emerged from this study, there appeared to be a broad consensus regarding the need for science priorities on Galápagos to be steered by conservation management needs (statement 19). However, participants' comments reveal a range of diverse opinions behind the apparent consensus. One factor A participant expressed qualified agreement with statement 19, but commented that he believed there was a role for science to "*look beyond the horizon*" (A14), suggesting a view that science shouldn't be entirely constrained by management priorities. Another factor A participant distinguished between pure and applied science, arguing that "*pure science in the end will help us with conservation*" (A06). On the other hand, a factor C participant agreed with statement 19, arguing that it was important that scientists give something back to the islands and raising his frustration at previous encounters with researchers who had come to Galápagos, done interviews or collected data, and then never been seen or heard from again. This resentment towards scientists also emerged in the (mildly) positive score awarded by factor C to statement 9 ('Scientists are more interested in publishing papers than in the Galápagos people and environment').

A belief in the need for 'more science' (statement 4) is a distinguishing feature of factor B, and is a sentiment widely expressed in National Park publications (e.g. Tapia et al., 2009c). The corollary of such a reliance on science is a generally more conservative stance, as Bocking explains:

'When societal problems are defined as technical, the view of science as objective and free of particular political values rules out political change as an option, thereby disallowing alternative political visions. Alternative ideas about the relations between humans and other species, or about economic systems, or democracy, are excluded. In effect, science supports a conservative view of society, rejecting all but minor adjustments in the social order' (Bocking, 2004 p. 39).

However, not all the factors were equally enthusiastic about the need for more science. Factor A for example, appeared neutral on this question, as one factor A participant commented:

"Of course I'm going to say yes because that's what I do for a living ... But do they need more people like me, no they don't ... Maybe it will help some, I don't think so. I mean I like doing it [science], I have fun doing it, it's my life, but I don't think it's what they need... I don't think you need so much more sophisticated analysis, technical analysis, I think what you need to do is train the people who are managing better..." (A06).

However, despite the doubts expressed by factor A and C about the need for 'more science' per se, comments regarding other statements were suggestive of a widespread faith in the

ability and necessity of 'objective science' and data to help resolve conflict and steer appropriate management strategies and policies. For example factor C agreed that there had been an irresponsible use of information such as the use of scarce data and approximations by the international community with regard to Galápagos conservation (statement 16), with one participant commenting that "*they bend it [data] to their will*" (A33). The implication being that if the 'facts' were known there would be less conflict.

The widespread idea that more science is fundamental for policy making is based on the idea that the presentation of more scientific data and evidence can help to build consensus about the nature of the problem and possible solutions and therefore indicate the 'best' policy direction. However academic critique suggests that this may not be as self evident a proposition as it might at first appear (cf. Pielke, 2007). For example Collingridge and Reeve (1986) argue that the presentation of additional information can rarely overcome value or interest disputes, but on the contrary it often serves to expand or entrench the debate by continuously expanding the number of technical matters under discussion. Pielke (2007) argues that the idea that more science will necessarily clarify decision making, is underpinned by a linear view of science's relationship to policy, and is built on a fundamentally flawed assumption that 'specific knowledge or facts compel certain policy responses' (p. 13). According to Pielke this view conflates two distinct types of inquiry: questions which can be answered with facts, and questions about what should be done about these facts. The latter are policy questions, and are resolved through political processes of negotiation about desired outcomes, which in turn depend on particular social values rather than science per se. As Yearley puts it, with regard to conservation 'science does not... compel people to conserve particular bits of their environment nor tell them what the conservation priorities are' (Yearley, 1992 p. 527). It is therefore a mistake to conflate a reduction in scientific uncertainty with a reduction in political uncertainty, a vision that has been labelled a technocracy (Jasanoff, 1990) and can result in policy making being approached as a technical exercise with a minimal need for political debate (See e.g. Weingart, 1999). In the majority of cases scientific facts cannot overcome, and may even exacerbate or re-enforce value or interest differences (See e.g. Nelkin, 1979), and indeed, in many cases it is not a lack of scientific data that is the issue for policy makers, so much as dealing with 'information overload' (Perri, 2002 p. 4). Furthermore, aside from the flawed conflation of scientific and political uncertainty supposed by technocratic arguments, as outlined in Chapter 2 (section 2.4.2), the vision of science implied by technocracy is also vulnerable to critique: i.e. the idea of scientific knowledge as an unproblematic source of objectivity and political neutrality, and of the

practice of science as separate from its social or institutional context, has been challenged on a number of fronts since the 1960s (e.g. Barnes and Edge, 1982, Bloor, 1976, Gieryn, 1983, Haraway, 1991, Jasanoff, 1995, Collins et al., 1993, Latour, 1987, Ravetz, 1971).

Fairhead and Leach have argued that highly political struggles for control over the rural world are frequently hidden 'in a technical managerial discourse' (Fairhead and Leach, 2003 p. 15), and it would appear that Factor B's calls to more science, and the deployment of apparently scientific terms such as 'carrying capacity' by factor A acts in a similar way to obscure value judgements and more political elements of the debate.

6.5 Conclusion

Calls for Galápagos to unite around a shared vision of Galápagos as the 'road map to a sustainable future' (PNG, 2005 p. 37, translated from Spanish), echo a global trend highlighted by Peterson toward 'consensus-based approaches to environmental decision making' (Peterson et al., 2005 p. 762). These approaches resonate with decision makers and publics alike because they suggest the possibility of a 'win-win' outcome with which everyone agrees. However the search for a consensus or a 'shared vision' may be misleading and undesirable on a number of levels, and has been the subject of some critique in recent years. Buscher for example, refers to the vocabulary of consensus and win-win solutions in conservation as 'a layer of discursive blur' (Buscher, 2008 p. 230) and argues that the use of this kind of 'anti-political' discourse can itself be considered a political strategy (Buscher, 2010, Ferguson, 1994) which reifies the status quo, acting to maintain existing hierarchies rather than change them, and feeding into the reinforcement of bureaucratic state power. The search for consensus suggests that the reduction of plurality of discourses and opinions around conservation is both possible and desirable, but as Peterson argues,

'we achieve the illusion of objectivity and universal reason only by bracketing or masking conflicts among participating groups and individuals...[hence] the illusion of consensus is fatal to democracy because a healthy democratic process requires recognition of differing interests and the recognition that open conflict about differing interests is legitimate' (Peterson et al., 2005 p. 764).

Rather than downplaying or obscuring the political nature of these debates through recourse to the 'anti-political' language of 'shared visions' and consensus, it is argued therefore that a more deliberative (Dryzek and Niemeyer, 2008) or argumentative (Hoppe, 1999) approach to policy making which shifts the focus away from the search for consensus and is based instead on 'acknowledgment of conflicting views and interests... [in order to] facilitate deliberation and concerted negotiation' (Hirsch et al., 2011 p. 260), is both more democratic and realistic.

It is also arguably likely to lead to better environmental outcomes than if individuals and institutions attempt to carry out conservation interventions built on false assumptions of consensus, as these are likely to be much less able to 'effectively mediate the complex political dynamics they encounter during implementation' (Buscher, 2010 p. 29). In its exploration of the discourses around conservation, this study has contributed to this process, illustrating that conservation on Galápagos is neither a universally understood nor internally consistent project, and unmasking some of the values, political underpinnings and implications of the various views. Although factor C (Social justice and equitable development) is the most overtly political discourse, illustrating the existence of a vein of resistance to some of the ideas and practices of conservation, and questioning the distribution of benefits from the current and historical model of development on the islands (as well as its ecological credentials), the other two discourses are no less political. For example, the factor A's framing of the issue of Galápagos' conservation in terms of the global importance of the islands, acts to legitimate the absconding of power and control over resources to the so-called 'international community', a tendency underscored by its emphasis on the role of global institutions such as UNESCO. Similarly this discourse's vision of the islands as uninhabited, and its related preoccupation with population growth as one of the central elements of the crisis narrative acts to conceal a particular political vision of the islands in which centralised control of the population is key. Factor B's calls for more science to steer conservation policy, is similarly suggestive of a de-politicized vision of conservation and sustainable development. Within this discourse, science is seen as the key to objective, apolitical decision making and the designing of 'appropriate management strategies' for tourism.

Science and the language of science emerged from this study as some of the key means by which a de-politicization of the discourses of conservation occurs. However the results also highlight that science itself is not a universally understood, homogenous project in Galápagos, and a range of views about the science and the role of the scientist on Galápagos were hinted at by the results. Despite the fact that 'more science' is highlighted by at least one of the discourses revealed, as being key to conservation, insights from political ecology and policy sciences suggest that it is unlikely that the straightforward application of 'more and better research could improve the outcomes of policy... without more fundamental changes in the relationship between research and ... policy making' (Leach and Mearns, 1996b p. 28). The next chapter will explore this relationship in more detail by examining different understandings of the role of science in Galápagos conservation.

Chapter 7. A Q study of the discourses of science in conservation

Chapter Outline

In fulfilment of objective 3 of this thesis, the focus of investigation is now narrowed down to examine the discourses about the role of science in conservation currently held by conservation practitioners and scientists working on the Galápagos Islands. The results of a Q study carried out between June and July 2010 are presented, and the discourses are described with reference to the comments made by participants during the sorting process. Four statistically different discourses emerged from the analysis, and have been labelled: Factor 1: Science for conservation management; Factor 2: Freedom of Science; Factor 3; Limits of Science; and Factor 4: Separation of Science and Conservation.

7.1 Introduction

Within the complex and contested discursive landscape of conservation on Galápagos which was revealed by the previous Q study, there have been calls for more science, in particular more ‘applied science’ and interdisciplinary work linking natural and social sciences in order to deal with the ‘crisis’. Thus a National Park publication argues that despite the fact that Galápagos is arguably one of the most studied places on the planet:

‘there is still an enormous scarcity of information about particular ecological and socio-cultural processes, knowledge of which is essential for informed decision making about management, and in order to develop the policies that Galápagos needs in order to attain sustainability’ (Tapia et al., 2009b p. 136 translated from Spanish).

The previous chapter highlighted some of the ways in which the language of science can mask the political nature of conservation discourses, and how calls to more science for policy making, may be based on unfounded assumptions about the objectivity and political neutrality of science, and unrealistic linear conceptions of the relationship between science and policy. This chapter now explores the issue of science in conservation in more detail, focussing the analysis in on the ‘science and conservation community’ (i.e. the people generating and using scientific knowledge on the islands) in order to ask how different members of this community understand the role of science in Galápagos conservation, and exploring the political and

material implications of these different discourses. While the participant group of the previous study encompassed the full range of Galápagos stakeholders, in order to explore the science/conservation interface in more detail this chapter focuses in upon the 'conservation community' as these

'experts... tend to enjoy privileged access to the political system, where they shape both policies and their implementation, framing definitions of what is and is not feasible, guiding the flow of information to senior bureaucrats and elected officials, shaping support for certain policies and denying support to others' (Bocking, 2004 p. 22)

Given their status as 'experts in conservation', the different discourses that these people adhere to are thus likely to be particularly influential, and it is arguably all the more important to examine the values and assumptions underpinning their views, and explore the political implications of these.

In addition to enabling a more detailed exploration of science in conservation, focusing the analysis within the 'conservation community' answers calls for studies which deconstruct the idea that conservation is a universally understood practice with identical practitioners (Redford, 2011), instead illustrating and critically analysing the diversity within this heterogeneous group.

7.2 Data collection

As for the previous study, the data collection and analysis for this study followed the generic phases outlined in section 3.3.1, starting with the initial construction of the concourse:

Concourse development

The concourse of this study was defined as '*opinion relating the role of science and scientists in Galápagos conservation*'. As in the previous study, a semi-naturalistic approach to concourse development was adopted, whereby opinion statements were gathered from a combination of document review and semi-structured interviews with scientists and conservation managers carried out on Santa Cruz Island in April 2010. Opinion statements from a number of the comments recorded during the first Q study also contributed to the sample. Secondary sources included academic literature, proceedings of events held by conservation and scientific organisations and clippings from the local and international press.

Development of the Q sample

The concourse was analysed for themes and categories that might aid the refinement into a Q sample, and the following five broad (somewhat overlapping) categories were discerned: 1.

Types of science and disciplinary differences (statements concerning what kinds of science are most useful and necessary on Galápagos, perceptions of disciplinary differences and barriers to collaboration, different disciplinary framings of Galápagos etc); 2. The relationship of science to policy (statements concerning what is, and what should be the relationship of science to policy); 3. The role of science in conservation management (statements concerning science and conservation management); 4. Science and the local community (statements concerning scientists in the social context of Galápagos), and the motivations of scientists (statements concerning the personal motivations and values held by scientists). These broad categories were then used as a guide to facilitate a balanced selection of statements from the concourse and try to ensure that the full diversity of the concourse was captured in the Q sample.

Table 7.1. Categories used to facilitate a balanced selection of statements from the Science Q concourse

Category	Number of statements in the final Q sample
Types of science and disciplinary differences	6
The relationship of science to policy	8
The role of science in conservation management	7
Science and the local community	6
The motivations of scientists	7
Total:	34

The Q sample was piloted with 3 participants in order to ensure the clarity of the statements and the translations. The final Q sample consisted of 34 statements³⁰. For a full list of statements see Table 7.4.

Selection of participants

Given that the primary interest of this study was to explore some of the internal tensions and differences within the conservation and science sectors on Galápagos, the participants selected for this study were all directly involved either in carrying out scientific investigation or conservation management on Galápagos. The participants were selected based on an understanding of the sectors developed through the previous three months of fieldwork, and as was the case in the selection of participants for the first Q study, the ‘snowballing’ approach of asking participants to identify potential recruits with opinions different from their own, was

³⁰ The Q sample for this study was significantly reduced from the 52 statements that made up the Q sample of the first study. A reduction in the number of statements in the Q sample was felt to be desirable due to participant feedback and researcher observation of participants during the sorting process, which suggested that sorting more than 30 – 40 statements was very taxing on the patience and concentration of the majority of participants.

also used. In total 27 individuals completed Q sorts on the islands of Santa Cruz and San Cristobal between June and July 2010. Twenty three participants carried out the sort in person, while in four cases, individuals were unable to complete Q sorts in person for logistical reasons. In these cases participants were sent a pack of cards and a distribution chart and a sheet upon which to write any comments, and returned their results by post or email. The sorts of these participants have been distinguished in Table 7.5 by the letter (P). Four individuals who were particularly influential in both conservation and science on the islands participated in both the first and the second Q study and these are distinguished by participant codes starting with the letter A. In total, fourteen of the participants were Ecuadorian nationals, of whom seven were born on Galápagos, and seven were born on the continent. The remaining thirteen participants were international visitors or long-term residents of the islands. The institutional affiliations of the participants are listed in Table 7.2 (note that the higher number of participants from the Charles Darwin Foundation is explained by the fact that the Foundation is the oldest and most significant organisation carrying out science on the islands, and continues to facilitate the scientific work of a large number of international visiting scientists, all of whom have been subsumed within this institutional affiliation).

Table 7.2 Institutional affiliations of the participants

Institution	Type of Institution	Number of participants
Galápagos National Park	National Park Authority	5
Charles Darwin Foundation	International Science and conservation NGO	10
FUNDAR Galápagos	Local conservation NGO	1
Conservation International	International Conservation NGO	1
Universidad of San Francisco de Quito	University	2
Universidad Andina Simón Bolívar	University	1
Pontificia Universidad Católica del Ecuador	University	1
Motu Economic and Public Policy research (New Zealand)	Non-profit research institute	1
University of Missouri –St. Louis (USA)	University	1
IMEDEA (Instituto Mediterráneo para estudios avanzados, Spain)	Non-profit research institute	1
No institutional affiliation	-	2
	Total:	27

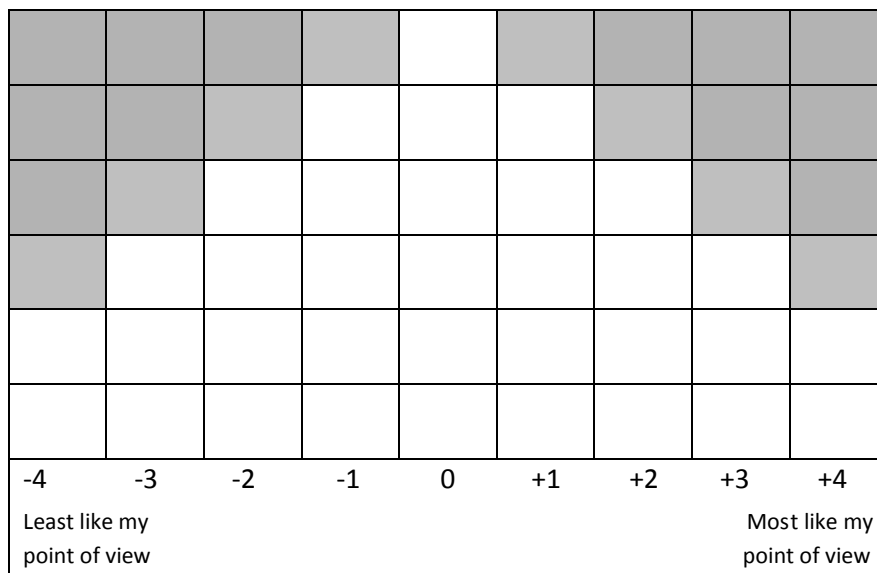
Completion of the Q sorts

The participants in this study were for the most part professionals with a high level of formal education and familiarity with a range of research instruments. Thus it was decided that a quasi-normal distribution (See Figure 7.1) would be used in this study. It has been argued that although the distribution shape has a negligible effect on the statistical outcome, the imposition of a forced distribution can encourage participants to engage more thoughtfully with the sorting process, and thus reveal their preferences more clearly (Webler et al., 2009, Brown, 2008). The study was explained to participants verbally and in writing, participant anonymity was assured, and their consent for the recording of comments was obtained (the information provided to participants and the instructions for carrying out the Q sort are reproduced in Appendix III).

Participants were given the following sorting instruction:

“Please place one statement card in each of the white squares on the chart according to how like or unlike your point of view they are, with +4 being most like your point of view and -4 being least like your point of view.”

Figure 7.1. The distribution onto which participants were asked to sort the statements (one statement card was to be placed in each of the white squares).



Statistical analysis

The resulting 27 sorts were factor analysed using PQmethod 2.11 (Schmolck, 2002). Principal Components Analysis was carried out on the 27 x 27 matrix of statement responses, and the resulting factors were rotated using a varimax rotation that aimed to find the simplest

structure in the data that explained the greatest amount of variance, and to rotate the factors such that each individual tended to be associated with just one factor. Sorts loading at ± 0.44 on a given factor were considered significant at the $p < 0.01$ level. This was based on the equation: $2.58 (1/\sqrt{n})$ where n = the number of statements in the Q sample: $2.58(1/\sqrt{34}) = 0.44$. For statistical details see Brown (1980 p. 283).

As for the previous study, a solution was sought that would maximise the variance explained and the number of participants loading on just one factor, minimize the confounders (participants loading on more than one factor) or non-loaders (participants not loading on any factor), and ensure that each factor contained at least 2 sorts that loaded on that factor alone (Watts and Stenner, 2005a p. 81). Based on these criteria, a 4 factor solution was felt to be optimum. See Table 7.3 for a comparison of the different factor solutions.

Table 7.3. Comparison of different factor solutions (2)

No. of factors rotated	% variance explained	Participants loading on just one factor (+/- 0.44)	Confounders (participants loading on more than one factor)	Non-loaders (participants not loading on any factor)	Minimum no. of participants loading uniquely on each factor
2	43	22	2	0	6
3	53	24	3	0	6
4	59	23	4	0	4
5	64	19	8	0	1
6	70	18	9	0	1

7.3 Presentation of results

The four factors were interpreted with reference to the idealised sorts generated by PQMethod, which gives each statement in the original Q sample a score along the original scale (-4 to +4), illustrating the way an individual loading 100% on the hypothetical/idealised factors or discourses would sort the statements (see Table 7.4). Comments made by participants who loaded significantly on each factor were used to aid the interpretation. Table 7.5 lists the 27 participants (including their interviewee codes, professional self-identification, and birthplaces), and shows the degree to which each participant's sort is correlated with each of the generalised factors. The correlation between the factors, the percentage variance explained by each factor and number of sorts loading on each factor alone at $p < 0.01$ are given in Table 7.6.

Table 7.4. Statements that made up the Science Q sample with idealized scores for each factor

Statement	Ideal factor score			
	1	2	3	4
1. A disciplinary approach to science focusing only on the threatened and endangered species and problems with the natural ecosystems of Galápagos is no longer appropriate on Galápagos.	0	-1	4	3
2. The solution to many of Galápagos' problems lie in the application of scientific investigation.	2	2	0	-1
3. Getting involved in politics threatens the reputation and legitimacy of scientists as providers of objective facts - scientists on Galápagos should focus on providing facts about the archipelago and leave the advocacy work to campaigning organisations like Sea Shepherd.	0	-1	-2	2
4. It doesn't matter who does the science as long as what's being done is high quality and useful to conservation.	4	3	0	4
5. We (scientists) need to be working out ways of building an island culture of conservation on Galápagos.	2	0	0	-2
6. People are the worst invasive species in Galápagos.	1	2	-3	0
7. We already know what the problems are - we don't need to do any more science, what's lacking is the political will to make changes.	-2	-3	2	-1
8. Ecosystems and societies should be conceptualised and managed as a single, integrated unit, a socio-ecological system.	2	0	-2	2
9. Despite the large amount of research that has been carried out on Galápagos, there are still big gaps in some areas of basic biology and ecology, and it is crucial that scientists continue to work to fill these gaps.	3	4	0	2
10. More social science would be useful on Galápagos but only as long as it helps to provide practical knowledge and suggestions to deal with particular problems.	1	1	0	0
11. Research priorities of science on Galápagos should be beyond the research interests of individuals or institutions and favour investigations that are directed to solving the most urgent management and conservation problems.	3	-1	1	1
12. My primary motivation for doing science here is that there are things here that you can't study anywhere else.	0	0	-1	-2
13. The scientists need to do their work, they aren't the Department of Social Services, there are other institutions whose role it is to take care of the community.	-1	1	-1	2
14. Science to me is a little bit like art, and in order to be a good scientist you need to be creative. People will only be creative if they have a certain liberty to do what they enjoy and what they want.	0	4	2	1
15. I think we scientists should voice our opinions, take an active interest and play a political role in steering conservation policy.	1	-1	2	-2

Statement	1	2	3	4
16. One of the main weaknesses of a lot of the science that's being carried out here is that it's not communicated to decision makers and managers.	1	0	3	4
17. I don't like the distinction between pure and applied science. I actually think there are only two types of science, good science and bad science, and all good science can be transferred to the decision makers if it's put in the right context.	-1	3	3	-1
18. Trying to play the roles of scientist and conservationist at the same time is a contradiction.	-3	-2	-2	1
19. Conservation management and scientific research really are different tasks, and trying to carry out both together is not possible.	-4	-2	-1	-4
20. The Darwin Foundation needs to become a social development organisation, otherwise it will become irrelevant.	-3	-4	-3	-4
21. The practice of science here should be geared towards improving life for the people who live here.	-1	-4	1	0
22. I don't think the Ecuadorian government should be spending money on pure research in Galápagos.	-4	-3	-1	-2
23. The park needs to have control over the science that is carried out on Galápagos.	3	-2	-1	-3
24. At the end of the day, the opinions of the owners of the big tour companies count much more to the Ecuadorian government than those of a scientist or even a scientific institution.	0	2	4	3
25. Developing collaborations with international experts in conservation science is vital to building a sustainable Galápagos.	2	2	1	3
26. Different elements of the Galápagos human-ecosystem can be quantified in terms of capital: natural capital, socio-economic capital, cultural capital Etc. Their flows and interactions can thus be modelled in order to provide integrated information decision makers, and to steer research priorities.	1	1	-3	1
27. Researchers play an important role in Galápagos: they have the responsibility not only to practice what they preach but also to provide integrated and complete information to decision makers.	4	3	3	1
28. The idea that scientific data is the basis for policy making is simply not true.	-3	0	1	0
29. "Ecologism" is the new colonialism of the 21st century.	-1	-2	-2	-3
30. These islands are too important to be left in the hands of Ecuador alone: external NGOs, scientists and the international community have to assume some responsibility.	0	1	1	0
31. One of the main reasons that I work here is just because it's Galápagos, and I think that plays a large role in why many scientists are here.	-2	1	0	-1
32. It is the role of the scientists to find ways of reducing the loss of diversity (be it biological or cultural) or to encourage the creation of new diversity.	-1	0	2	-1
33. Science shouldn't be driven by gringos coming down and telling the Ecuadorians what to do.	-2	-1	-4	0
34. Really, I'm quite oblivious to the political issues, I just want to focus on my scientific work.	-2	-3	-4	-3

Table 7.5. Participant list and degree of correlation with each factor

Interviewee codes and professional/ disciplinary self identification of participants	Birthplace (Galápagos/ Ecuadorian mainland/ elsewhere)	Degree of correlation with each factor			
		1	2	3	4
Factor 1					
B11. Ecologist (INGO)	Mainland	0.5655*	0.3512	0.0429	0.1594
B05. GNP biologist	Mainland	0.6914*	0.1878	0.2112	-0.1313
B04. GNP conservation manager	Mainland	0.8526*	0.1551	-0.0063	0.0139
B19. Botanist (INGO)	Mainland	0.5757*	0.3117	0.0256	0.0828
B13. GNP biologist	Galápagos	0.5448*	0.2619	-0.1676	0.1335
A31. GNP conservation manager	Galápagos	0.7633*	0.1736	0.0686	0.3525
B23. GNP ecologist	Galápagos	0.7779*	-0.0505	0.1888	0.3050
A19. Conservation professional (INGO)	Galápagos	0.6916*	-0.1010	0.1037	0.0284
B22. Visiting scientist (biology)	Elsewhere	0.4903*	0.3521	0.2763	0.3858
Factor 2					
B07. Ecologist (INGO)	Galápagos	0.0773	0.6899*	-0.3822	0.1313
B17. Visiting scientist (geology) (independent)	Elsewhere	0.0844	0.5303*	0.0994	0.1265
B16. Ecologist (INGO)	Elsewhere	0.0712	0.8045*	0.1135	0.2513
A06. Visiting scientist (social science), Ecuadorian University	Mainland	0.0989	0.5791*	0.3278	0.0716
B02. Visiting scientist (ecology), Ecuadorian university	Galápagos	0.2883	0.7221*	0.2638	-0.2383
B21. Visiting scientist (ecology), international university (P)	Elsewhere	0.1316	0.6976*	-0.1462	0.2031
Factor 3					
A03. Social scientist (INGO)	Elsewhere	0.0145	0.0908	0.7749*	0.1555
B06. Social scientist (INGO)	Elsewhere	0.1397	0.0587	0.7464*	-0.0813
B18. Visiting scientist (social science), Ecuadorian university (P)	Mainland	0.3431	0.1164	0.6032*	0.1440
B20. Visiting scientist (social sciences), international university	Elsewhere	-0.1597	0.0152	0.7589*	0.3641
Factor 4					
B15. Ecologist (INGO)	Elsewhere	0.0290	0.3652	0.2376	0.5178*
B10. Conservation professional (INGO) (P)	Elsewhere	0.3255	0.0590	0.3544	0.4977*
B14. Visiting scientist (ecology), international university	Elsewhere	0.0965	0.0028	0.2891	0.6385*
B03. Conservation professional (local NGO)	Galápagos	0.1366	0.3990	-0.0904	0.6966*
Participants loading on more than one factor					
B09. Ecologist (INGO)	Elsewhere	0.4994*	0.6690*	0.1589	-0.0008
B01. Biologist (INGO)	Elsewhere	0.3374	0.5503*	0.5196*	0.2704
B08. Conservation professional (INGO)	Mainland	0.5537*	0.0561	0.0521	0.5702*
B12. Visiting scientist (biology) international university (P)	Elsewhere	0.6073*	0.4945*	0.2082	-0.2230

* indicates that a sort loads significantly at the $p < 0.01$ level. (P) indicates a participant who carried out a postal Q sort.

7.4 Interpretation of the factor narratives

The four discourses that emerged from the analysis have been labelled: Factor 1: Science for conservation management; Factor 2: Freedom of Science; Factor 3; Limits of Science; and Factor 4: Separation of Science and Conservation. In the narrative descriptions of the factors that follow, the numbers in square brackets refer to the number of the statement on which the analysis is based, while the score assigned to that statement by each of the four factors is given in brackets following the statement (for a full list of statements and scores see Table 7.4). In line with previous chapters, quotes in italics are comments from participants who loaded significantly on a given factor and their interviewee codes are given in brackets following the quote. Those marked with an asterisk (*) have been translated from Spanish. As was the case for chapter 5, the purpose of this chapter is to describe the different discourses from within their own subjective frames of meaning, there will thus be no attempt here at critique.

Table 7.6. Factor correlations, % variance explained and the number of participants that loaded on each factor alone

	Factor correlations				% variance explained	Number of sorts loading on this factor alone
	1	2	3	4		
1	1.00	0.53	0.27	0.52	20	9
2		1.00	0.32	0.46	17	6
3			1.00	0.40	12	4
4				1.00	10	4

7.4.1 Factor 1: Science for conservation management

Nine individuals loaded on this factor alone, and it explains 20% of the study variance (see Table 7.6). Eight of these individuals were Galápagos residents, of whom four were born in the archipelago and four were born on the Ecuadorian mainland but had moved to the archipelago at some point in their lives. Five individuals were associated with the Galápagos National Park, and three with international scientific and conservation institutions. One individual was a visiting biologist from an Ecuadorian University.

One of the central features of this factor is a belief that research priorities on Galápagos should be clearly tied to conservation management needs:

[11] Research priorities of science on Galápagos should be beyond the research interests of individuals or institutions and favour investigations that are directed to solving the most urgent management and conservation problems. (+3, -1, +1, +1)

As one participant put it: *“that’s what the park needs”** (A31), another commented: *“Take away the interests of the scientists... Some scientists are just interested in publishing”** (B11). This viewpoint is optimistic about the contribution of appropriate science to the development of conservation policies:

[28] The idea that scientific data is the basis for policy making is simply not true (-3, 0, +1, 0)

And from this point of view, as long as the science is ‘high quality and useful’ it is unimportant who carries it out:

[4] It doesn't matter who does the science as long as what's being done is high quality and useful to conservation. (+4, +3, 0, +4)

Proponents of this view believe however, that in order to ensure it meets the needs of conservation management, science needs to be closely controlled by an institution such as the National Park:

[23] The park needs to have control over the science that is carried out on Galápagos. (+3, -1, -2, -3).

Despite the focus on the practical applications of science in policy and management, this discourse maintains that there is still a need for more science of all types on Galápagos:

[9] Despite the large amount of research that has been carried out on Galápagos, there are still big gaps in some areas of basic biology and ecology, and it is crucial that scientists continue to work to fill these gaps. (+3, +4, 0, +2)

As one participant put it: *“you are never going to finish investigating a place, new things come up all the time”** (A19).

[10] More social science would be useful on Galápagos but only as long as it helps to provide practical knowledge and suggestions to deal with particular problems. (+1, +1, 0, 0)

[22] I don't think the Ecuadorian government should be spending money on pure research in Galápagos. (-4, -3, -1, -2)

In the words of a participant: *“applied science is urgent, but basic science is also necessary, at some point it will be useful”** (B05). From this point of view, conservation management and scientific research are considered similar tasks and should be carried out together:

[18] Trying to play the roles of scientist and conservationist at the same time is a contradiction. (-3, -2, -2, +1)

[19] Conservation management and scientific research really are different tasks, and trying to carry out both together is not possible. (-4, -2, -1, -4)

One participant commented on statement [19]: *“I think that’s nonsense...they should be carried out together, they should be complementing each other really. You should do the research to do the management”* (B19).

For proponents of this viewpoint Galápagos is conceived of as an ‘integrated socio-ecological system’:

[8] Ecosystems and societies should be conceptualised and managed as a single, integrated unit, a socio-ecological system. (+2, 0, -2, -1)

One participant referred to the socio-ecological system concept as being about the *“ecology of humans”* (B22). In line with this understanding, the responsibilities of science and scientists are understood in a broad way, encompassing such activities as ‘building culture’:

[5] We (scientists) need to be working out ways of building an island culture of conservation on Galápagos. (+2, 0, 0 -2)

One participant commented that *“of course that’s part of our role too”** (A19), while another qualified his response by suggesting that it was true but mainly *“for social scientists”** (B23).

With regard to the involvement of scientists in politics, this discourse was ambivalent, hence the zero score awarded to statement [3]:

[3] Getting involved in politics threatens the reputation and legitimacy of scientists as providers of objective facts - scientists on Galápagos should focus on providing facts about the archipelago and leave the advocacy work to campaigning organisations like Sea Shepherd. (0, -1, -2, +2)

One participant suggested that any potential loss of legitimacy would be to do with an individual’s failing rather than a broader issue to do with science as an enterprise, commenting

that: *“basically the scientists fault if they do that. If they provide objective facts then I think it’s fair to get involved in politics”* (A19). The notion of the scientist as the provider of ‘objective facts’ was evident again in the comments made by another participant who argued that:

*“independence is the key tool, it’s the key that opens doors, because you go in with facts... but you need to be aligned with politics, not in the sense of being left wing or right wing, but because the facts tell you, if we don’t do this, if we don’t pass law X, they we aren’t going to save this species”** (B11).

7.4.2 Factor 2: Freedom of science

Six individuals loaded on this factor alone, and it explains 17% of the study variance. Three individuals were international visiting scientists (two ecologists, one geologist) working with or through international science and conservation institutions. One individual was a visiting social scientist (anthropology) from an Ecuadorian University, two were Galápagos residents (born in the archipelago) of whom, one was a conservation manager for an international conservation organization and one was a biologist affiliated to an Ecuadorian University.

Within this discourse freedom and creativity are held to be important parts of the scientific enterprise:

[14] Science to me is a little bit like art, and in order to be a good scientist you need to be creative. People will only be creative if they have a certain liberty to do what they enjoy and what they want. (0, +4, +2, +1)

The distinction between pure and applied science is felt to be unhelpful:

[17] I don’t like the distinction between pure and applied science. I actually think there are only two types of science, good science and bad science, and all good science can be transferred to the decision makers if it’s put in the right context. (-1, +3, +3, -1)

As one participant commented: *“you never know when pure science becomes applied, most of the great findings start usually with pure science, and then you find out, wow this is going to help me with doing something”* (B02).

In contrast to the other three discourses (and in line with this factor’s belief in the importance of freedom for science) proponents of this view are in mild disagreement with the idea that:

[11] Research priorities of science on Galápagos should be beyond the research interests of individuals or institutions and favour investigations that are directed to solving the most urgent management and conservation problems. (+3, -1, +1, +1)

Thus several participants who loaded on this factor commented that if science had been constrained by management priorities in 1835, “*Charles Darwin wouldn’t have done the work he did*” (B07). This view is also in mild disagreement with statement [1]:

[1] A disciplinary approach to science focusing only on the threatened and endangered species and problems with the natural ecosystems of Galápagos is no longer appropriate on Galápagos. (0, -1, +4, +3)

According to one participant, this kind of science “*will continue to be appropriate on Galápagos.*” * Another participant commented:

“This is a statement that people always make, they blame the [Charles Darwin] Foundation for it I guess, that we have been too much focused on threatened species, but I mean in a way that’s our role, that’s what scientists do... if you do conservation science then you want to figure out what is a threat and why are species endangered. So that’s what we should do better in order to provide the facts” (B16).

Indeed, another defining feature of this discourse is the belief in the need for more ‘basic’ research:

[9] Despite the large amount of research that has been carried out on Galápagos, there are still big gaps in some areas of basic biology and ecology, and it is crucial that scientists continue to work to fill these gaps. (+3, +4, 0, +2)

And ‘more science’ in general, as evidenced by the disagreement with the statement:

[7] We already know what the problems are, we don’t need to do any more science, what’s lacking the political will to make changes. (-2, -3, +2, -1)

One participant highlighted the existence of outstanding ‘scientific questions’ as opposed to management problems:

“we know what the main problems for management are, but still there are scientific questions and challenges for scientists that are unresolved...evolution of certain species and community organisation...etc ... questions that are important for science but not so much for immediate management” (B07).

Scientists from this viewpoint are ideally providers of facts and therefore this point of view is more cautious about scientists ‘voicing opinions’ on conservation issues:

[15] I think we scientists should voice our opinions, take an active interest and play a political role in steering conservation policy. (+1, -1, +2, -2)

In the words of a participant, *“When scientists start to give opinions it’s total chaos...and trying to produce conservation policies, even worse!”** (B07). Similarly it is not the role of science or scientists to be working explicitly for the social welfare of Galápagos’ residents:

[21] The practice of science here should be geared towards improving life for the people who live here. (-1, -4, +1, 0)

One participant commented that *“perhaps some”* scientists should be concerned with that, but *“for example I don’t think that Peter Grant [a well-known evolutionary biologist] should be worried about the wellbeing of the people here. He’s doing studies about evolution and that’s all he cares about, that’s fine, we need people like that”* (A06).

This view is neutral or perhaps unfamiliar with the idea that:

[8] Ecosystems and societies should be conceptualised and managed as a single, integrated unit, a socio-ecological system. (+2, 0, -2, +2)

As one participant put it *“I don’t understand what they mean by ‘socio-ecological system’, show me a socio-ecological system, I don’t know, does it exist?”* (B07). Or in the words of another *“I don’t think so, I think they should be kept separate”* (B16). In fact for this factor, far from being considered as integrated in the ecosystem, to a degree:

[6] People are the worst invasive species in Galápagos. (+1, +2, -3, 0)

As one commented: *“you could say that about people on the planet, we are the most destructive thing on the planet, nobody can discuss that”* (A06).

7.4.3 Factor 3: Limitations of science

Four individuals loaded on this factor alone, and it explains 12% of the study variance. Three of the individuals were visiting international social scientists, two geographers affiliated with an international conservation institution, one anthropologist associated with an international university. The fourth individual was a visiting Ecuadorian anthropologist associated with an Ecuadorian University.

This factor can be distinguished by its belief in the more limited role for science in policy for conservation. Thus for example within this discourse it is maintained that:

[24] At the end of the day, the opinions of the owners of the big tour companies count much more to the Ecuadorian government than those of a scientist or even a scientific institution. (0, +2, +4, +3)

Similarly this factor is in mild agreement with the statement:

[28] The idea that scientific data is the basis for policy making simply isn't true. (-3, 0, +1, 0)

As one participant (a geographer) commented: "*I'm always telling the biologists that... the idea that you're going to have any influence over conservation policies just with biological data seems to me completely erroneous*"*(A03). The same participant went on:

*"it's much more complex than they think (and when I say they, I mean my colleagues in the natural sciences)... they think that, ok it's about flows or maybe numbers in the arrow, and more models, and with this we're going to convince the mayor to resolve the problem... No! It's not so simple"** (A03).

According to this view it is not science that is lacking, but the political will to make the necessary changes, thus more science on Galápagos is not really considered necessary:

[7] We already know what the problems are - we don't need to do any more science, what's lacking is the political will to make changes. (-2, -3, +2, -1)

[9] Despite the large amount of research that has been carried out on Galápagos, there are still big gaps in some areas of basic biology and ecology, and it is crucial that scientists continue to work to fill these gaps. (+3, +4, 0, +2)

In line with the view that more 'basic biology and ecology' are not necessary, this factor is in agreement that:

[1] A disciplinary approach to science focusing only on the threatened and endangered species and problems with the natural ecosystems is no longer appropriate on Galápagos. (0, -1, +4, +3)

With one participant commenting that "*it never was*"* (B06).

The distinction between 'pure' and 'applied' science is felt to be false:

[17] I don't like the distinction between pure and applied science. I actually think there are only two types of science, good science and bad science, and all good science can be transferred to the decision makers if it's put in the right context, (-1, +3, +3, -1)

However, this factor agrees with the statement that:

[32] It is the role of the scientists to find ways of reducing the loss of diversity (be it biological or cultural) or to encourage the creation of new diversity. (-1, 0, +2, -1)

From this point of view:

[21] The practice of science here should be geared towards improving life for the people who live here. (-1, -4, +1, 0)

One participant qualified that all science should be *“at the service of humanity, of its wellbeing, the development of its greatest potential”** (B18). This factor is also defined by its opposition to certain concepts, including: the quantification of different elements of Galápagos in terms of capital:

[26] Different elements of the Galápagos human-ecosystem can be quantified in terms of capital: natural capital, socio-economic capital, cultural capital Etc. Their flows and interactions can thus be modelled in order to provide integrated information to managers and decision makers, and to steer research priorities. (+1, +1, -3, +1)

As one participant commented: *“it’s intellectually satisfying, these models with arrows and numbers ... but where are the power relations? Where are the lifestyles?”** (A03).

Neither, according to this discourse, is Galápagos a ‘socio-ecological system’:

[8] Ecosystems and societies should be conceptualised and managed as a single, integrated unit, a socio-ecological system. (+2, 0, -2, -1)

In the words of one participant: *“societies are not embedded in nature, not explainable nor managed by natural laws”* (A03)

Similarly this discourse disagrees with the idea that:

[6] People are the worst invasive species in Galápagos. (+1, +2, -3, 0)

According to one participant: *“that has a lot of implications on how you perceive people and our role on the planet and I don’t agree with those implications”* (B20).

7.4.4 Factor 4: Separation of science and conservation

Four individuals loaded on this factor alone, and it explains 10% of the study variance. Three of the individuals were international visiting scientists (biology), two associated with an international science and conservation institution, one independent. The fourth individual was a Galápagos resident associated with a local conservation foundation.

One of the distinguishing features of this discourse can be seen to be a belief in the need for a clear boundary between 'science' and 'conservation'. Thus unlike the other three discourses, this view expresses agreement (albeit mildly) with the statement:

[18] Trying to play the roles of scientist and conservationist at the same time is a contradiction. (-3, -2, -2, +1)

As one participant put it, "*I'm not a conservationist, I'm a scientist...a pragmatist. I have to be that way otherwise it just gets too confusing my role in life*" (B15). From this point of view, the role of a conservationist is understood as "*more activist maybe...more political*" (B03), which is considered different from that of a scientist as a provider of 'objective facts'. Thus this discourse disagrees with statement [15]:

[15] I think we scientists should voice our opinions, take an active interest and play a political role in steering conservation policy. (+1, -1, +2, -2)

According to this viewpoint, scientists need to be careful about blurring the boundaries of scientific work by 'getting involved in politics' or 'advocacy' for conservation:

[3] Getting involved in politics threatens the reputation and legitimacy of scientists as providers of objective facts - scientists on Galápagos should focus on providing facts about the archipelago and leave the advocacy work to campaigning organisations like Sea Shepherd. (0, -1, -2, +2)

As one participant commented: "*someone who takes a role in a conflict, that same person can't provide information because they aren't credible any more, it's about credibility*"* (B03). Another comment highlighted the disconnect between the globalisation of the problem frame, and the national boundaries of political decision making, commenting: "*it isn't my role to become a political advocate I have no right to become a political advocate, I'm not a citizen of this country*" (B15).

Communication of scientific data (seen as distinct from advocacy) is key according to this factor:

[16] One of the main weaknesses of the science that's being carried out here is that it's not communicated to decision makers and managers. (+1, 0, +3, +4)

Thus this factor agrees less strongly than the others with statement [27]:

[27] Researchers play an important role in Galápagos: they have the responsibility not only to practice what they preach but also to provide integrated and complete information to decision makers. (+4, +3, +3, +1)

As one participant commented: *“they [scientists] should be playing an important role, but right now they’re not”* (B15).

From this point of view it is not the role of scientists to be trying to create culture:

[5] We (scientists) need to be working out ways of building an island culture of conservation on Galápagos. (+2, 0, 0, -2)

In the words of one participant: *“I agree there is a need for island culture...[but] what role does science have in that?”* (B14).

The zero score given to statement [33] (in contrast to the negative score this statement was awarded by the other factors) and to statement [30], interpreted alongside participant comments, suggest that proponents of this view are relatively more uncomfortable with some of the political implications of the levels of international involvement on Galápagos:

[33] Science shouldn't be driven by gringos coming down and telling the Ecuadorians what to do. (-2, -1, -4, 0)

[30] These islands are too important to be left in the hands of Ecuador alone: external NGOs, scientists and the international community have to assume some responsibility. (0, +1, +1, 0)

As one participant put it: *“what other place in the world are we going to have some foreign institution telling us what to do? Of course not, we're going to use our local people you know?”* (B15).

Chapter 8. Critical analysis of discourses of science in conservation

Chapter Outline

The results of the Q study presented in the previous chapter revealed the existence of at least four distinct discourses about the role of science and scientists on Galápagos. These discourses are illustrative of the ways in which different people understand and actively construct the boundary between science and ‘conservation management’ and science and society more broadly on Galápagos. This chapter now examines some of the tensions within and between these four discourses. Findings are discussed in relation to the various bodies of literature on science in conservation and environmental policy making. Where supplementary reference to context is necessary, primary ethnographic data is drawn upon.

8.1 Introduction: contested boundaries

During an interview, one of the participants in this study (a researcher employed by the Charles Darwin Foundation who loaded on factor 4: ‘Separation of science and conservation’) raised his frustration at what he believed was a negative trend toward the conceptual blurring of science and conservation on Galápagos:

“The community needs to understand what science is, and I would dare say very few people understand what science is... they think its conservation and that we’re all a bunch of rabid greenies. And there’s a huge difference between being a rabid greenie and a scientist, you know?” (B15).

This desire to separate science from conservation was particularly in evidence in the views expressed by factor 4 participants. However, despite assertions of the ‘huge difference’ between these two camps (as emphasized by the use of the derogatory term ‘rabid’ to describe conservationists), the separation is by no means as straightforward as this quote might imply. Indeed over the half a century of the existence of the national park and the Charles Darwin Foundation, the boundary has shifted, and even its existence has been contested. Thus nearly forty years earlier, a speaker at a conference on Science in Galápagos that took place in the Charles Darwin Station had asserted that: ‘[y]ou can’t really separate conservation and science in many places, and certainly not in Galápagos’ (Simkin, 1972 p. 7).

Indeed the academic literature in social studies of science suggests that this latter view might be closer to reality, arguing that what demarcates science from non-science or ‘conservation’ is ‘not some set of essential or transcendent characteristics or methods but rather an array of contingent circumstances and strategic behaviour known as “boundary work”’ (Guston, 2001 p. 399, and cf. Gieryn, 1983, Jasanoff, 1990). An examination of the divisions between the four discourses revealed by this Q study provides insights into the shifting and contested boundaries of science and conservation on Galápagos, revealing the plurality of different ways in which the boundary between the two concepts is understood and discursively constructed, and allowing an exploration of some of the implications of these differences.

In the discussions that follow, as in previous chapters, original (anonymous) quotes from Q sort interviews with participants will be distinguished by the use of italics and double quotes (“”), and the interviewee codes will be given in brackets. Those from secondary sources will be indicated by single quotes (‘). Quotes translated from original Spanish will be marked by an asterisk (*). Where quotes are taken from interviews carried out separately from the Q process, the date and place of the interview are given in brackets.

8.2 Understanding different views of/in science – the pure/applied debate

One of the concepts that emerged as divisive between the four discourses revealed by the Q study was the validity (or otherwise) of the distinction between so-called ‘pure’ or ‘basic’ science, and ‘applied’ science. The distinction has been widely critiqued in Galápagos, and in the discourses emerging from this study, was rejected by factor 2 (‘Freedom of Science’) and factor 3 (‘Limitations of Science’). However there is also a widespread sense that there is a disconnect between the production of scientific knowledge and the needs of management, and as a result, the Galápagos National Park’s current (2005) management plan underscores the need for greater production of ‘applied research’, even while the maintenance of a division between the two ‘worlds of science and management’ is called a ‘sterile, senseless division’* (GNP, 2005 p. 255). Thus although the debate is dismissed as “false”, or overly simplistic by some participants, it is still evidently present and influential on the ground. Thus one factor 2 participant refers to “*individuality, initiative, and creativity*” as the “*most important parts of a scientific investigation*”* (B07), and another joked that the emphasis on applied science currently present in Galápagos meant that: “*if Charles Darwin came to Galápagos today his research permit would be refused!*” (A06). On the other hand, a factor 1 (‘Science for conservation management’) participant working to devise management strategies for invasive

wasps vocalised his frustration with pure science by characterising the problem thus: *“pure scientists would investigate why wasps are yellow. What good is that to me? Knowing why they’re yellow doesn’t help me figure out what to do with them!”** (B04).

Debate around variously labelled pure/basic, and applied research is by no means new, or unique to Galápagos. Pielke (2007) traces the divide back to the late nineteenth century, during which time there was a strong sense in the scientific community that the pursuit of knowledge for knowledge’s sake represented the ‘higher calling’ of the scientist, a view which conflicted with the priorities of policy makers who were almost exclusively focused on whether practical benefits emanated from scientific discoveries. This ‘pure science ideal’ (Daniels 1967) has been, and remains an influential construct in western views of science, and is most evident in the views expressed by factor 2 (‘Freedom of Science’). Similarly this idea of a ‘higher calling’ resonates with a view that frames science (in particular ‘pure science’) as more highly regarded than conservation management or ‘applied science’. Thus as one (factor 2) participant summarised the issue on Galápagos:

“Many people would like to do scientific work because it’s more prestigious in the international world, I mean if you are to write a scientific paper...it’s relevant to a much bigger group of people and colleagues than if you do your local management work... It depends on your personal interests, do you want to be recognised in the international scientific community or do you feel happy if you think that your management advice... is really valuable and is really accepted by the people?” (B16).

This sense of a hierarchy of science and management on Galápagos, leads one participant to argue that the current emphasis on the need for research to be tied to management needs and for the research interests of scientists to be secondary, reflected to a degree the *“personal resentments and frustrations”** (B07) of particular individuals who would have wanted to become scientists but ended up being employed in conservation management due to a lack of institutional and other support.

Conflicts between the ideal of the pure scientist, and management or policy needs, was described more than 40 years ago by Daniels, who points out:

‘[t]he pure science ideal demands that science be as thoroughly separated from the political as it is from the religious or utilitarian. Democratic politics demands that no expenditure of public funds be separate from political...accountability. With such diametrically opposed assumptions, a conflict is inevitable’ (Daniels 1967 p1704, cited in Pielke, 2007).

On another level, ideals aside, some authors have pointed out that the divide between science and management or ‘pure’ and ‘applied’ is explainable by the fact that:

'...most academic scientific research is principally addressed to problems which arise in the matrix of the discipline... It is not intended for immediate use by "customers" and the research objectives of academic ecologists are unlikely to coincide with practical conservationists' (Yearley, 1992 p. 519).

Thus for example, one visiting biologist talked of how he had needed to frame his project as relevant to conservation in order to satisfy the National Park, but that in reality he couldn't see the direct application of his data to management. As he put it:

"Making my project relevant to conservation involves putting the factor "island" into my model to show whether there is any difference between the inhabited and uninhabited islands and show whether human impact affects the processes I am studying. But what implication this could have for concrete management practices I really have no idea" (Informal interview, Puerto Ayora, Mar 2010).

One of the arguments often made by scientists whose work on Galápagos has little or no direct or obvious link to management needs is that, as one participant who loaded on factor 2 ('Freedom of Science') put it: *"You never know when pure science becomes applied, and most of the great findings start usually with pure science, and then you find out, wow, this is going to help me with doing something"* (B02). This argument has long been influential, and was key to the famous report to the US president by Vannevar Bush (1945), entitled 'Science - The Endless Frontier'. This report emphasized the way in which all research could be potentially useful to society, and made the case that therefore governmental support for pure or 'basic' research should be a priority, and scientists should be free from political accountability. Not only did this view reinforce the pure science ideal, but made concrete a linear view of the relationship between science and policy, whereby knowledge is conceived of as flowing from pure science (conceived of as a realm outside of political influence) to applied research to development and finally societal benefits and solutions to particular policy problems. Although this view is still prominent in society today, and apparent in several of the discourses revealed by this study, it has been extensively argued to be both 'descriptively inaccurate and normatively undesirable' (Pielke, 2007 p. 13), and has been widely criticized (Sutton, 1999, Moll and Zander, 2006, Wolmer, 2006).

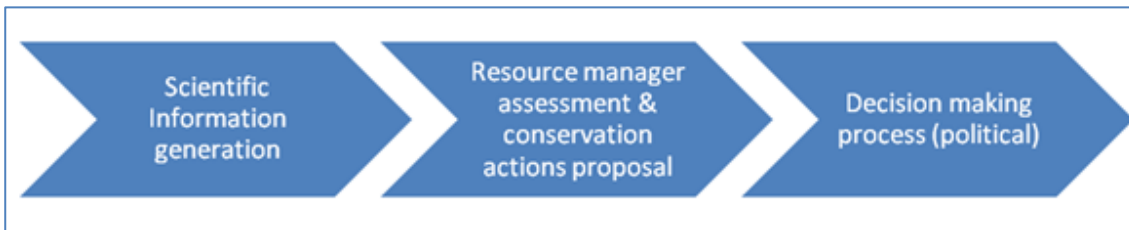
8.3 The linear model of science

The results of this study illustrate that the linear view of science described in section 6.4.2 is widespread on the islands, and factors 1, 2 and 4 all appear to support a linear view of science's relation to policy. In particular factor 1, with its focus on the need for more science for management appears to embody a particularly technocratic view of policy making. For example, a linear conception of the relationship between science and policy is evident in the following quote from a visiting scientist with several decades of experience working on

Galápagos who loaded on factor 1: *'If you have scientific data, and data you can indicate, ok species X should not be exploited anymore and that is scientific data, then that is the basis, politics has to change and go over to conservation, right?'* (B22). Here, not only (as another participant who commented on a draft of this paper said) is this view arguably quite a naïve view of the policy process, but here it is clear that scientific data is assumed to compel a particular policy outcome. Thus the speaker is conflating factual and normative statements, science is claimed to be able to dictate that a species 'should not' be exploited, not just that it is declining or endangered. This is an example of what Pielke (2007) would call 'stealth advocacy', or what Lackey (2007) would call an inappropriate blending of science and advocacy.

Another participant who also loaded on factor 1 presented Figure 8.1 to the researcher following the Q sort interview. According to the participant, this schema represents how the process of policy making should work, and again, clearly illustrates this linear conception. Implicit within the schema is a clear divide understood to exist between the scientific element of the process and the political element. As he explained: *"By the time the politicians get involved, we may avoid a final decision based only on the politician's personal perceptions or their biased interests"* (A19). While this rationale is easy to understand, similar reasoning has been critiqued by science studies scholars, and increasingly political ecologists who argue that no such separation of 'objective science' from 'biased politics' actually exists, and that the generation of scientific information is also unavoidably political to some degree. Forsyth for example, has argued for the 'need to see the evolution of environmental facts and knowledge as part of the political debate rather than a pre-prepared basis from which to start environmental debate' (Forsyth, 2003 xiii), while Jasanoff's observations of the policy making process in the United States have highlighted the way in which power struggles and issues of social control can characterise this supposedly clear boundary. As she puts it: '[w]hile no one doubts that science should be done by scientists and policy by policy-makers, the problem for each interest group is to draw the dividing line between science and policy in ways that enlarge its own control over social decisions' (Jasanoff, 1987 p. 199). This understanding of policy making calls into question the view expressed by Gonzalez *et al.* who argue that one of the main problems in Galápagos is that 'progress is hampered by frequent political interference in technical decisions' (González et al., 2008 p. 11).

Figure 8.1. A linear model of the relationship between science and policy [Source: participant from an international conservation NGO who loaded on factor 1.]



The widespread existence of a linear view of the relationship of science to policy could partly be explained by reference to the 2005 Galápagos National Park Management Plan, in which these concepts are also very much in evidence. For example, the plan maintains that ‘[o]nly through scientific knowledge...can we attain a sustainable use of the goods and services, of the natural capital of Galápagos and at the same time ensure the conservation of the islands’ biodiversity’ (PNG, 2005 p. 254). The way in which science is viewed as integral to decision making is further underscored by statements (also from the Galápagos National Park) that there need to be ‘closer links between research and management and decision making’ (*ibid* p. 154, translated from Spanish), as well as an ‘increase and improvement in knowledge about the structure, functioning and dynamics of Galápagos as a socio-ecological system... [so that] decision makers have the best scientific knowledge available in order to take informed decisions’ (Tapia et al., 2009c p. 159, translated from Spanish).

The linear model of science is closely related to a rise in calls for more ‘evidence-based policy-making’ in conservation (e.g. Sutherland et al., 2004). Although there is nothing fundamentally new or contentious with the idea that policy should make use of evidence, the issue of what (or whose) knowledge counts as evidence *is* contentious. This framing of policy making has thus been widely critiqued as a mis-representation of the ways in which different forms of knowledge are negotiated as ‘evidence,’ and for being ‘inherently unable to explore the complex, context dependent, and value laden way in which competing [policy] options are negotiated by individuals and interest groups’ (Greenhalgh and Russell, 2009 p. 304).

Discourses that emphasize the authority of science in decision making (such as factor 1 in this study) have been critiqued as signalling ‘an unprecedented willingness to turn public decision making over the ‘experts’ (Elgert, 2010 p. 381), and for being based on unfounded assumptions about scientific knowledge being objective, apolitical and universally applicable. For example, Marston and Watts highlight that ‘[i]n determining what is to count as evidence and the ‘discovery’ or selection/presentation of evidence, assumptions about the nature of the

social world play a fundamental role' (Marston and Watts, 2003 p. 152), and they suggest that therefore no evidence claim within an evidence-based policy argument can be considered detached, value free and neutral. In addition to this critique of the neutrality of 'evidence', they illustrate that in reality policy-making is a 'contested and contingent practice [in which] stakeholders assert various forms of knowledge in the context of material and hierarchical power relations' (*ibid* p. 159), and argue that therefore simplistic models of evidence based policy making are neither accurate descriptions nor effective prescriptions.

The political implications of a linear view of science in policy and related calls for more 'evidence-based policy' have been noted by various authors. Lackey, for example, highlights that within this schema there is a risk that questions of science 'end up serving as a surrogate polemic for the inability (or unwillingness) of decision makers to adjudicate unpleasant value and preference tradeoffs' (Lackey, 2007 p. 11). 2002. Others have argued that discourses stressing the need for evidence based policy become a means for 'policy elites to increase their strategic control over what constitutes knowledge...in a way that devalues tacit forms of knowledge, practice based wisdom, professional judgment, and the voices of ordinary citizens' (Marston and Watts, 2003 p. 158), a situation that has been labelled the 'tyranny of bureaucratic decision making' (Perri, 2002 p. 7).

A linear view of science's relationship to policy is also apparent in factor 2's emphasis on the importance of freedom of science, but in this view science is portrayed more as 'the upstream end of a one way process by which useful discoveries and inventions eventually 'flow' to an application home' (Roux et al., 2006 p. 16). However this factor appears more aware than factor 1 of the limitations of science, as one participant expressed: '*A common vision of where to go with Galápagos cannot be built only on the results of science, and managers should not always blame the scientists because of the divergent nature of the problem*' (B16).

Factor 4 (Separation of science and conservation) is also perhaps more conscious than factor 1 of the pitfalls of conflating scientific arguments with policy preferences, and keen to point out that providing scientific data is just one part of a decision making process: '*I just come in and say my piece and you know, try not to put my natural human tendencies to put an emotive layer in it, and people respect me for it. And then they can take it or leave it*' (B15).

Factor 3's conception of the nature of science in policy is different again as illustrated by the positive score awarded to statement 28 ('The idea the scientific data is the basis for policy making is simply not true'). One factor 3 participant commented:

'I completely reject any suggestion that science can remain politically neutral, but I also reject the idea that 'science' or the scientists should decide the fate of Galápagos. Scientists need to play a political role, not to substitute for the community, but as one more part of the community' (B18).*

Here science appears to be understood as inescapably part of the political process (remaining unengaged in politics is not an option), however the speaker also appears to suggest a more humble role for scientists, whose contributions to the political debate, while valuable, cannot substitute for the debate itself. Thus factor 3 can be understood as a rejection of the technocratic position outlined above, and in fact defines itself in strong opposition to the idea that *"the problem of Galápagos is that there's too much politics and not enough science in decision making about the future of the islands"* (B18). This view is more in line with Pielke who points out that 'in situations of political conflict about the means or ends that a policy is to achieve, politics will always and necessarily 'trump' science simply because science does not compel action' (Pielke, 2007 p. 35).

8.4 Science and conservation

The various different views of the relationship between science and policy outlined above are further complicated by divergent understandings of the project and practice of conservation itself – the plurality of opinions around which were highlighted by the first Q study (Chapter 5). Depending on the particular view that is taken of conservation, a blending of the roles of scientist and conservationist is seen as more or less problematic. For example several respondents who loaded on factors 1, 2, and 3 referred to conservation or 'being conservationist' as a lifestyle choice, with little or no political component. Thus a Factor 1 participant defined being conservationist in very general terms as *"not throwing litter, saving energy, looking after the environment, being considerate with other people"** (B11). With this apolitical take on conservation it is easy to understand the view espoused by a factor 3 participant that *"everyone, not just scientists, should be conservationists"* (A03). However for other individuals (notably those loading on factor 4), conservation is considered an inherently political activity, more akin to political activism than green lifestyle choices. Here, a strict division between the roles is felt to be necessary to maintain the legitimacy of science and to avoid bias within investigations. As one participant put it responding to statement 27:

"If an investigator discovers that sea cucumber can be fished, and that there's no problem, they have to say it. But if they're an activist as well, there's a bias... an ideal investigator... doesn't have to practice what they preach because they don't preach anything, they just inform" (B03).*

Similarly, another factor 4 participant highlighted:

“[t]he thing we try and say is the Charles Darwin Foundation isn't, we're not a conservation agency we're a science agency. You know, CI or WWF play advocacy roles and often roles in politics, whereas our role is to provide information, you know, scientific based information, that's it... It's just not an advocacy role” (B15).

However, despite efforts by certain individuals and institutions to maintain a separation, the boundary between the two concepts is intrinsically blurred, not least in this case because the mandate of the Charles Darwin Foundation is to ‘provide knowledge and assistance through scientific research...to ensure conservation of the Galápagos islands’ (CDF, 2006 p. 9, emphasis added). And as late as 1990 it was being claimed that ‘the first aim of the Foundation was, and still is, to protect Galápagos wildlife and habitats from human impact’ (Dorst, 1990 p. 3, emphasis added).

The social conflicts and the changing institutional context of science and conservation have generated difficulties for various conservation organisations on the islands, and the Charles Darwin Foundation in particular has struggled to define and operationalize its mission over the past two decades. Particularly in the volatile periods of social unrest of the 1990s, the organisation was at the centre of a number of conflicts with other groups in the islands (Ospina, 2004). In an interview, a consultant employed by the CDF in 2005 to lead a restructuring of the organisation, stated that he considered that a blurring of the boundary between scientific and conservation activities and roles, was at the root of many of the organisation’s conflicts, both internally (between staff and departments) and externally with other Galápagos stakeholders. As he saw it, the problem was that the CDF had suffered from what he referred to as “mission drift”, thus he maintained that rather than “undertaking science to support institutions to effect conservation, it [the CDF] appeared to have taken on a role of attempting to influence institutions to protect resources” (Interview, Puerto Ayora, March 2010). An institutional re-shaping was thus focused on highlighting the fact that the ‘core business’ of the CDF was science rather than conservation per se. But in practice this has proved a tricky distinction to maintain, especially given the historical role of the CDF in the formation of the park and in early conservation management activities. Furthermore, as science studies scholarship has illustrated, even in less overtly normative situations than that in which the CDF is operating (i.e. providing science advice for conservation), ‘studies of scientific advising leave in tatters the notion that it is possible in practice to restrict the advisory practice to technical issues, or that the subjective values of scientists are irrelevant to decision making’ (Jasanoff, 1990 p. 249).

In the case of the CDF on Galápagos, the use of various rhetorical strategies have been seen as necessary to maintain (at least the appearance of) a strict boundary between science and conservation in order to avoid social conflict and protect institutional legitimacy. But in practice this has generated some confusion within the organisation, not least because of the simultaneous drive towards the incorporation of more social sciences, and a number of social development activities as part of the organisation's remit. Thus one interviewee employed by the CDF highlighted what he saw as contradictions in the mission of the organisation:

'[The mission of the CDF] seems to be diluting... on one extreme we've got pure natural science which doesn't help conservation, and on the other I see community development actions that aren't directly linked to conservation either... and still less with science' (Informal interview, social scientist, Puerto Ayora May 2010, translated from Spanish).

8.5 Different understandings of humans in ecosystems/ disciplinary differences

Linked to the diversity of views of conservation that emerged, a variety of different perspectives towards humans and ecosystems was also evident from the analysis of the discourses of science. For example, one powerful and divisive concept that has emerged from the scientific literature on Galápagos is the idea of humans as an 'invasive species', a view that defines factor 2 and with which factor 1 was also in agreement. A factor 1 participant used an emotive argument for this point of view:

'I agree, [humans are the most invasive species] in the world. Humans are part of the planet, but we think we are the only important part of the planet, so we destroy whatever we want so that we can feel good. It doesn't matter what other species and ecosystems exist, as long as we think we are okay. So it is a form of invasion, motorways, petrol, industry, chemical weapons, biological weapons, wars...' (A31).*

However, more significant are attempts by individuals to justify the categorization of humans on Galápagos as invasive in purely scientific or 'technical' terms, for example this factor 2 participant: *'From a technical standpoint they are an invasive species, they came to Galápagos un-naturally... You know we used mechanical means to come here, we didn't come only with the wind or only with the current'* (B07).³¹ The use of the term 'invasive' to describe the human population on Galápagos, is inherently political, but in its veneer of scientific objectivity³², the politics inherent in the categorization is masked: it is held to be self evident

³¹ Aside from any other critique, this statement is somewhat ironic given the fact that the discoverer of the Galápagos islands, Tomas de Berlanga did in fact arrive on the islands carried by the currents, arriving purely by chance when his ship drifted off course in 1535 (Larson, 2001 p. 21)).

³² However, even with regard to plants and animals, the non-scientific/metaphorical dimensions of the term 'invasion' have been highlighted by Davis (2005), who argues that the term is akin to the 'value-laden terminology...more typically associated with environmental action groups' and that it would be

and the result of objective reasoning, rather than a political position building on a particular set of values and ideals. As one (factor 2) participant put it: “*we are the most destructive thing on the planet, nobody can discuss that*” (A06). These attempts to define humanity’s presence on Galápagos in scientific terms as ‘invasive’ are akin to attempts to use purely scientific criteria to delineate the bounds between ‘nature’ and ‘culture’, a Western dualism which is far from universal as numerous anthropological works have shown (e.g. Egri, 1999, West, 2006, Smith, 1996). Adams (2005) points out that ‘the very idea that there is something called ‘nature’ or ‘the environment’ as a category that is logically separate from humanity is itself a product of centuries of post-enlightenment thinking’ (p. 63), and indeed the ‘nature of Galápagos’ has been understood in very different ways throughout the history of the islands, as illustrated by chapter 4. Similarly, the long history of human interactions with the islands, and the multitude ways in which human actions are now required to maintain the ‘naturalness’ of the islands (removal of certain species, introduction or re-introductions of others etc³³) further complicate the apparently clear distinction between the ‘human’ and the ‘natural’, leading to claims that far from a ‘pristine wilderness’ the islands are in fact ‘profoundly humanised’ (Grenier, 2007 p. 339). Claims to define humanity as ‘invasive’ using purely scientific arguments can thus be read as appeals to ‘nature’ in order to support a particular, historically and culturally specific view of what the Galápagos (or the world) should look like, without appreciating that there is ‘no single un-interpreted nature capable of putting an end to political dispute’ (Dryzek, 1997 p. 12). With regard to Galápagos, the argument that maintenance of ‘naturalness’ should be the end goal of conservation is still prominent in conservation strategies and plans despite the extensive social scientific literature critiquing simplistic conceptualisations of ‘the natural’. Thus for example, a project proposal for a high profile conservation project (‘Project Floreana’) being carried out jointly by the CDF and GNP on one of the inhabited islands, states that the overall goal of the project is ‘restoring Floreana Island’s ecosystems to their earlier, *more natural state* through a combination of community-based conservation and adaptive management’ (Galápagos Conservancy 2009, p. 1 emphasis added).³⁴ Ospina (2000 , p 8) highlights the issue with the pursuit of naturalness by asking what the real difference in ‘naturalness’ is between a species which required human help to

preferable for scientists to use ‘terminology in which values were articulated more explicitly than implicitly... [such as] ‘harmful introduced species’ (p. 55).

³³ For an example of an eradication program, see literature on goat eradication from northern Isabela (Cruz et al., 2007), for re-introductions see the example of the Espanola tortoise (Gibbs et al., 2008), for an introduction program, see the introduction of non-native ladybugs as a biological control agent (Causton et al., 2006)

³⁴ Report on project Floreana available to download from the Galápagos Conservancy website: <http://www.Galápagos.org/2008/index.php?id=225>

install itself, and one which requires human help to be conserved. The problematic nature of appeals to scientific definitions of 'naturalness' is further evident in resulting claims that (as well as being profoundly misanthropic) are also extremely difficult to defend rationally. For example one participant who argued that humanity's invasiveness was a question of scientific fact due to the fact that humanity has modified ecosystems wherever 'it' went, ended up arguing that therefore 'strictly speaking' the only place in which it would be possible to say that humans weren't invasive was where modern *Homo sapiens* had first evolved in central Africa. As Lele and Norgaard point out, this kind of thinking has a number of social implications, and there is a danger that:

'an ethic that respects all natural beings and processes becomes distorted into one that rejects the less privileged of its own kind. Use is pejoratively termed disturbance, which is simple-mindedly equated with degradation. The obvious policy is to police, and the costs of preserving naturalness are dumped with curious regularity on the nature-dependent rural poor' (Lele and Norgaard, 1996 p. 358).

Another concept that has been influential on Galápagos in recent years, and that differentiated the factors emerging from this study, is the framework of Galápagos as an integrated 'socio-ecological system' (Berkes et al., 1998, González et al., 2008). This concept was one of the defining frameworks for the development of the 2005 Galápagos National Park Management Plan. Viewed through this lens, Galápagos is

'an ecological system that is linked to and interacts with a social system, which can be subdivided into a series of social subsystems with particular characteristics that self organize on each of the 4 populated islands' (PNG, 2005 p. 44, translated from Spanish).

The application of this concept was felt to be appropriate given that all of the conservation problems facing the national park were understood to emanate from the populated areas, and thus a framework focusing solely on the protected areas and not encompassing the people was seen to miss the point. However, the application of this framework has been controversial, and in terms of the factors emerging from this study, the socio-ecological system concept (statement 8) was divisive, being accepted by factor 1 and 4, neutral for factor 2, and rejected by factor 3. Although, given the small number of individuals who take part in a typical Q study, it is not possible to draw any conclusions about the broader population from the characteristics of the participant group, an examination of these characteristics can sometimes help to provide useful context and clues that aid the interpretation of the factors. Thus in the case of factor 3 (Limitations of science) it is striking that the four participants who loaded on this factor alone were all social scientists (two geographers and two anthropologists). Hence division around the socio-ecological system concept appears to go to

the heart of another split within the scientific community on Galápagos, namely: the natural/social sciences divide.

Again this conflict is not unique to Galápagos, and conservation managers and academics from various disciplines have been struggling with the challenges of inter-disciplinarity in conservation for many years (Mascia et al., 2003, Norgaard, 1992, Brosius, 2006), often leading to what Mulder and Coppolillo call 'predictable and deeply engraved interdisciplinary skirmishes' (2005 p. 50). Ironically, the application of the socio-ecological system model to Galápagos has been criticized from both sides. For example, writing in the Galápagos newspaper, *El Colono*, Matthias Wolff (2010) head of Marine Sciences at the CFD, suggests that the application of this framework (which he considers to be advocated by the 'social science realm') is linked to a suggestion that the science that natural scientists on Galápagos have been providing for years is not sufficient to deal with the problems of Galápagos. The problem, according to the author is not that the science is or has been inadequate, but that the problems facing Galápagos are not solvable by science alone, be that traditional natural sciences or a 'more modern holistic science approach' (*ibid*). On the other side, certain social scientists (most notably Christophe Grenier, head of social sciences also at the CDF) have suggested that the socio-ecological system model represents an effort by natural scientists to "*do social science*" meanwhile ignoring the vast corpus of previous human-environment research in the social sciences, that by subsuming societies into natural systems and attempting to study them with the tools of natural sciences, is "*not good science*" and furthermore represents a "*slide back towards an early 20th century environmental determinism*" (Interview, Puerto Ayora, May 2010) that has long been refuted in most social science circles. Meanwhile however, the framework continues to be influential, being the 'unit of planning and management of the archipelago of Galápagos' (PNG, 2005 p. 46, translated from Spanish), as well as the guiding framework for the types of scientific investigations prioritised by the Galápagos National Park, and a feature of discourses 1 and 4 in this study.

Despite the increasing calls for interdisciplinary work, and for more collaboration and contribution from social scientists in conservation, during the period of this research (2009 – 2011) the 'great divide' (Snow, 1959) between the natural and social sciences on Galápagos appeared to be as wide as ever. Ethnographic observation of the various disciplinary divisions with the Charles Darwin Foundation provided ample evidence of some of the barriers to communication and collaboration between disciplines. Thus for example, on various occasions

scientists from natural science backgrounds referred to the social sciences as “*pure theory*” (Interview, ornithologist, Puerto Ayora June 2010), or dismissed some social science contributions as “*bla bla bla*” (Interview, fisheries scientist, Puerto Ayora, June 2010). From the other side of the divide, one social scientist (a geographer) bemoaned the fact that despite attempting to incorporate social and economic data in their analyses, many natural scientists “*haven’t read a single classic in the social sciences... they don’t even know the greats... Durkheim, Weber, Braudel, historians, sociologists, geographers, economists, nothing!*”* (Interview, Puerto Ayora, July 2010).

One episode in particular serves to illustrate a number of facets of the issue of integrating natural and social sciences in the context of conservation. The Charles Darwin Foundation holds a fortnightly seminar discussion group at the research station, at which a recent paper is presented and discussed by the group, and at which attendance by permanent staff members is obligatory. During one such discussion group at which the researcher was present and participating, the paper for discussion, presented by a social scientist, was a paper by Judkins *et al.* (2008) which elaborated a critique of the Pulitzer prize winning work, ‘Guns, germs and steel,’ by Jared Diamond (1997). Reactions from the assembled group composed primarily of biologists, were almost unanimously negative. One biologist commented that she didn’t feel it was fair that scientists should be made to read such things as she had found the paper entirely inaccessible. Another joked that he didn’t get beyond the abstract, while a third said that while he had made it through the paper he had found it “*boring and unconvincing,*” but that if he had got nothing else from the paper he would now read Diamond’s work. Several points are noteworthy from these exchanges. Firstly in none of the four other discussion groups observed (at which ecological papers were discussed), had such comments been raised about even the most dense ecology article, suggesting that claiming ignorance or inability to understand social scientific writing is seen as acceptable in ways that would not be the case for ecological or other natural science papers. But secondly, the choice of so potentially challenging an article in the first place was also interesting. In a subsequent interview, the social scientist in question raised his frustration that the participants in the seminar had not engaged with the paper as he would have liked, arguing that “*this is what they are involved in, this is relevant to them*”. However, the potential inaccessibility of the article to non-social scientists had not escaped him, and he joked that he had chosen the article in “*revenge*” for all the ecology articles he had had to sit through. The choice of what he was aware would be a challenging article should be understood in the context of the fact that previously he had complained that natural scientists had little idea of what ‘doing social science’ entailed:

*“They have no idea that we also have a methodology, base our work in theory, have bibliographies as long as your arm... they think they can do social science by just going up to the ‘parte alta’ and doing some interviews with farmers. That’s not science its journalism!”** (Informal conversation, Puerto Ayora, June 2010).

This sentiment resonates with concerns raised by other social scientists working in conservation that many biologists seem to be ‘failing to distinguish between working with people and ‘doing social science’ (Welch-Devine and Cambell, 2010 p. 343). In this case, the choice of a challenging article could thus be interpreted as part of a strategy to stake out a terrain of legitimacy for the knowledge he was producing. However, the inaccessibility of the article arguably resulted in a lost opportunity for meaningful dialogue and building of mutual understanding that such a discussion group might have held: biologists left the group frustrated at the inaccessibility of the article, and with their preconceptions about social sciences as ‘*bla bla bla*’ reinforced, while social scientists left the group feeling defensive that what was believed to be an interesting and important topic was not engaged with or dismissed by those involved. Ironically one of the conclusions of the paper under discussion was that: ‘[t]he failure of the human–environment discipline to counter the revival of faulty deterministic logic testifies to the weakness of the discipline to communicate effectively...’ (Judkins et al., 2008 p. 28), and yet arguably the paper itself had failed on just that count.

Exchanges such as these serve to illustrate some of the practical difficulties faced by individuals attempting to communicate outside of their discipline, but they also bring into relief some of the power dynamics that make inter-disciplinary collaboration so difficult. Macmynowski has argued that ‘interdisciplinary barriers are not simply problems to be fixed...but are reflective of underlying power relationships through which particular types of knowledge come to be seen as more or less authoritative’ (MacMynowski, 2007 p. 346). Other authors have likewise pointed to the existence of a disciplinary hierarchy of so-called physics envy (cf. Massey, 2005) in which ‘concepts from physics are invoked as references to a higher (and by assumption *truer*) authority’ (Evans and Randalls, 2008 p. 582, parentheses and emphasis in original). In Galápagos, one way in which the power differential between disciplines (and the relative importance accorded to the knowledge produced by different disciplines) becomes apparent is in the widespread expectation that social scientists will operate within a problem framework as defined by natural scientists. Thus for example an influential ‘Biodiversity Vision’ was produced in 2002 by the Charles Darwin Foundation and the WWF, who assembled ‘a group of world-class biologists’ and charged them with:

‘formulating a vision, based on their extensive experience and knowledge of the ecological processes at work, of what the archipelago would be like, in biological

terms, in the year 2050, if it were managed optimally for conservation... [and identifying] key issues that Ecuador will need to address in order for such a biological vision to become a reality' (Bensted-Smith, 2002 p. 1).

These 'key issues' according to the plan, 'should be the focus of a subsequent social and economic analysis' (*ibid* p.1). Thus, social science contributions were considered useful in as far as they could 'highlight areas of probable contradiction between conservation requirements and social aspirations' (*ibid* p. 1), and thus help steer development towards the vision defined by the biologists. This view of the role of social scientists as facilitators of plans and visions defined by natural scientists using biological criteria, resonates with other analyses of the perceived role of social scientists in conservation. For example, Welch-Devine and Cambell, note that 'social scientists are often called upon to manage conflicts, avoid litigation, improve participation, and do environmental education... or to 'fix' socio-economic problems' (Welch-Devine and Cambell, 2010 p. 341). This pre-determining of the problem framework by natural scientists is indicative of different status accorded to the knowledge produced by natural and social scientists, and automatically excludes a range of contributions to conservation that might be made by some political scientists, anthropologists, sociologists and others, who might resist the role of facilitator, or seek to 'test some of the underlying assumptions of conservation' (*ibid* p. 341).

Although differences between broadly defined natural and social sciences are brought into relief by exchanges such as that described, highlighting some of the practical difficulties of integration, talking of a 'great divide' between natural and social sciences, can itself act to gloss over the great diversity of disciplines that are subsumed within these categories. Thus various authors have highlighted that there are often equally as great divisions between social scientists from different disciplines as between natural and social scientists. For example Welch- Devine and Campbell point out that:

'Anthropology... brings something quite different to the study and practice of conservation than does economics, which in turn contributes quite differently than does education... and within a particular discipline different scholars have very different orientations, with some focusing on providing data to better craft projects, while others use their work to question the very merit of a project-based approach' (Welch-Devine and Cambell, 2010 p. 342).

Although the differences between and within social science disciplines were not specifically revealed by the factors emerging from this Q study, observation of, and interviews with social scientists on Galápagos flagged up the existence of a range of different perspectives towards the knowledge produced by social scientists in the context of conservation, and individual scientists displayed different strategies when presenting their data or findings outside their

discipline. For example one geographer, who worked closely with an international conservation NGO, appeared to be attempting to establish the knowledge he produced as on a par with natural science contributions: *"I normally do surveys aimed at answering hypotheses"* (Informal interview, Puerto Ayora, July 2010). On the other hand, another (an anthropologist), who worked with an Ecuadorian University, appeared to want to define a different kind of status for the knowledge he produced. Following his Q sort he maintained that: *'I'm not a scientist, what I do isn't science'* (A06).

Attempts to re-define Galápagos as a socio-ecological system and calls for increasingly interdisciplinary research are linked. However, as illustrated above, neither the conceptual framework of a socio-ecological system, nor the view of barriers to inter-disciplinarity as straightforward problems to be overcome, are universally accepted. Although the conceptual framework of the socio-ecological system has achieved widespread acceptance in some quarters (see for example the work of the resilience alliance www.resalliance.org), arguably the application of systems thinking in the Galápagos context might have unintended political consequences, acting to extend the control of the GNP almost indefinitely into areas of social life otherwise unconnected with conservation. Thus for example, a GNP publication suggests that the systems perspective 'allows the identification of new types and areas of knowledge, that previously weren't perceived of as important for the adequate management of the system' (Tapia et al., 2009c p. 161, translated from Spanish), and lists sexual health, drug addiction and the influence of religion (among other themes) as some of its priority areas for investigation (*ibid.* p 167), suggesting a need for better monitoring of these in order to develop appropriate systems of management for sustainability. Indeed this trend is not isolated to the GNP. The Charles Darwin Foundation also claims to be 'broadening the conservation agenda' and applying 'science-based knowledge' in an 'integrated effort to design an island wide sustainable development model that can serve as a guide for decision making and an example for the world' (Lopez, 2010 p. 4). Given the argument that 'ways of knowing the world are inseparably linked to ways in which people seek to organise and control it' (St Clair, 2006 p. 66), extending the knowledge gaze of the GNP and CDF into these social areas appears more like a political project. This trend also resonates with Ferguson's suggestion that development discourses (which are becoming increasingly entwined with those of conservation) and their associated managerial and technical projects, act as an 'anti-politics machine' (Ferguson, 1994), obscuring the political nature of many social problems, which are 'increasingly separated from questions of distribution and social transformation... [becoming something to be dealt with] through projects rather than political change' (Bebbington, 2005 p. 940, cited in

Buscher, 2010 p. 33). According to Ferguson, rather than dealing with problems, the ultimate goal of this type of development is the 'political operation of expanding bureaucratic state power' (Ferguson, 1994 p. xv). The Galápagos National Park argues that 'a system cannot be understood, much less managed efficiently, if the flows (energy, materials, information) that bind and connect its different components are not known and managed' (Tapia et al., 2009b p. 129, parentheses in original), but this focus on 'efficient management' engenders a highly scientized view of social life, which implies 'that political and social issues are better resolved through technical expertise than democratic deliberation' (Backstrand, 2003 p. 24).

Calls to conceptualise Galápagos as a socio-ecological system or to 'broaden the conservation agenda' (Lopez, 2010 p. 4) resonate with concerns raised by Takacs that by 'attempting to redraw normative boundaries to include more space for biodiversity's importance...[conservation biologists are] redrawing the boundaries of what it means to be a biologist' (Takacs, 1996 p. 103). There is evidence on Galápagos of a drive to extend those boundaries even further. For example, Figure 8.2 shows a recent billboard campaign in which photo collages of island residents were incorporated into pictures of the charismatic fauna of the islands. These billboards were displayed in prominent positions in the main towns of Puerto Ayora and Puerto Baquerizo Moreno with a caption reading: 'biodiversity: humans and nature in harmony.' Although on the surface these images could be read as progressive attempts to break down the traditional problematic distinction between humanity and nature which has long been dominant on Galápagos, to show 'humans as part of the natural web of life' (CDF, 2010, p.2), an alternative reading is that by subsuming the notion of an ideal harmonious society within the apparently scientific, apolitical terminology of 'biodiversity', the caption feeds into an assumption that 'science' (rather than politics) can define, measure and lead the way towards such an ideal of social and natural harmony.



Figure 8.2. A billboard photograph of two Albatross composed of hundreds of pictures of Galápagos residents, on display in Puerto Ayora, Santa Cruz. The caption reads, 'Biodiversidad: humanidad y naturaleza en armonía.'

8.6 Conclusion

This study has revealed a range of different discourses around science on Galápagos, underpinned by a range of values and assumptions about the nature of science, policy, and the relationship between the two, as well as fundamentally different ideas about humans and ecosystems. The linear understanding of science's relationship to policy suggested by the previous Q study appears to be widespread in the 'conservation community', and the political implications of this view, which can tend towards a technocratic view of governance in which more science is seen as key to the achievement of sustainability, have been examined and critiqued. Certain divisive constructs within the discourses of science were explored (including the idea of humanity as an invasive species, or the conceptualisation of Galapagos as a 'socio-ecological system') and the ways in which disciplinary differences contribute to these divisions was examined. Discussion highlighted the fact that barriers to interdisciplinary work are not simply 'problems to be overcome', but represent fundamental differences in the ways in which societies and ecosystems are conceived of, and are further compounded by power dynamics which determine that certain types of knowledge are seen as more authoritative than others. Where interdisciplinary collaboration or communication is attempted, barriers manifest themselves in the form of lost opportunities for dialogue as outlined in the description of the FCD journal club, or by defensive attitudes and behaviour developing as a result of the power imbalances inherent between disciplines.

Chapter 9. Conclusions

Chapter Outline

The aim of this thesis was to contribute to a greater understanding the social and political dimensions of biodiversity conservation on Galápagos through an analysis of the discourses of conservation and science on the islands. Previous chapters have explored the shifting discursive representations of the islands throughout their history, and provided empirical evidence of the multiple contemporary framings of ‘the problem’ of conservation on Galápagos, and of the different ways in which the boundary between science and society is discursively constructed and contested in the context of Galápagos conservation. This chapter now concludes the thesis with a brief review of the research, a reiteration of the main findings, and a discussion of the strengths and weakness of the study (in particular the use of Q methodology). The final sections explore some of the implications of the research for conservation in Galápagos and beyond, and reflect on potential avenues for future research.

9.1 Reviewing the research

The research presented here took place in three overlapping, iterative phases. In order to explore the historical roots to the present day discourses of conservation on the islands, and to subject the contemporary narrative of ‘ecological crisis’ to critical scrutiny, the first step was ‘to investigate the changes in the discursive construction of the Galápagos Islands throughout their history’ (Objective 1). Chapter 4 presents the results of a review of historical literature which aims to fulfil this objective. Drawing insights from the field of environmental history, this chapter explored the ways in which people, events and ideas have interacted with the environment of the archipelago to produce, three powerful, sometimes overlapping discursive representations of the islands: the islands as ‘the infernal regions’ or hell, the islands as a ‘natural laboratory’ and finally the islands as ‘Eden’ and a ‘paradise in peril’. The chapter illustrated that the meanings attributed to the islands are not fixed, but have always been subject to change and contestation, and highlighted the ongoing power of discourses of pristine or untouched nature in the Galápagos Islands. It also illustrated the political and constructed nature of contemporary discourses of ‘ecological crisis’ which emphasize the recent, urgent nature of threats to the ‘pristine nature’ of the archipelago (implying that

human incursion into the nature of the islands is a recent phenomenon), by illustrating the long history of human impacts on the islands.

The second phase of research aimed *'to investigate and analyze the variety of discourses about conservation currently present on the islands'* (objective 2), and to question the plausibility and desirability of calls to a 'shared vision' of Galápagos conservation. Chapters 5 and 6 were dedicated to fulfilling this objective using Q methodology and ethnographic observation. Three statistically different factors or discourses emerged from the Q analysis, and were labelled: Conservation as an international/global concern; Conservation with sustainable development; and Social welfare and equitable development. The structure of these different discourses was explored in Chapter 5 with reference to the statements from the Q sample, and to comments made by individuals loading on each of the discourses. In Chapter 6, the discourses were exposed to more critical scrutiny and comparison in the light of current and historical debates in conservation and sustainable development, and some of the material effects and political implications of these discourses were explored. The continued existence of a powerful discursive construction of the islands as un-inhabited and pristine was apparent within the international conservation discourse (factor A), and the political and ethical implications of this were discussed. This discourse is also distinguished by its framing of Galápagos conservation as a global issue requiring global management and the involvement of the 'international community,' and the ways in which this framing acts to legitimise the strong international presence on the islands was highlighted. Parallels between the conservation and sustainable development discourse (factor B) and global discourses of ecological modernisation were evident in the way in which this discourse appeared to view the problems of conservation not as symptomatic of contradictions inherent in the development model of an economy built on ecotourism, but as discrete management challenges requiring the generation of more science in order to be dealt with in the most efficient manner. The tendency to downplay the political dimensions of conservation as a result of this framing of problems as 'technical' was discussed and critiqued. The political dimensions of conservation on Galápagos were more overtly apparent within the final discourse uncovered, that of Social justice and equitable development (factor C). Within this discourse the question of 'conserve for whom?' was brought to the fore, and resistance to some of the ideas and practices of conservation was apparent. This discourse also questioned the strict separation of human settlement and parkland that has historically characterised the islands, suggesting that this separation, rather than being a self-evident 'good' for conservation, has actually had negative consequences for the possibility of achieving sustainable development in the archipelago. The

diversity of discourses around conservation, and the political nature of these, calls into question both the possibility and desirability of attempts to build consensus around a 'shared vision' for Galápagos, highlighting the ways in which the search for consensus can be both illusory, and anti-democratic, acting to reify the status-quo, and shore up existing hierarchies.

Scientific knowledge occupies a central place in conservation discourses on the islands, but a number of tensions around science were also hinted at by the results of the first Q study. The third phase of research therefore aimed to delve deeper into the views of the 'conservation community', *'to examine different discourses about the role of science in conservation currently held by conservation practitioners and scientists working on the islands'* (objective 3). Chapters 7 and 8 fulfil this objective, through another application of Q methodology and ethnography. What emerged from this study was a picture of the heterogeneity of the conservation sector on the islands, and empirical evidence of the ways in which the boundary between science and society on Galápagos is discursively constructed and contested. Differences emerged regarding the nature of science (in particular conceptions about the existence and nature of the divide between so-called 'pure' and applied science), and the appropriate role of science in policy and conservation management. The widespread existence of a linear understanding of the relationship of science to policy was uncovered in three of the four discourses revealed by the study, and the political implications of this view for Galápagos society were discussed. Significant disciplinary differences were also suggested by the emergence of one apparently 'social scientific' factor (factor 3: 'Limitations of Science'). Differences emerged regarding the ways in which humans and ecosystems are understood, and these were linked to understandings of the role of science on the islands. For example, an influential vein of 'systems thinking' in which the Galápagos Islands are conceptualised as a 'socio-ecological system' was present in at least two of the discourses uncovered. This framework has been influential in generating calls for more social scientific and interdisciplinary research on the islands, but the way in which this construct might work to extend the remit of 'science' on Galápagos into the social realm indefinitely, tending towards a scientized view of politics on the islands, and acting to shore up the bureaucratic power of the GNP was discussed. Disciplinary differences were further explored through ethnographic work, and a number of challenges to achieving meaningful inter-disciplinary collaboration in conservation were highlighted. Overall, the analysis questioned the apolitical nature of discourses of science on the islands, and highlighted the problematic nature of straightforward claims that the building of a sustainable society on Galápagos necessarily requires 'more science' (Tapia et al., 2009a).

9.2 Reflecting on the use of Q methodology: strengths and limitations of the study

The specific strengths and limitations of Q methodology and the reasons for its application in this research were outlined in sections 1.4 and 3.2.1. This section will briefly reflect on the experience of using Q methodology within the context of this particular research project, and consider some of the strengths and weaknesses of the study overall.

One of the strengths of the Q method was the way in which it permitted an examination of discourses without recourse to categorizing people and discourses according to political affiliation or livelihood, an approach that would have missed similarities between individuals from distinct 'sectors' – for example one of the significant sorts loading on the local conservation discourse (factor B) was a fishing cooperative representative. Another characteristic of the method that arguably improved the results of the study, was the way in which participants were asked to engage with statements that had been made by other individuals in Galápagos, rather than a list of questions formulated by a researcher, as in a standard interview. Although the evidence is anecdotal, this characteristic of the Q sorting process apparently put people at their ease much more quickly, and appeared to result in participants revealing their points of view more freely. Thus certain statements resulted in forceful denouncement or agreement, and stimulated people to argue their point of view sometimes passionately. In some cases individuals claimed also to recognize who had made a particular statement, and then explained why they did or didn't agree. These comments and the explanation of the different debates from people on all sides were very revealing about the different tensions between individuals, institutions and sectors on Galápagos. Furthermore, many of the participants gave feedback that they enjoyed the process, which has a game-like quality due to the manipulation of the cards on the board, and again, this appeared to improve the results of the study as participants were keen to finish the process 'properly'.

The quali-quantitative nature of the Q method proved to be another of its strengths. Firstly, the statistical underpinnings of the method helped to minimize researcher bias, and allowed for the description of patterns that might have otherwise gone unnoticed had an alternative form of discourse analysis been adopted (cf. Ockwell, 2008). Equally importantly, this characteristic of the method also provided a powerful platform from which to engage a wide range of scientists and conservation managers from different disciplines, whose familiarity with statistical modelling techniques and quantitative data meant that they felt at home with this dimension of the method, and were thus apparently more open to engage with the study.

Although this greater openness to a method incorporating ‘hard figures’ and the unfounded assumptions about the scientific objectivity of numbers that this implies, is itself somewhat dubious (cf. Porter, 1995), nonetheless in the interests of inter-disciplinary communication in conservation, the method itself proved to be a powerful tool.

The use of Q method does entail some limitations. Some of these (for example the inability of Q method alone to reveal changes in discourses over time, or to explore the wider context in which discourses are operating) were overcome by the adoption of a mixed-methods approach incorporating environmental history and ethnographic observation, as outlined in section 3.3.3. However dealing with other limitations would require the adoption of alternative methodological approaches, and these are suggested as potential avenues for future research.

One limitation of the study overall, and one common to site-specific or case study research, is the issue of generalizability of the findings. In this case, although (as will be outlined in the following section) certain insights can be gleaned from the results in order to inform global debates around conservation and science, nonetheless the particular discourses uncovered by this study need to be understood as specific to the Galápagos context, and any insights regarding the tensions between them, or the political implications of the differences cannot be expected to apply in any straightforward way to other locations. However, testing for the existence of similar discourses to those revealed by this study, in other parts of the world, could form the basis of further study.

With regard to generalizability *within* the Galápagos context, the issue of sample size in a Q study (and concerns about whether the results it is possible to generalise about the population at large on the basis of the results of a Q study) is addressed in chapter 3 (See Box 3 on page 59). More central to the concerns of Q research, is not the question of whether the participant group is ‘representative’ of the population at large (given the small sample size, it is not), but whether the discourses revealed are indeed ‘representative’ of the diversity of discourses in the study site. In order to critically assess this question, the two dimensions of sampling that take place in Q process can be evaluated. Firstly, the Q sample (i.e. the statements that will be sorted by participants), needs to be as ‘representative’ as possible, and secondly the participant group needs to be as diverse as possible. In the research presented here, the Q samples were collected using both structured and un-structured approaches, but in both cases, ‘saturation point’ was reached in the process of discourse development. In both cases a degree of unavoidable subjectivity entered into the process of defining the limits of the discourse topic, and in the selection of the particular statements for the Q sample. However,

the full Q sample of each study is given so that readers can critically evaluate the comprehensiveness of the sample. With regard to the participant groups, these were purposively selected using a combination of existing stakeholder analyses and a snowballing approach. While as broad as possible a range of participants were asked to participate, the study *is* open to the criticism that the addition of different participants might have revealed the existence of additional/different discourses. Although this is a valid concern, given that various decision makers and ‘opinion formers’ (such as the heads of various fishing cooperatives, NGOs, National Park, and government departments) were included in the participant groups, the discourses revealed are likely to be some of the more influential discourses on the islands, and as Brown (1980) points out, although the addition of different participants might have revealed alternative discourses, it would simply add another layer of complexity to the picture, but would not challenge the existence and structure of those discourses already revealed (Brown, 1980 p. 67).

9.3 Implications for Galápagos conservation and beyond

In their influential 2007 report, ‘Galápagos at Risk’, Watkins and Cruz end their analysis with the rhetorical question: ‘if we cannot achieve a sustainable society and long-term conservation in Galápagos, will it be possible to do so anywhere else in the world?’ (p. 19). Given the huge amounts of funding for conservation on the islands, the large number of NGOs and government institutions working to protect the islands, the levels of international interest in their conservation, and the unparalleled scientific knowledge about the islands, the logic of this question is understandable. However the results of this study suggest that rather than inferring from a self-evident ‘crisis’ in Galápagos, the impossibility of achieving conservation and sustainability worldwide, perhaps some of the assumptions and ideas underpinning discourses and approaches to conservation on the islands might need to be re-thought. Building on Cronon’s argument that ‘[h]istorical wisdom usually comes in the form of parables, not policy recommendations or certainties’ (Cronon, 1993 p. 16), rather than make particular recommendations (to which the results of a discourse analysis like an exploration of history, do not readily lend themselves), this section will instead draw out some of ways in which the results of this research might be relevant to this proposed ‘re-thinking’ of conservation.

Questioning ‘crisis’

Without belittling the many real environmental and social challenges facing Galápagos, the material presented in this thesis suggests that there may be a need for a critical re-appraisal of

the narrative of ecological crisis currently influential on the islands. For example, by demonstrating the fact that discourses which paint the Galápagos islands as 'pristine' or 'untouched', do not stand up to historical scrutiny, Chapter 4 problematizes the framing of the problems of Galápagos conservation as novel, recent and urgent incursions of humanity into a previously pristine nature, and points to the need to examine what interests are served by the continuing strength of this crisis narrative (cf. Roe, 1995). Questioning the narrative of 'pristine nature' underpinning notions of crisis also gives rise to questions about whether the historical decision to give material reality to the discursive construct of the 'natural laboratory' through the strict separation of human from natural or apparently 'pristine' zones, and the decision to grant exclusive access to tourists or scientists to many of these zones, was the only or self-evidently best way to conserve the islands. Not only has this commodification of the islands as an ecotourism product arguably been responsible for many of the trends which are now causing conservationist anxieties (i.e. by integrating the Galápagos ever more tightly into the capitalist world system (cf. Grenier, 2007)), but the artificial separation of human/colonized zones from apparently pristine parkland has acted to reinforce a view which frames any development or human presence on Galápagos as essentially negative. Framing the islands as pristine thus not only acts to erase history discursively, but materially (in that conservation actions are geared towards the removal of human traces) and in the production of spaces for tourism (cf. Hennessy and McCleary, 2011). Understanding discourses of conservation as co-produced with social order, i.e. 'embedded in power politics that both reflect and create the broad social order' (Elgert, 2010 p. 375), helps to highlight the fact that the narrative of a pristine, uninhabited Galápagos is not a neutral, objective view of the islands, but a highly political one. Within this framing, the space for political negotiation about desired futures is effectively closed down: humanity is painted as 'invasive' (e.g. Oxford and Watkins, 2009) and therefore solely in need of monitoring, educating and controlling, as conservation strives to return the islands to their pre-discovery ecological state (e.g. Bensted-Smith, 2002). If creative solutions to the problems facing Galápagos are to be found, there first needs to be conceptual space for imagining alternative futures, and dialogue about what these might look like. Framing all discussion within a narrative of crisis, is ultimately unhelpful and acts as an invisible barrier to this process.

Re-thinking calls to a shared vision of conservation

Viewed through the lens of coproduction, the idea that one universally relevant 'shared vision of conservation' might be possible and desirable, also becomes highly questionable, especially

given the political nature of the dominant narrative of ecological crisis and the historically specific construction of 'pristine nature' upon which it draws. At best the search for a consensus around a shared vision thus emerges as somewhat futile, at worst, it appears undemocratic, striving toward the elimination of interplay between legitimately different perspectives, and (given the inevitable presence of existing political structures in which some groups have greater power than others), having the unintended effect of maintaining the status quo, and making social transformation much less likely. As Leach and Mearns put it, in the search for consensus 'exchanges between policy actors with radically different endowments of power could never be politically neutral' (Leach and Mearns, 1996a p. 32). Furthermore, in practical terms in the conservation setting, decision making processes built on achieving consensus can be more vulnerable to being vetoed by a single party (Peterson et al., 2005). As one participant complained: *"as long as we're just looking for shared ground, things will go on like this..."*

Rather than searching for consensus within an unquestioned narrative of 'ecological crisis' in Galápagos, the multiple discourses about conservation revealed in chapters 5 and 6 lend support to the normative need for more deliberative (Elgert, 2010), argumentative (Peterson et al., 2005, Hoppe, 1999), or discursively democratic (Dryzek and Niemeyer, 2008, Dryzek, 1990) decision making, or for policy processes to be 'opened up' beyond 'the singular narratives and associated pathways which dominate current agendas, to embrace a range of alternatives' (Leach et al., 2010 p. 375). There are various ethical and substantive reasons why this should be preferable to the unquestioned dominance of a given discourse or narrative. Dryzek and Niemeyer highlight the normative undesirability from the perspective of accountability within a democracy (which they argue to be the most rational form of decision making) of allowing a network to be dominated by a single discourse (Dryzek and Niemeyer, 2008 p. 13). Others highlight the partiality of all knowledge claims and point out that 'a single and final understanding of a sufficiently complex issue is inherently over simplistic' (Hirsch et al., 2011 p. 263), and that therefore other understandings or discourses could always claim relevance. Others stress the fact that there are times when transformation or more radical social change may be desirable, and argue that this is not facilitated by a focus on consensus which 'further legitimizes continuity or stability' (Peterson, 2005, p. 766). In revealing and examining the different societal discourses around conservation on Galápagos, and critiquing the range of subjective values and assumptions that underlie the various positions, the material in this thesis hopes to contribute to a deliberative process whereby conflicts can be

'addressed more openly, rather than remain concealed in hegemonic environmental readings and policy' (Leach and Mearns, 1996a p. 467).

A more modest role for science?

While it is normal and desirable that scientists and scientific knowledge should play an important role in helping society find ways of dealing with the complex environmental challenges of the 21st century, the material presented in this thesis suggests that this role may need to be conceived of in 'more modest' terms (cf. Giller et al., 2008). The analysis of different discourse about the role of science on Galápagos revealed and critiqued a widespread (but descriptively inaccurate and normatively undesirable), conception of science's relation to policy in terms of a linear model. As discussed, this view of science as 'truth speaking to power' from an impartial, objective domain outside of social and political influence has been thoroughly critiqued from science studies fields. Especially when (as in the case of Galápagos conservation), multiple conflicting perspectives on 'the problem' to be solved exist, the assumption that science alone can steer a course toward the best policy is deeply flawed. This study has illustrated that different discourses about science are not defined by disagreements about facts but are normative discourses about how science and society should operate, and were also revealing of a range of different subjective world views about the nature of humans and ecosystems. This subjectivity within the discourses of science underscores the fact that the views of scientists (and the knowledge that they bring to policy making), like those of other stakeholders, are always necessarily partial and value-laden to a degree. The contested terrain of conservation as revealed by the first Q study coupled with the necessarily partial views of scientists make highly problematic the calls to more science for conservation and sustainability on the islands. As Sarewitz (2004) puts it:

'When political controversy exists, the whole idea of "reducing uncertainty" through more research is incoherent because there will never be a single problem for which a single optimizable research strategy or solution path can be identified, let alone characterized through a single approach to determining uncertainty. Instead there will be many different problem frameworks defined in terms of many competing value frameworks and studied via many disciplinary approaches' (p. 396).

In the current context of Galápagos conservation, rather than making these different problem frameworks and value judgements explicit, the material presented in this thesis has pointed to a range of 'stealth advocacy' (Pielke, 2007) tactics being carried out (often unknowingly) by some scientists and conservationists who conflate particular values with 'scientific fact' in sometimes subtle ways. Hence, for example the application of the category of 'naturalness' as the end goal of conservation as though this were a value-neutral, universally recognised

inherent 'good', rather than a particular value judgement. On the other side of the spectrum, some individuals (most notably members of the conservation community who loaded on factor 4), wary of the dangers of an inappropriate blending of science and advocacy, have sought to maintain a strict separation between science and conservation in order to conserve the objective status and authority of the former. However, ironically this attempt to maintain a strict separation actually opens scientists up to critique, either of the objectivity or usability of their results, or both, in what Nowotny terms the 'objectivity trap' (Nowotny et al., 2002 p. 55). Attempting to shore up the legitimacy of science by stressing its separation from value laden activities such as conservation, builds on a premise that achieving a value neutral, objective science is possible. However as Demeritt argues:

'Rather than accepting this premise and being forced to deny that science is socially situated and contingent, the proper response is to develop a more reflexive understanding of science as a situated and ongoing social practice, as the basis for a more balance assessment of its knowledge' (Demeritt, 2001 p. 309)

In revealing the range of contemporary discourses about conservation currently present on Galápagos, and in exploring the shifting and contested boundary between science and conservation, the results of this study lend support to the argument that science for conservation should be understood as an inherently social task. For example, Lele and Norgaard suggest that in the face of many competing perspectives and value frameworks, one way in which scientists could carry out scientific work and simultaneously contribute meaningfully to the achievement of 'sustainability', is through identifying 'communities of like-minded or like-valued individuals ... understanding the effects each community might be concerned about, and then analysing various proposals for sustainability in terms of these various effects' (Lele and Norgaard, 1996 p. 362). Thus the role of the scientist in conservation becomes that of measuring the different effects of different resource use options against differently understood conservation objectives, across time frames and for differently effected individuals. In other words, given that there will be inevitable trade-offs of values and goals, these decisions should be allowed to 'emanate from society' (*ibid* p.362) rather than remaining concealed in the subjective value judgements implicit in the choices made by scientists. Conceived of in this way, science and scientific knowledge are still in a position to provide useful information, but have no claim to any particular authority in terms of defining the direction of policy. As Keulartz puts it '[t]he idea is not to gag the ecologists, but to give the final word back to society' (Keulartz, 1999 p. 101).

Interdisciplinary collaboration or better communication?

One of the further implications of the material presented in this thesis, concerns the issue of interdisciplinary collaboration in conservation. While greater collaboration between disciplines in conservation is widely hailed as crucial to conservation success, an examination of the Galápagos situation suggests that there are still a number of barriers to collaboration and to meaningful interdisciplinary work occurring. Given the power hierarchies that determine that social scientific contributions (especially those in a more constructivist vein) carry less weight than positivist social or natural science contributions, achieving interdisciplinary collaboration emerges as a far more complex endeavour than simply learning to work with different types of data. Perhaps unsurprisingly the results of this research suggest that currently collaboration and communication between natural and social scientists is only happening at a superficial level in Galápagos. Given the real barriers to collaboration, perhaps a more realistic goal in the first instance would be simply to achieve more meaningful communication between disciplines. Indeed, in some ways calls to interdisciplinary collaboration in conservation on Galápagos mirror uncritical calls to societal consensus around a common vision, but arguably disciplinary tensions and differences are necessary to the advancement of conservation in both theory and practice, what Iggoe refers to as 'productive tensions' (Iggoe, 2011 p. 333), and that these should be explored not ignored, or simply seen as 'barriers'. Bauer likens disciplines to languages, and suggests that imagining interdisciplinarity is like trying to imagine 'interlingual speech', and argues that self conscious attempts to produce a universal languages (Esperanto, Ido, Interlingua etc) have resulted only in 'hopeful monsters [and] short lived curiosities' (Bauer, 1990 p. 114). Given the difficulties associated with achieving genuine interdisciplinarity, (which were also highlighted by the differences between the discourses revealed by the second Q study) perhaps the focus needs to shift towards *multi-disciplinary* effort, and toward the promotion of more meaningful communication. Following his language metaphor, Bauer goes on to argue that children brought up in multilingual environments learn to communicate across languages with much greater ease than adults attempting to learn new languages can, and suggests that over time students from different disciplines working in a multi-disciplinary environment may eventually bring genuinely interdisciplinary aspects to their work by transcending the 'barriers they perceive among their mentors' (Bauer, 1990 p. 114). The implication is that interdisciplinarity cannot be taught, however communication between disciplines *can* be facilitated. In its use of Q methodology to reveal the diversity and structure of perspectives within the scientific community on Galápagos, the material in this thesis can contribute to this process of

deepening and enhancing communication between disciplines. Although some people have argued that there is really 'no obvious reason to assume that a greater degree of interdisciplinary debate amongst natural and social...scientists will lead to better outcomes in the conservation policy domain' (Filer, 2011 p.265), arguably better communication between disciplines could lead to a more realistic conceptualisation of policy processes. This might facilitate a shift towards the more deliberative policy ideal in which scientific knowledge (from various disciplines) is included alongside other forms of knowledge and discourses, as 'one among a plurality of factors that help determine how people frame a particular problem or position' (Sarewitz, 2004 p. 400).

9.4 Avenues for future research

The research presented in this thesis has been focused at the level of discourse, uncovering and analysing the range of discourses around conservation and science on Galápagos. The results represent an attempt to move debate about Galápagos conservation beyond simplistic binary oppositions of development versus conservation premised on a vision of the Galápagos as a pristine space into which humans have invaded, and have given rise to a number of suggestions about possible directions for a rethinking or re-framing of the conservation debate in Galápagos.

Further work analysing the discourses and practices of science on Galápagos would appear particularly necessary. While exercises such as the National Park's 'Science for sustainability' project (Tapia et al., 2009a), might appear to be attempting this, the findings of the project that science must be at the heart of decision making (*ibid.* p. 144) actually serves to reinforce a 'rendering technical' (Li, 2007) of the problems of Galápagos, placing knowledge into a hierarchy in which science emerges as the 'gold standard for policy relevant knowledge' (Elgert, 2010 p. 388) without paying sufficient attention to the fact that scientific knowledge is inevitably partial and value-laden, and (especially when dealing with 'wicked problems' such as conservation or sustainability) that the technical is always to some degree political. Future research examining ways in which policy spaces could be opened up for deliberation about what or whose knowledge constitutes evidence in policy making could be a step in the right direction.

Similarly more in depth work exploring challenges to the idea of a 'pristine nature', or the idea of 'naturalness' itself that underpins so many conservation interventions on Galápagos appears to be a pressing concern. Although this research has illustrated the continued existence of a vision of the islands as 'uninhabited' (for example within the discourse of

International Conservation concern revealed in chapter 5), there *is* some evidence that in recent years the narrative of pristine nature and associated discourses which posit the ultimate conservation aim as achieving the ecological state of the islands in pre-discovery times, are slowly beginning to lose their grip on the conservation community. Thus Mark Gardener, head of terrestrial sciences at the Charles Darwin Foundation recently commented:

‘Ten years ago I was much more idealistic and my vision of restoration was to return nature to its pristine, pre-human state. With the wisdom of hindsight I now realise that this vision was unrealistic. The inhabited islands of the Galápagos have been irrevocably changed.... What is a realistic vision for restoration in Galápagos[?].... A cultural landscape: one that merges the needs of conservation and people’ (Gardener, 2010)

Similarly a participant who loaded on the discourse of Social Justice and equitable development, situated himself against the strict separation of humanity from nature, arguing that *“we need to believe in the idea that human beings can live in environmentally friendly ways. That is sustainable development.”* Future research could take these emerging ‘visions’ of Galápagos as a starting point to explore ways of opening up deliberation about what kind of nature is it that conservation is trying to conserve on Galápagos.

Finally, although research revealing a plurality of perspectives is valuable, in order for that research to be useful in the policy process, the ‘policy process and its institutions have simultaneously to change’ (Leach and Mearns, 1996a p. 33). Thus while revealing and critiquing the different discourses was a vital first step toward understanding the dynamics of conservation on Galápagos as a social and political process, in order to build up a more comprehensive understanding of the reasons as to *how* and *why* certain discourses come to dominate in policy at the expense of others, and hence to explore in more depth the challenge of *how* policy processes might be made more deliberative and inclusive, future research needs to be broadened beyond the analysis of the discourses that inform (or not) policy positions, to further explore the way in which these ‘policy positions become embedded in networks (of actors, funding, professional and other relationships, and particular institutions and organisations), and the enabling or constraining power dynamics’ (Wolmer, 2006 p. 9). One of the ways in which this more comprehensive understanding might be achieved in the Galápagos context is following the more ethnographic approach as outlined by Fairhead and Leach (2003), which combines a ‘Foucauldian discourse analytic with attention to the particular scientific and policy practices and forms of agency which both give rise to and sustain, but may also challenge dominant discourses over time’ (p. 17).

9.5 Concluding remarks

Conservation decision making has been called a 'tournament of value' (Robertson and Hull, 2001 p. 973) in which different stakeholders compete to advance diverse agendas. The research presented in this thesis was motivated by a sense that the discursive contours of this 'tournament of value' had not been adequately examined in the existing literature about Galápagos. Here, perhaps more clearly than anywhere else, many people taking part in debates around conservation 'reify "science" and "nature" and wield these ideals as if they held the sharp and definitive reality of swords' (*ibid* p. 973). The material in this thesis has sought to question these terms, examining how they feature in different discourses around conservation in the archipelago, and exploring how these discourses act to open-up or close-down space for democratic deliberation about desired futures. By exposing the normative presuppositions operating below the surface of the different discourses and examining how these act to structure understandings and definitions of problems, this thesis hopes to have contributed to making debates around conservation on Galápagos both more transparent and democratic. Analysing discourses in this way matters given that discourses 'help to constitute and re-constitute the world just as surely as do formal institutions or material economic forces' (Dryzek, 1997 p. 236), and is a vital first step in the search for creative solutions to the multiple challenges of conservation in Galápagos and elsewhere.

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Appendix I: Current and historical names of the Galápagos Islands

The Galápagos Islands were officially re-named the Archipiélago de Colón by the Ecuadorian Government in 1892, in commemoration of the 400th year anniversary of Columbus' arrival in the Americas, but when designated as a province in 1973 the name was entered in the records as Provincia de Galápagos, and the islands are widely known as the Galápagos Islands or Las Islas Galápagos. The individual islands have also been named and renamed several times over their history by successive travellers starting in 1684 William Ambrosia Cowley's chart. Until the late nineteenth century the islands were known by various English and some Spanish names, but they were subsequently officially re-named in 1892 with their now widely used Spanish names which appear in the left-hand column of the list below. However the earlier English names (listed in the right-hand column) continued to be used throughout the last century, and are still (albeit infrequently) used today. The list below covers the names of the 18 islands whose surface area exceeds 1 km².

Current Spanish name	English name
Baltra	South Seymour
Bartolomé	Bartholemew
Darwin	Culpepper
Española	Hood
Fernandina	Narborough
Floreana/Santa María	Charles
Genovesa	Tower
Isabela	Albermarle
Marchena	Bindloe
Seymour Norte	North Seymour
Pinzón	Duncan
Pinta	Abingdon
Rábida	Jervis
San Cristóbal	Chatham
Santa Cruz	Indefatigable
Santa Fé	Barrington
Santiago/San Salvador	James
Wolf	Wenman

[Source: Woram 2005]

Appendix II: Information sheet and instructions for participants in English and Spanish.

Project title: “Mapping Social Perspectives on Galápagos Conservation”

You are being invited to take part in a research project. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask me if there is anything that is not clear or if you would like more information (contact details on reverse). Take time to decide whether or not you wish to take part.

Thank you for reading this.

What is the project’s purpose?

This study aims to uncover the different opinions, values and worldviews underlying the various environmental perspectives and attitudes towards biodiversity conservation on Galápagos. Ideally results will help to build understanding of root causes of conflict over natural resources, highlight the areas of consensus between viewpoints, and perhaps signal ways of moving towards a shared vision of a sustainable society on Galápagos.

Why have I been chosen?

Participants for this study have all been purposively selected on the basis of being actively involved in or affected by Galápagos conservation, and are therefore assumed to have well formed (if potentially divergent) opinions about the topic in question. In all, the study aims to work with between 30 – 40 people.

Do I have to take part?

Taking part in this research is entirely voluntary and if you do not wish to participate you do not need to do so. If you do decide to take part you will be given this information sheet to keep (and be asked to sign a consent form) and you can still withdraw at any time without it affecting any benefits that you are entitled to in any way. You do not have to give a reason.

How do I take part?

If you would like to be involved in this research you will be contacted to arrange a time to undertake an interview (at your convenience and in the location of your choosing) that will last between 30 minutes to 1 hour. During this interview you will be asked to read a number of statements about the Galápagos environment and conservation, and to sort these statements according to whether you feel they represent your opinion or not. Whilst you are sorting these statements you will be asked to discuss your reasons for sorting the statements in the way that you do. Questions will be open ended, for example “*why do you feel that this is an important issue?*” or “*why do you agree with this statement?*” There are many different opinions about the conservation of Galápagos, and this study is not looking to judge anyone as right or wrong, the research is simply interested in your opinion. If you do not wish to discuss your reasons for sorting any particular statements, you do not have to.

Will I be recorded, and how will the recorded media be used?

Your interview will be recorded in order to help the researcher interpret the results.

Transcripts of the audio recordings made during this research will be used only for analysis and for illustration in conference presentations and lectures. You will not be identifiable in the publication of these transcripts. No other use will be made of them without your written permission, and no one outside the project will be allowed access to the original recordings.

What are the possible disadvantages and risks of taking part?

There are no foreseeable risks to you as a result of taking part in the study.

What are the possible benefits of taking part?

Whilst there are no immediate benefits for those people participating in the project, it is hoped that this work will provide insights into the different ways in which people on Galápagos understand the challenges facing the islands, and perhaps help to shed light on underlying causes of conflict, and point to common ground and potential solutions.

Will my taking part in this project be kept confidential?

All the information that we collect about you during the course of the research will be kept strictly confidential. You will not be able to be identified in any reports or publications.

What type of information will be sought from me and why is the collection of this information relevant for achieving the research project's objectives?

You will be asked to provide details about your age, gender, profession, and to describe your involvement with the Galápagos Islands (e.g. number of years residence, island of residence etc) This information will be used in the analysis of the results.

What will happen to the results of the research project?

The results will form part of doctoral level research at the University of Leeds. Additionally the researcher will seek to publish these results in academic journals in the UK. If you would like a copy of the published results to be sent to you, please tick the appropriate box on the consent form.

Who is organising and funding the research?

The study is being carried out by a doctoral level researcher at the University of Leeds, UK. It is funded by the Natural Environment Research Council (NERC) and the Economic and Social Research Council (ESRC), and is carried out in collaboration with the Galápagos National Park.

Contact for further information

If you have any queries or questions, or would like to discuss any aspect of this study (with no commitment to participate) please do not hesitate to contact me:

Rose Cairns

Sustainability Research Institute/ Faculty of Biological Sciences

University of Leeds

LS2 9JT

Email: r.cairns08@leeds.ac.uk

Cel Ecuador: (+ 593) 0801 85178

Tel UK: (+44) 0 113 3434 966

<http://www.see.leeds.ac.uk/people/r.cairns>

If you agree to take part you will be given a copy of this information sheet to keep along with a signed consent form. Thank you for your time.

Título del Proyecto: “Documentando Perspectivas Sociales sobre la Conservación de las Galápagos”

Le invitan a participar en una investigación. Antes de decidir, es importante entender por qué se hace la investigación y en qué consiste exactamente. Por favor, tómese su tiempo para leer la siguiente información y comentarla con otras personas si desea. Pregúnteme si hay algo que no está claro o si requiere de más información (datos de contacto al revés). Tómese su tiempo para decidir si quiere participar o no.

Gracias por leer esto.

Cuál es el objetivo del proyecto?

Este estudio tiene como fin descubrir las diferentes opiniones, valores y puntos de vista subyacentes de las diferentes perspectivas y actitudes respecto a la conservación de la biodiversidad en las Galápagos. Idealmente los resultados ayudarán a construir un mejor entendimiento de las causas del conflicto sobre los recursos naturales, señalar donde haya acuerdo entre diferentes puntos de vista y quizás señalar maneras de progresar hacia una visión compartida de una sociedad sustentable en las Galápagos.

Por qué he sido elegido?

Los participantes en este estudio han sido seleccionados porque todos están involucrados o afectados por la conservación en Galápagos y se supone que tendrán opiniones bien formadas (y potencialmente muy diferentes) sobre el tema. En todo, el objetivo del estudio es trabajar con entre 30 y 40 personas.

Es obligatorio participar?

Participar en este estudio es completamente voluntario, y si no desea participar no es obligatorio. Si decide participar se le dará esta hoja de información para guardar (y se le pedirá firmar un formulario de consentimiento) del que seguirá pudiendo retirarse en cualquier momento sin que afecte a cualquier beneficio. No es necesario dar un motivo.

Cómo participo?

Si quiere participar en esta investigación se contactará con usted para organizar una entrevista (a su conveniencia y en un lugar que usted elija.) La entrevista durará entre unos 30 minutos y una hora. En esta entrevista se le pedirá leer unas declaraciones sobre el medio ambiente y la conservación de las Galápagos y se le pedirá organizar estas declaraciones según si usted cree que reflejan su opinión o no. Mientras organiza estas declaraciones se le pedirá dar las razones por las que las ha organizado de la manera en la que las ha hecho. Las preguntas serán abiertas, por ejemplo ‘por qué usted cree que esto es un tema importante?’ o ‘por qué está de acuerdo con esta declaración?’ Hay muchas opiniones diferentes sobre la conservación de las Galápagos, y este estudio no se trata de juzgar a nadie ni de decir que hay opiniones correctas o erróneas, lo importante de esta investigación es su opinión personal. Si no quiere hablar de los motivos por los que organiza unas declaraciones particulares no tiene porque hacerlo.

La entrevista será grabada y cómo será utilizada la grabación?

Su entrevista será grabada para ayudar a la investigadora a interpretar los resultados. Los transcritos de las grabaciones hechas durante la investigación serán utilizados sólo para análisis y por motivos de ilustración en presentaciones y conferencias. Usted quedará anónimo en la publicación

de estos transcritos. No serán utilizados de cualquier otra manera sin su permiso escrito, y nadie tendrá acceso a las grabaciones originales.

Cuáles son las desventajas y riesgos posibles de participar

No hay ningún riesgo previsible como resultado de participar en el estudio.

Cuáles son los beneficios de participar?

Mientras no hay ningún beneficio inmediato para los que participan en el estudio, se espera que este trabajo dará una visión reveladora, y ayudará a entender mejor las distintas maneras en las que la gente en las Galápagos entiende los retos que enfrentan las islas, y quizás ayudar a señalar cuales son las causas subyacentes del conflicto, y destacar las cosas en común y las soluciones potenciales.

Mi participación en el proyecto será confidencial?

Toda la información que recojamos de usted durante la investigación será estrictamente confidencial. Usted no será identificado en ningún informe o publicación.

Qué tipo de información se requiere de mi y por qué es pertinente a los objetivos de la investigación?

Se le pedirá dar sus datos personales (edad, genero, profesión) y también describir su involucramiento con las islas Galápagos (por ejemplo numero de años de residencia, isla de residencia, etc.) Esta información será utilizada en el análisis de los resultados.

Cómo serán utilizados los resultados del proyecto?

Los resultados formarán parte de un doctorado en la universidad de Leeds en Inglaterra. Además, la investigadora espera publicar los resultados en publicaciones académicas en el Reino Unido. Si usted desea que le envíen una copia de los resultados publicados, por favor, marque la casilla apropiada en el formulario de consentimiento.

Quién organiza y financia la investigación?

El estudio se realiza por un estudiante de doctorado de la Universidad de Leeds. Esta financiado por el 'Natural Environment Research Council (NERC)' (Instituto de Investigación sobre el Medio Ambiente Natural) y el 'Economic and Social Research Council (ESRC)' (Instituto de Investigación Económico y Social) con el Parque Nacional Galápagos.

Contacto para más información

Si usted tiene cualquier duda o pregunta o si quiere hablar sobre cualquier aspecto de este estudio (sin cualquier obligación a participar) por favor no dude en contactarme:

Rose Cairns

Sustainability Research Institute/ Faculty of Biological Sciences

University of Leeds

LS2 9JT

Email: r.cairns08@leeds.ac.uk

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<http://www.see.leeds.ac.uk/people/r.cairns>

Si decide participar se le dará una copia de este documento conjunto con un formulario de consentimiento firmado. Gracias por su tiempo.

Instructions for completing the Q sort

There are different opinions regarding the conservation of Galápagos. This study aims to uncover some of these opinions.

You will be given a pack of 52 cards each with a statement referring to the Galápagos printed on it. These statements have been drawn from literature about Galápagos, and informal interviews with Galápagos residents, scientists and others.

Please read through all the statements before starting, then place each statement on the chart (between -4 and +4) according to how well it matches your point of view.

There is no right or wrong answer – this study is interested in your personal opinion. Please take the time to consider the position of the statements relative to one another.

Instrucciones para completar el 'análisis Q'

Hay opiniones diferentes respecto a la conservación de las Galápagos. Este estudio tiene como fin, descubrir algunas de estas opiniones.

Se le dará un paquete de tarjetas 52, cada una con una declaración referente a las Galápagos impresa encima. Estas declaraciones han sido sacadas de literatura sobre las islas Galápagos y entrevistas informales con residentes de las Galápagos, científicos y otras personas.

Por favor lean cada una de las declaraciones antes de empezar, después coloquen cada declaración en la tabla (entre -4 y +4) según como corresponde con su punto de vista personal.

No hay una respuesta acertada ni equivocada – este estudio se trata de su punto de vista personal. Por favor tómense su tiempo para considerar como las declaraciones se relacionan entre ellas.

Appendix III. Information sheets and instructions for participants in English and Spanish

Project title: “Understanding the role of science on Galápagos”

You are being invited to take part in a research project. Please take time to read the following information carefully and discuss it with others if you wish. Ask me if there is anything that is not clear or if you would like more information (contact details on reverse). Take time to decide whether or not you wish to take part.

Thank you for reading this.

Project background. The urgent nature of the conservation challenges facing Galápagos have resulted in repeated calls for science to make itself relevant to the building of a sustainable future on Galápagos and to contribute to conservation. However, there has been little formal study of exactly what this means for the different scientists involved in production of scientific knowledge about the islands, and little engagement with critical debates about the appropriate role of scientists and the application of this knowledge in society. This study therefore aims to use Q methodology (see below) to examine the variety of perspectives towards the role of science and scientists on Galápagos held by those within the scientific community itself. Ideally results from this study will highlight common ground as well illustrating the root causes of disciplinary and other differences and provide a framework within which to clarify debate.

Q method The research will employ Q method, a technique derived from psychology. Q provides a rigorous method for the empirical study of ‘subjectively held beliefs’ or perceptions. The method is fundamentally different from survey techniques or opinion polls which aim to look at the proportions of particular viewpoints in a given population. Instead Q method seeks to understand the underlying structure of the viewpoints held by different people without assuming that these necessarily fall into the categories devised by the questionnaire, poll or survey. Further details about Q methodology can be found here: www.qmethod.org

What is involved in doing a “Q sort”? Q Interviews take between 30 mins – 1 hour. During this time you will be asked to rank a number of subjective statements (in this case 34) about science on Galápagos, according to how much or how little they match your own opinion. Statements are printed onto cards which are rank-ordered into a forced quasi-normal distribution chart. The use of this distribution is simply to encourage participants to consider the relative importance of each statement relative to the others, and has been shown to reveal greater subtleties in perspective differences than a straightforward scoring system. The viewpoints of different participants are then compared using factor analysis in order to determine what, if any, patterns of thought exist in the population.

Why have I been selected? Participants for this study have all been purposively selected on the basis of being actively involved in science on Galápagos, and are therefore assumed to have well formed (if potentially divergent) opinions about the topic in question. Q studies work with a small sample size of between 30 – 40 individuals. In this case, key individuals from the Galápagos National Park service and the Charles Darwin Foundation, visiting scientists from a range of external institutions, and researchers from other Galápagos based or national institutions involved in science on Galápagos have been contacted to carry out a Q sort.

Will I be recorded, and how will the recorded media be used? Your interview will be recorded in order to help the researcher interpret the results. Transcripts of the audio recordings made during this research will be used only for analysis and for illustration in conference presentations and lectures. You will not be identifiable in the publication of these transcripts. No other use will be made of them without your written permission, and no one outside the project will be allowed access to the original recordings.

Will my taking part in this project be kept confidential? All the information that we collect about you during the course of the research will be kept strictly confidential. You will not be able to be identified in any reports or publications.

What type of information will be sought from me and why is the collection of this information relevant for achieving the research project's objectives? You will be asked to provide details about your age, gender, profession, and to describe your involvement with the Galápagos Islands (e.g. number of years residence, island of residence etc) This information will be used in the analysis of the results.

What will happen to the results of the research project? The results will form part of doctoral level research at the University of Leeds. Additionally the researcher will seek to publish these results in academic journals in the UK. If you would like a copy of the published results to be sent to you, please tick the appropriate box on the consent form.

Funding and collaboration This research is funded by the UK's Economic and Social Research Council (ESRC) and the Natural Environment Research Council (NERC), and forms part of doctoral level research into Galápagos Conservation, carried out at the University of Leeds, in collaboration with the Galápagos National Park.

Contact for further information If you have any queries or questions, or would like to discuss any aspect of this study (with no commitment to participate) please do not hesitate to contact me:

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Sustainability Research Institute/ Faculty of Biological Sciences
University of Leeds
LS2 9JT
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If you agree to take part you will be given a copy of this information sheet to keep along with a signed consent form. Thank you for your time.

Título del proyecto: Perspectivas sobre el papel de la ciencia en las islas Galápagos

Le invitan a participar en una investigación. Por favor, tómese su tiempo para leer la siguiente información y comentarla con otras personas si desea. Pregúnteme si hay algo que no está claro o si requiere de más información (datos de contacto al revés). Tómese su tiempo para decidir si quiere participar o no.

Gracias por leer esto.

Antecedentes del Proyecto La naturaleza urgente de los retos de conservación a los que se enfrentan las Islas Galápagos ha dado lugar a continuos llamamientos para que la ciencia participe de forma activa en la creación de un futuro sostenible para las Islas Galápagos y contribuya a la conservación. Sin embargo, existen pocos estudios formales acerca de lo que esto significa exactamente para los diferentes científicos que están involucrados en la producción de conocimiento científico sobre las islas y también hay poca participación en los debates críticos sobre la naturaleza y el estado del conocimiento científico producido, el papel apropiado de los científicos y la aplicación de estos conocimientos en la sociedad. Por lo tanto, este estudio pretende utilizar el método Q (véase a continuación) para examinar la variedad de perspectivas que existe dentro de la propia comunidad científica con respecto al papel de la ciencia y los científicos en las Islas Galápagos. Los resultados ideales de este estudio resaltarán el terreno común, ilustrarán las causas iniciales de las diferencias disciplinarias o de otro tipo, y proporcionarán un marco en el que se podrá clarificar el debate.

Método Q Esta investigación utiliza el método Q, una técnica que proviene de la psicología y que proporciona un medio riguroso de estudiar empíricamente las creencias o percepciones subjetivas existentes. El método Q es totalmente diferente de las técnicas de sondeo o encuestas, cuyo objetivo es observar las proporciones de los puntos de vista concretos de una población específica. El método Q pretende comprender la *estructura* subyacente de los puntos de vista que tiene cada persona, sin asumir que estos se clasifican necesariamente en las categorías que determina el cuestionario, la encuesta o el sondeo. Para obtener más información acerca de la metodología Q visite: www.qmethod.org

¿Cómo participo? Un análisis Q toma entre 30 minutos y una hora para ser completada. Se le pedirá que ordene un número de enunciados subjetivos (en este caso 34) sobre el tema de la ciencia en Galápagos de acuerdo si usted está de acuerdo o en desacuerdo con estos. Las afirmaciones impresas en las tarjetas se clasifican en una gráfica de distribución forzada cuasi normal. Esta distribución se utiliza simplemente para que considere la importancia relativa de cada afirmación con respecto a las otras y ha demostrado ser eficaz para revelar mayores sutilezas en las diferencias de las perspectivas que las que muestra un sistema directo de puntuación.

¿Por qué he sido elegido? Los participantes en este estudio han sido seleccionados porque todos están involucrados en la ciencia en Galápagos y se supone que tendrán opiniones bien formadas (y potencialmente muy diferentes) sobre el tema. En todo el objetivo del estudio es trabajar con entre 30 y 40 personas.

La entrevista será grabada y cómo será utilizada la grabación? Su entrevista será grabada para ayudar a la investigadora a interpretar los resultados. Los transcritos de las grabaciones hechas durante la investigación serán utilizados sólo para análisis y por motivos de ilustración en presentaciones y conferencias. Usted quedará anónimo en la publicación de estos transcritos. No serán utilizados de cualquier otra manera sin su permiso escrito, y nadie tendrá acceso a las grabaciones originales.

Mi participación en el proyecto será confidencial? Toda la información que recojamos de usted durante la investigación será estrictamente confidencial. Usted no será identificado en ningún informe o publicación.

Qué tipo de información se requiere de mí y por qué es pertinente a los objetivos de la investigación? Se le pedirá dar sus datos personales (edad, género, profesión) y también describir su involucramiento

con las islas Galápagos (por ejemplo número de años de residencia, isla de residencia, etc.) Esta información será utilizada en el análisis de los resultados.

Cómo serán utilizados los resultados del proyecto? Los resultados formarán parte de un doctorado en la universidad de Leeds en Inglaterra. Además, la investigadora espera publicar los resultados en publicaciones académicas en el Reino Unido. Si usted desea que le envíen una copia de los resultados publicados, por favor, marque la casilla apropiada en el formulario de consentimiento.

¿Quién organiza y financia la investigación? El estudio se realiza por un estudiante de doctorado de la Universidad de Leeds. Esta financiado por el 'Natural Environment Research Council (NERC) (Instituto de Investigación sobre el Medio Ambiente Natural) y el Economic and Social Research Council (ESRC) (Instituto de Investigación Económico y Social) de Reino Unido, con el Parque Nacional Galápagos.

Contacto para más información

Si usted tiene cualquier duda o pregunta o si quiere hablar sobre cualquier aspecto de este estudio (sin cualquier obligación a participar) por favor no dude en contactarme:

Rose Cairns
Sustainability Research Institute/ Faculty of Biological Sciences
University of Leeds
LS2 9JT
Email: r.cairns08@leeds.ac.uk
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Tel UK: (+44) 0 113 3434 966
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Si decide participar se le dará una copia de este documento conjunto con un formulario de consentimiento firmado. Gracias por su tiempo.

Instructions for completing the Q sort

There are different opinions regarding the role that science and scientists should play on Galápagos. This study aims to uncover some of these opinions.

You will be given a pack of 34 cards each with a statement referring to science and scientists on Galápagos printed on it. These statements have been drawn from literature about Galápagos, and interviews with scientists and conservation managers working on Galápagos.

Please read through all the statements before starting, then place each statement on the chart (between -4 and +4) according to how well it matches your point of view (from +4 being most like your point of view to -4 being most unlike your point of view).

You are being asked to rank order the statements in a grid with a quasi-normal distribution. This is in order to encourage you to consider the relative importance of each of the statements in your point of view.

There is no right or wrong answer – this study is interested in your personal opinion.

While you sort the cards you are encouraged to ‘think out loud’, and any comments will be recorded to aid interpretation of your point of view following the interview. Your Q sort and any comments you make during the course of the interview will remain anonymous.

Instrucciones para completar el ‘análisis Q’

Hay opiniones diferentes respecto al papel de la ciencia y los científicos en las Galápagos. Este estudio tiene como fin, descubrir algunas de estas opiniones.

Se le dará un paquete de tarjetas 34, cada una con una declaración referente a ciencia y científicos en las Galápagos impresa encima. Estas declaraciones han sido sacadas de literatura sobre las islas Galápagos y entrevistas con científicos y otras personas trabajando en la conservación.

Por favor lean cada una de las declaraciones antes de empezar, después coloquen cada declaración en la tabla (entre -4 y +4) según como corresponde con su punto de vista personal (+4 significa lo más cerca de su punto de vista, hasta -4 siendo lo más lejos de su punto de vista.)

Usted tiene que colocar las tarjetas en una tabla con una forma ‘cuasi-normal’. Esto es para incentivarle a considerar la importancia relativa de las declaraciones según su punto de vista.

No hay una respuesta acertada ni equivocada – este estudio se trata de su punto de vista personal.

Mientras usted está colocando las tarjetas cualquier comentario que usted hace será grabado para ayudar a la investigadora interpretar su punto de vista después de la entrevista. Su análisis y cualquier comentario permanecerán anónimos.