What constitutes a successful biodiversity corridor? A Q-study in the Cape Floristic Region, South Africa

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Abstract

'Success' is a vigorously debated concept in conservation. There is a drive to develop quantitative, comparable metrics of success to improve conservation interventions. Yet the qualitative, normative choices inherent in decisions about what to measure – emerging from fundamental philosophical commitments about what conservation *is* and *should be* – have received scant attention. We address this gap by exploring perceptions of what constitutes a successful biodiversity corridor in the Cape Floristic Region, South Africa, an area of global biodiversity significance. Biodiversity corridors are particularly illustrative because, as interventions intended to extend conservation practices from Protected Areas across broader landscapes, they represent prisms in which ideas of conservation success are contested and transformed. We use Q method to elicit framings of success among 20 conservation scientists, practitioners and community representatives, and find three statistically significant framings of successful corridors: 'a last line of defence for biodiversity under threat,' 'a creative process to develop integrative, inclusive visions of biodiversity and human wellbeing,' and 'a stimulus for place-based cultural identity and economic development.' Our results demonstrate that distinct understandings of what a corridor *is* – a planning tool, a process of governing, a territorialized place – produce divergent framings of 'successful' corridors that embody diverse, inherently contestable visions of conservation. These framings emerge from global conservation discourses and distinctly local ecologies, politics, cultures and histories. We conclude that visions of conservation success will be inherently plural, and that in inevitably contested and diverse social contexts success on any terms rests upon recognition of and negotiation with alternative visions.

Keywords: *Biodiversity corridors; Cape Floristic Region; conservation success; values; framings; Q method*

1. Introduction

Success is a vigorously debated concept in conservation science and practice (Stern, 2001; Kapos et al., 2008; Howe and Milner-Gulland, 2012). Success is particularly pertinent because the rapid and continued disappearance of species and habitats undermines one of the most oft-cited rationales for conservation – the protection of biodiversity – and appears to suggest that many conservation interventions, particularly protected areas (PAs), are 'failing' (Kareiva et al., 2011). This perception of failure, and the need to spend the "limited resources available for conservation" wisely, has prompted widespread efforts to devise common frameworks and standard lexicons by which to assess conservation success (Kapos et al., 2008: 155; Sutherland, 2005; Salafsky et al., 2008). These initiatives rest on the premise that precise, objective, and quantitative measures of success – generally equated with biological and ecological indicators – will enable the design of more effective conservation interventions (Salafsky et al., 2002). But while quantitative measures are surely important, these attempts often fail to make explicit the normative, qualitative choices that lie behind quantitative indicators, emerging from inherently contestable philosophical commitments about what conservation *is* and *should be* (Sandbrook 2015). Indeed, failure to recognize the diverse ways in which participants in conservation interventions may judge success has led to conflict in both conservation research and practice (Stern, 2001; Axford et al., 2008; Tallis and Lubchenco 2014). Murray (2005: 903) notes that neglect of the multifaceted ways in which conservation success is judged may be "more likely to compromise the conservation of biodiversity than promote it by ignoring – or intentionally deemphasizing – critical aspects of social process and social context." Therefore, an equally important yet less widely acknowledged endeavour is to clarify plural notions of success among diverse conservation actors. This paper contributes to the literature on conservation success by exploring stakeholder perceptions of what constitutes a successful biodiversity corridor in the Cape Floristic Region (CFR), South Africa. The CFR is especially important because of its global significance for biodiversity conservation, and biodiversity corridors are particularly illustrative because, as interventions intended to extend conservation practices from PAs to broader landscapes, they represent prisms where ideas of conservation success are contested and transformed.

Many potential criteria for conservation success have been proposed. Karp et al. (2015) identify seven broad conservation objectives, including extinction risk, extirpation risk, evolution, naturalness, and provisioning, regulating and cultural services, each with a number of possible indicators of success. Murray (2005: 889) and Brechin et al. (2010) identify a range of economic, political and social conservation goals, including poverty alleviation, empowerment of marginalized communities, and participatory and inclusive processes. The criteria for success selected in any particular conservation intervention represent, on the one hand, valued outcomes by particular people in particular contexts, and on the other hand, normative assumptions about desirable or actual relationships between people and nature. For instance, Mace (2014) shows how four framings of conservation, 'nature for itself,' 'nature despite people,' 'nature for people,' and 'people and nature,' produce very different metrics for measuring success. Mace notes that these framings exist alongside each other (often in the same organization, government department, or citizen group), complicating conservation interventions. A particularly visible expression of the conflict that may occur between competing framings is the contemporary debate between 'people-centred' and 'traditional' conservationists. Kareiva et al. (2011) advocate a "new," people-centred conservation that protects biodiversity as a means to ameliorate human poverty and generate economic growth, while Soulé (1985, 2013) argues for conservation motivated by the intrinsic value of biodiversity and based on the "mainstream" metrics of, e.g., endangered species listings. Despite the clear link between qualitative framings of conservation and quantitative criteria for success, the two debates have rarely been empirically linked.

In this paper we link these debates by exploring framings of successful biodiversity corridors. Biodiversity corridors have been identified as "cornerstones of modern conservation," widely employed by conservation practitioners, communities, policy-makers and land-managers (Chetkiewicz et al., 2006: 318). As initially formulated in the 1960s and 70s, biodiversity corridors constituted linear strips of habitat that would supposedly enable direct dispersal of species - largely fauna – between PAs, thus improving the "conservation status of otherwise isolated populations" (Bennett, 2003: 7). Successful corridors were framed as linking habitat islands in 'inhospitable seas' of human activity (e.g. Gilpin and Diamond, 1980). However, the core assumptions underlying this approach – that 'natural' habitats are spatially homogenous and temporally constant compared to an apparently heterogeneous, fragmented matrix hostile to biodiversity – have been widely challenged (e.g. Haila, 2002; Bennett, 2003; Chetkiewicz et al., 2006). Contemporary fragmentation research suggests that all habitats, whether considered 'natural' or 'human-influenced,' are fragmented in particular ways, and

that each particular kind of fragmentation has uneven consequences for biodiversity (Fahrig, 2003; Fischer and Lindenmayer, 2007). Corridors have been subsequently incorporated into a wider discourse around 'connectivity conservation,' where success is framed in terms of the effectiveness of various habitat patterns to ensure particular types of ecological connectivity for particular species, communities and processes (Crooks and Sanjayan, 2006). This framing has removed the sharp distinction between 'natural' and 'human-influenced' habitat, and, by recognizing connectivity in the landscape as a relation between human practices and ecological patterns, corridors have subsequently become vectors for imagining manifold forms of "economic, institutional, and cultural" as well as ecological connectivity (Bennett, 2003: x).

These expanding interpretive possibilities reflect the corridor's intuitive conceptual and metaphoric appeal. This ambiguity can be seen in positive or negative lights. For some the corridor concept has become vague, related more to the human attraction to 'pathways' through the landscape than to the ecological requirements of species or habitats, while for others it is precisely this heuristic attractiveness that enables the corridor to perform the role of a 'boundary-object' – facilitating the coordination of disparate groups acting in the landscape (Star and Griesemer, 1989; Evans, 2007). In this paper, we contribute to the debate on conservation success not by producing a consensus framework or metric, but by clarifying the diverse ways in which successful corridors are framed in the CFR. In contrast to dominant approaches in conservation science, but common to those in the social sciences, we do not treat the term biodiversity corridor (or indeed conservation) as a pre-existing object about which an objective definition can be derived; rather, we treat corridors as discursive phenomena employed by different actors, in different contexts, to undertake particular kinds of work (e.g. Cairns and Stirling, 2014). We use Q method to explore framings of success in CFR biodiversity corridors among 20 conservation scientists, practitioners, and community representatives. This interpretive approach is novel – to our knowledge Q method has not previously been used to examine framings of biodiversity corridors – and contributes to growing efforts to expand social science, and particularly interpretive, contributions to conservation science (Newing, 2010; Sandbrook et al., 2013; Moon and Blackman, 2014).

1.1. Framing 'successful' biodiversity corridors in the Cape Floristic Region

The high stakes of contrasting perspectives on conservation success are starkly outlined in efforts to conserve biodiversity in the Cape Floristic Region (CFR), at South Africa's southwestern tip. The CFR is one of 35 global 'biodiversity hotspots' identified by Myers et al. (2000) and subsequently Conservation International (http://www.conservation.org/How/Pages/Hotspots.aspx) in an attempt to prioritise areas for biodiversity preservation. Biodiversity hotspots are representative of a perspective that associates conservation success with the protection of high levels of species and habitats (Fisher and Christopher, 2007). The CFR has exceptionally rich biodiversity – for instance, 70% of the CFR's 9000 plant species are endemic (Goldblatt and Manning, 2002). Yet the CFR, particularly the Cape Town metropolitan area, is also presented as a potential biodiversity 'mega-disaster' area, with 1406 plant species in the Red Data Book of endangered species (Cowling et al., 2003). Holmes et al. (2012a) identify habitat loss and fragmentation as the major threats to CFR biodiversity, driven by, among others, rapid urbanization, agriculture, invasive alien species and inappropriate fire regimes. Conservation biologists and planners have identified biodiversity corridors as a means to successfully prevent a "mega-disaster" by preserving ecological connectivity in the CFR (Cowling et al., 2003; Holmes et al., 2012a). However, the apparent 'threats' of urbanization and agriculture to conservation success reflect the diversity of imperatives in the CFR. Land-use and extant biodiversity patterns in the CFR reflect the fractured histories of apartheid, including exclusionary public policy and planning, high poverty and inequality (Graham and Ernstson, 2012). Consequently, increasingly diverse goals and criteria have entered into the discourse around biodiversity corridors.

Corridors are a key component of both the regional Cape Action for People and the Environment (CAPE) strategy and the City of Cape Town's strategy to integrate the preservation of ecologically functioning networks of remnant indigenous vegetation with urbanization and development imperatives (Younge and Fowkes 2003; Holmes et al., 2012a, 2012b). The South African National Parks authority (SANParks) envisages biodiversity corridors as a means of demonstrating how biodiversity conservation can be "an instrument for rural and regional [economic] development" in the CFR, including job creation, improved rural living standards, and broad-based economic participation, inclusion and empowerment (Harrison, 2013). Meanwhile, the World Wildlife Fund (WWF) views corridors as essential to enable CFR biodiversity to adapt to climate change (Pence, 2009), while

various private landowner and conservancy initiatives, such as the Biodiversity and Wine Initiative, the Agulhas and Langeberg biodiversity initiatives, and the organization Conservation at Work, view corridors as a way to integrate biodiversity conservation and agricultural production. These diverse criteria make Cape conservation frequently fractious, with different stakeholder groups establishing (not always explicitly) inherently normative orderings of the 'means' and 'ends' of conservation. While these controversies are on the one hand decidedly local, emerging from the specific social-ecological histories of particular places in the Cape, they also connect to global conservation discourse and action. For example, Fisher and Christopher (2007) highlight the high degree of overlap between the list of global biodiversity hotspots and widespread poverty in an attempt to broaden the terms on which success is judged in hotspot conservation interventions.

2. Method

We used Q method to examine framings of successful biodiversity corridors in the CFR. Q method is a form of discourse analysis first developed in psychology to study subjective understandings of particular phenomena (Stephenson, 1953), and increasingly applied in conservation science and environmental management (Cairns et al., 2013; Frantzi et al., 2009; Webler et al., 2009). Q method is an intensive 'small n' methodology in which a targeted group of participants – usually between twenty and forty people – individually rank order a series of statements about a particular topic in a numbered grid (Watts and Stenner, 2012). These rankings, or 'Q sorts,' are then analysed using factor analysis to identify groups of similarly completed sorts; these clustered areas of 'common ground' represent shared framings of the phenomena in question. Q method generally proceeds through three primary stages. First, statements about the phenomena in question are collated in a 'concourse,' before a smaller number of statements are selected in the 'Q sample' to be sorted by participants. Second, participants are identified and perform the Q sort. Third, the Q sorts are statistically analysed and interpreted.

2.1. Collating the concourse and the Q sample

Following standard practice in Q methodological research (e.g. Webler et al., 2001) we gathered statements about 'success' in biodiversity corridors from a wide range of sources, including seven semi-structured interviews with conservation practitioners, scientists, landowners, and community representatives; observational data from CFR biodiversity corridor workshops and meetings; scientific conference presentations and discussions at the 2013 Fynbos Forum and the 2013 International Sustainable Development Research Conference; published scientific articles; corridor newsletters, work plans and promotional material; and newspaper reports. The aim was to develop a comprehensive concourse that captured the diversity of opinions about success in CFR biodiversity corridors (Brown, 1993). There were 160 statements in the final concourse, by which point 'saturation point' was reached and new statements became repetitious.

A sample of 50 statements were selected from the concourse to form the 'Q sample' to be sorted by participants. The Q sample was produced through a semi-structured process drawing on previous empirical studies of conservation success (Axford et al. 2008), in which the entire concourse of statements were coded into the following categories: (1) ingredients for success (subdivided into broad categories such as 'rights and incentives,' 'participation and involvement,' and 'messaging and visions'), and (2) pictures of success (subdivided into categories such as 'ecological process and function,' 'governance,' 'society and economy'). This categorization was not intended to represent any authoritative delimitation of ingredients for and pictures of success, but to ensure that an appropriate range of statements were included in the Q sample. Finally, we took into account the advice of Webler et al. (2009: 9) to select statements that carry "excess meaning" (that can be interpreted differently by different participants), and that accurately reflect what is said in the concourse (even if such statements link multiple concepts). We selected an approximately even spread of statements across our categories for the final Q sample of 50 statements.

2.2. Participant selection and performing the Q sorts

In Q method, the aim is not to select participants based on their imagined representativeness of a wider population, but rather to strategically select participants whose viewpoints "matter" in relation to the subject at hand, and who are likely to express "a particularly interesting or pivotal point of view" (Watts and Stenner, 2012: 71). Nevertheless, representativeness is important in the sense that the researcher usually aims to select a participant group that will express a diverse range of opinions about the subject at hand. In this study, we targeted key sectors and stakeholder groups responsible for designing, implementing, and participating in CFR biodiversity corridors: local and provincial government bodies, NGOs, landowners, and community representatives. To maximise the diversity of

opinions, we ensured that participants were chosen from a range of landscape types, including urban, peri-urban and rural. Moreover, as attitudes to conservation in South Africa have been reported to diverge between ethnic and cultural groups (e.g. Graham and Ernstson 2012) we sought to ensure diversity in our participant group. We complemented this targeted approach with snowball sampling by encouraging participants to recommend other potential participants with different opinions, to ensure that a wide range of perspectives were included in the study.

All Q sorts were performed during audio recorded, face-to-face interviews, at locations chosen by participants. The researcher explained that the exercise was designed to elicit subjective opinions about success in CFR biodiversity corridors, and presented participants with the Q sample of 50 statements, all of which were formulated to complete the sentence '*a successful biodiversity corridor is one in which…*' Participants were then instructed to sort the statements into a pyramidal or 'quasi-normal' grid, see Figure 1, numbered on a scale from +4 ("most like my point of view") to -4 ("least like my point of view"). Participants were asked to order the statements onto the grid based on their personal opinions about biodiversity corridors in the CFR in general, taking into account their own experiences with corridors, but not attempting to replicate their organization's official position. While Brown (1980: 288-9) points out that the effects of the distribution matrix on the statistical results of a Q study are "virtually nil," use of a quasi-normal grid is widespread because it encourages participants to think carefully about the positioning of the statements and to express their preferences more clearly (Webler et al., 2009). In order to ease the potential concerns of participants about ranking statements, it was made clear that the scale is purely relative and used for heuristic reasons (Watts and Stenner, 2012: 78-9); for instance, ranking a statement at -4 does not necessarily mean the participant 'disagrees,' but simply that they apportion less importance to the statement than -3. Likewise, a statement ranked at 0 does not necessarily signify participant indifference, but may represent a "meaningful hub or centre from and around which positive and negative salience, the meaning of the Q sort and the variability of the distribution *distend*" (Watts and Stenner, 2012: 79). While some participants found ranking difficult, none expressed a wish to move away from the forced distribution. Many reported that the forced distribution helped them to clarify their perspective on corridors. The researcher encouraged participants to explain their reactions to statements during the exercise, and to explain their final ranking of statements. Q sorts generally took between 1 and 1½ hours to complete.

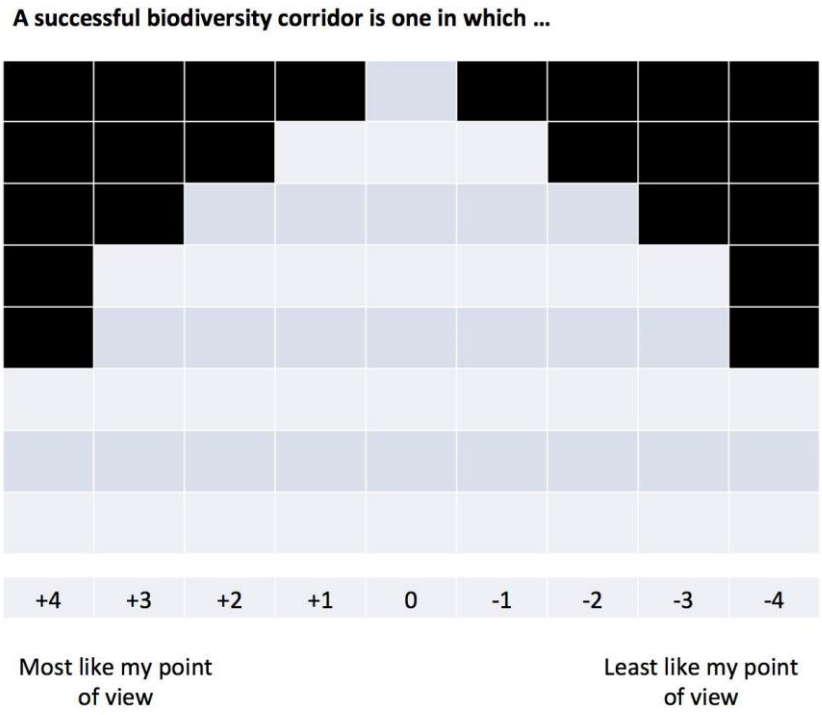

***Figure 1*:** The sorting grid. Participants were unable to place statements in black grid squares, encouraging participants to prioritise and express their preferences more clearly.

2.3. Analysis and interpretation

Q sorts were analysed with PQMethod software (Schmolck, 2002). Correlating each Q sort with all other sorts generated a correlation matrix, and bundles of similarly performed sorts were identified using a principal components analysis. A varimax rotation was then applied to these bundles, which represented 'factors' or shared framings of success. We sought a solution that maximised the simplicity, clarity, distinctness and stability of the factors (Webler et al., 2009), and used a mix of both qualitative and quantitative criteria to select the final factors to report. On the quantitative side, we only accepted factors upon which two or more participants placed statistically significant loadings (Brown 1980), that had eigenvalues greater than 1, and that explained significant degrees of variance (Watts and Stenner 2012). On the qualitative side, we chose the final factors based on their distinctness to each other, their internal coherence, and their relevance to existing discourses in the Cape and conservation discourses more broadly. Correlation between an individual sort and shared factor was considered significant at the $p < 0.01$ level if it exceeded a factor loading of ±0.36, according to the equation: 2.58 x $(1 \div \sqrt{n})$, where n = the number of statements in the Q sample, 2.58 x $(1 \div \sqrt{50}) = 0.3648$ (Brown 1980: 222).

Idealised sort patterns for each factor were produced using the weighted average of individual Q sorts significantly correlated with that factor (see Table 2). We used Watts and Stenner's (2012) 'crib sheet' technique to interpret the factors. The crib sheet is intended to provide a systematic, methodical and data-driven approach to factor interpretation that can be applied consistently to each factor. First, the idealised sort patterns of each factor were systematically compared and contrasted using a crib sheet (Appendix A), and consensus statements were examined to draw out similarities and differences between the factors. The meanings of the statements are not fixed, but rather constructed by participants in the context of the sorting exercise. It was therefore important at this stage to interpolate the idealised sort patterns with the interview transcripts, to ensure these meanings were appropriately captured and represented. Second, extended narrative descriptions of each factor were produced, incorporating circa 40 statements from the Q sample and interview data (Appendix B). Third, concise summaries of these extended descriptions were produced. Both extensive and condensed descriptions were then sent to participants, who were invited to comment, clarify and potentially dispute our descriptions. These comments were subsequently used to improve the validity of the final narrative descriptions.

3. Results

Ten men and ten women from a variety of cultural and ethnic backgrounds completed a Q sort (the sectors of each participant are provided in Table 1, names have been removed to protect anonymity). Three factors emerged from the statistical analysis. The idealised sort patterns for each factor are provided in Table 2, and the correlations between each factor are shown in Table 3. The condensed summary narratives of each factor are presented below, with the numbers in brackets representing the number of the statement in Table 2. The three factors represent differenst framings of successful biodiversity corridors. They reflect social rather than psychological phenomena, and as such we do not presume that individual participants are inherently or irrevocably tied to a particular frame. Rather, we understand frames to correspond to relatively stable societal discourses that participants may move between depending on the context of the Q sort, perceived or enacted role and, potentially, mood or experience.

Sector	**Number of Participants**
Local government department (Conservation)	4
Private landowner	3
Community representative	3
Regional government agency (Conservation)	1
Local government department (Environmental education)	1
International NGO (Conservation)	1
Regional NGO (Conservation)	1
Local NGO (Sustainable development)	1
Independent consultant	1
Academic (Natural sciences)	1
National research institute (Natural sciences)	1
National research institute (Social sciences)	1

***Table 1*:** Participant sectors

323
324
325

Statement	Idealised sort pattern		
	1	2	3
1. The historic scenery of the Cape is protected: people do not come here from around the world to see urban sprawl but to see the amazing natural scenery	1*	-2*	3*
2. Biodiversity conservation is mainstreamed into the spatial development plans and integrated development plans of municipalities	4	3	0*
3. It is demonstrated that communities in and around the corridor have an improved quality of life	-1*	2*	4*
4. Alien invasive species are eliminated from the corridor	4*	1*	-2*
5. Local people are trained to start up and run their own businesses	-2*	-1*	1*
6. Connections between fynbos islands are created amongst hostile seas of human activity	1*	-3	-2
7. Biodiversity is seen as an asset and is used as an engine of economic growth	-1	-1	4*
8. A shared vision for the future is established between all the different communities who live and work in the area	0	4*	0
9. Areas of critically endangered vegetation - as identified through the BioNet and other biodiversity planning instruments - are locked up for conservation at as little cost as possible	3*	1*	-1*
10. Habitat patches are linked together so that genetic exchange can take place between populations of species and allow rare species to persist and evolve	3	4	-1*
11. Stakeholders in the landscape just talk a bit more to each other and increase understanding a bit more	*0*	*-1*	*0*
12. Industrial development is prevented and restricted	2*	-2*	-3*
13. A social movement is created through new interpersonal relationships between communities, landowners, and government	-2*	1	0
14. Economic development is limited to very low impact activities such as high-value ecotourism, as fynbos is too ecologically sensitive to allow much else without damaging the ecosystem	2*	-1	-1
15. Clear economic incentives are provided to landowners, as participation and stakeholder buy-in really depend on whether it makes people better off financially	0	-3*	0
16. The design is based around the movements of large and charismatic wild animals like leopards and honey badgers	0*	-3	-3
17. The economy is transformed to create decent work	-3*	0*	1*
18. The corridor doesn't try to be all things to all people and simply focuses on the central goal of nature conservation	3	-4*	2
19. The corridor is designed to provide a pathway for plant and animal species to move to cooler places in the landscape as the climate warms	*1*	*2*	*2*
20. The corridor ensures the continued provision of ecosystem services to people in the Cape, in particular water filtration and natural aquifers (20)	2*	3	4
21. Activities are geared towards fulfilling the strategic development priorities of the national government	-2*	0*	-4*
22. The celebration of all the different cultures of an area, for instance the struggle heritage, indigenous history and Afrikaner culture, is used to say 'No' to the separation of apartheid	-4	1*	-2
23. Land parcels are locked up for conservation, ensuring there is no drastic land-use change in the future	4*	1	1
24. Support is given to private landowners who do much for conservation without expectation of reward and recognition, but just for a love of the land	2	-1	1
25. Landowners' property rights are strengthened and invasion of land by illegal farmers or settlers is prevented	*-1*	*-3*	*-3*
26. Educational activities are used to create pride among local communities in their natural heritage and the cultural value of place-based biodiversity is raised in the eyes of the people	*1*	*2*	*2*
27. Conservationists embrace an ethic of a lived-in worked-in landscape	-1*	3*	1*
28. Individual landowners begin to see the whole landscape as their resource to be	0	3*	1

managed collectively, rather than limiting their vision to their own plot of land			
29. The concept of the corridor works primarily as a networking platform	*-2*	*-2*	*-1*
30. As much habitat is preserved as possible, nevermind scientific data. We have got to the stage here where we need to conserve all the habitat we can, and while corridors might not work for all species, they are a pragmatic way of conserving at least something	2*	-1	-2
31. We try to figure out how to help heavy industry such as mining to become more biodiversity-friendly, for instance through offsets	-1	-2	-3*
32. The huge informal biodiversity economy in the Cape, for instance traditional medicine, is recognized and promoted	-3	1*	-3
33. A spirit of entrepreneurism, innovation and self-reliance is fostered	-3*	0*	0
34. Linkages are created between rich and poor	-4*	0*	2*
35. Poor communities are invited onto the corridor steering committee and to take part in decision-making	-1*	2	3
36. Fire management of fynbos and renostervelt is improved and learning is generated about appropriate fire regimes	3	0*	2
37. Big game such as eland is re-introduced to the landscape	1*	-2*	-4*
38. We contribute to South Africa meeting its legally-binding commitments under international law to preserve biodiversity	2*	0	-1
39. Democratic institutions are strengthened through systematic capacity-building for local municipalities	-2	0	-1
40. Windfarms are rejected - they encourage road building, introduction of invasive alien species, and prevent fire necessary for fynbos regeneration	3*	-2*	-4*
41. "The book is put away" and people think creatively about how to make life better for each other	-2	2*	-1
42. All the stakeholders in and around the corridor feel able to share their stories with each other and feel listened to	0*	3	3
43. Participants are carefully and strategically selected, as many people do not have the capacity to participate effectively and can disrupt the whole thing	-1	-4*	-2
44. The messaging is layered - for instance green jobs, climate change, international commitments - to achieve political buy-in	0*	2*	-2*
45. Access for the public to land in the corridor is controlled, not open	0*	-4*	3*
46. Chronic hunger among children is reduced and food security is improved	-4*	0	0
47. Strictly planned land-use is avoided, because in the context of climate change the balance of desirable land-use may change	-3*	-1*	0
48. Environmental education programmes are rolled out in schools - young people won't defend biodiversity if they don't know about it	1	4*	1
49. Green energy is produced through biomass pellets	-3	-3	2*
50. Uncertainty is embraced - the unpredictability of biodiversity means we will not know if the corridor is a success for many years	*1*	*1*	*3*

Table 2: Idealised sort patterns for each factor. Asterisks represent the statement scores that were significantly associated with a particular factor. Scores in italics represent consensus statements.

	Factor 1	**Factor 2**	**Factor 3**
Factor 1	1	0.0622	-0.0104
Factor 2		1	0.2855
Factor 3			1

Table 3: Correlations between factors

3.1. *Factor 1: 'A successful biodiversity corridor is one in which … a last line of defence is provided for biodiversity under threat.'*

The sorts of six participants were significantly correlated with Factor 1, including three participants from local government departments (conservation), two private landowners and one participant from a national biodiversity research institute with a natural science background.

A successful biodiversity corridor is one that is focused on preserving a representative sample of CFR biodiversity (18, Interviews). We are losing species and habitats at rapid and depressing rates (9). Corridors provide a last defense against hostile human activities (6) and invasive alien species (4) and help South Africa meet its international, legally binding biodiversity targets (38). A corridor is successful not by embracing a lived-in, worked-in landscape (27), but by locking-up land and controlling access (23, 47), restricting development (12), and regulating unsustainable human activities (32). Biodiversity is inherently valuable and it is dangerous to see it as an asset or an engine of economic growth (7, 49). Nevertheless, biodiversity does provide multiple values and services (20) and layering the message is an unfortunate necessity to get political and social buy-in (44). However, the 'politics-speak' of creating jobs (17), reducing chronic hunger (46), challenging apartheid (22) and making linkages between rich and poor (34) has little to do with the core business of protecting biodiversity, and risks creating excessive expectations of corridors (18). Indeed, communities and politicians often have quite different understandings to scientists about corridors, and listening to all stakeholders (42) and developing shared visions (8) may not be achievable or even desirable. Corridors need expert scientific input, and their success should not be based on the participation of poor communities in decision-making (Interviews, 35). While it is essential that corridors are informed by science, biodiversity is unpredictable and there is no guarantee that corridors will successfully protect it (50). In the context of overwhelming pressures on biodiversity, never mind the science – corridors are a pragmatic way of preserving at least something (30).

3.2. *Factor 2: 'A successful biodiversity corridor is one in which … a creative process develops integrative, inclusive visions of biodiversity and human wellbeing.'*

The sorts of six participants were significantly correlated with Factor 2, including one community representative, one representative of a regional government agency (conservation), one academic with a natural science background, one independent consultant, one representative from an international conservation NGO and one from a national biodiversity research institute with a social science background.

A successful biodiversity corridor recognizes the multiple, diverse values that ecosystems provide to society (20), and pursues social as well as ecological goals (3, 10, 19). If you perceive human activities to be 'hostile' to biodiversity you have shot yourself in the foot from the beginning (6, Interviews). Conservationists need to embrace an ethic of a lived-in, worked-in landscape (27). A successful corridor is a creative, catalytic process that generates a shared vision for the landscape from all stakeholders (Interviews, 8), and establishes new forms of connectivity between ecological, social, governance and economic spheres (44, 6, 27). Environmental education programmes are essential for transforming mindsets, improving knowledge and nurturing pride in natural heritage (48, 26). Corridors have multiple values and the message should be layered to unlock these values in all areas of society (44). Biodiversity conservation is about equity (34), jobs (17), and human wellbeing (41, 46), and extends across multiple scales, from local (3), to national (21), to international (38). This multidimensionality means that it is dangerous to see biodiversity purely as a financial asset and an engine of economic growth (7). Corridors cannot work by excluding, restricting and controlling human activities like industrial development (12), windfarms (40) and the collection of medicinal plants (32). While some land will need to be preserved for conservation (2, 9, 23), a successful corridor will not build the barriers ever higher through, for instance, restricting public access (45) or strengthening property rights (25). The ideal situation is that individuals will begin to envision the whole landscape as a resource to be managed collectively (28). In order to stimulate these collective visions there needs to be input from all areas of society, especially poor communities (35), and everyone needs to feel able to share their stories and be listened to (42, 43). The open-ended nature of a successful corridor means that uncertainties of all kinds are ever-present and must be embraced (50). In order to negotiate a long-term vision for a landscape in the context of such uncertainty, you need to have social ties that bind – if you invest in people, and get the right processes and systems in place to bring people together, then the rest will follow (Interviews).

3.3. *Factor 3: 'A successful biodiversity corridor is one in which … the local landscape fuels place-based cultural identity and economic development.'*

The Q-sorts of five participants were significantly correlated with Factor 3, including one private landowner, two community representatives, one representative of a local sustainable development organization, and one participant from local government responsible for environmental education.

A successful corridor harnesses the cultural and natural heritage values of local scenery to create decent work for local communities (1, 17). A corridor cannot be all things to all people – it has to promote nature conservation as a means to improve the quality of life of all those who live nearby (18, 44, 3). The Cape has always been lived-in and worked-in and conservationists need to embrace this (27). Practically, this means supporting jobs based on local identity, such as nature walks, honey and jam production, and mountain bike trails (Interviews). It also means that success should not be based on complete eradication of invasive alien species – they provide a crucial source of income for locals (4, 49, interviews). A successful biodiversity corridor is all about treating biodiversity as an asset and using it as an engine of economic growth (4, 49). However, this is not primarily about contributing to national development agendas or international legal commitments, but about safeguarding ecosystem services like natural aquifers for the people of the Cape (21, 38, 20). To be sustainable, conservation must come from the people themselves, so education is essential to give communities and young people pride in their natural assets (26, 48). But while a love of the land is vital, a corridor also needs to provide financial incentives, as participation really depends on whether it makes people better off – local communities need to put bread on the table! (24, 15, interviews). In order to leverage these assets public access to land needs to be controlled, not open (45). However, this should be a collective form of control, where the communities themselves take ownership (25, 28). A successful corridor is one where all stakeholders feel able to share their stories and be listened to, and where poor communities are invited onto the steering committee (42, 35, 43). It is through wide participation that linkages will be established between rich and poor, that will create opportunities like training local people to open up their own businesses (34, 5, 33). The reality in the Cape is that there are huge discrepancies between rich and poor, and a corridor will only be successful if the benefits from biodiversity are shared equally (Interviews).

4. Discussion

These three framings of success are not in any sense definitive or final, but rather they are heuristically valuable – offering a means to think through contemporary conservation concerns in the CFR and beyond. Here we explore some important tensions and differences between the framings in relation to a) conceptions of human-nature relationships, b) understandings of biodiversity corridors, and c) the implications of these varied understandings for visions and measures of conservation success (Table 4). We unpack these differences with reference to two contemporary global discussions in conservation: firstly the attempt to devise measures and metrics of conservation success, and secondly the on-going debate between various conservation paradigms, especially 'protectionist' and 'people-centred.'

	Perspective on nature	**Perspective on corridor**	**Visions of success**	**Illustrative measures and metrics of success**
Factor A: 'A successful biodiversity corridor is one in which … a last line of defence is provided for biodiversity under threat.'	Biodiversity	Planning tool	- Protection of endemic species - Protection of endangered species - Elimination of invasive species - Legal protection and government control of biodiversity-rich sites	- Biodiversity lists and metrics (e.g. species richness, Biodiversity Intactness Index, endangered species lists) - Proportion of land under legal protection for biodiversity (e.g. Convention on Biological Diversity targets)
Factor B: 'A successful biodiversity corridor is one in which … a creative process develops integrative, inclusive visions of biodiversity and human wellbeing.'	Humans-in-ecosystems	Governance process	- Improved ecosystem functioning - Enhanced provision of ecosystem services - Improved human wellbeing and quality of life	- Ecosystem services metrics (e.g. stocks and flows, access to benefits) - Functional diversity - Learning metrics (e.g. convergence of views, enhanced care for nature) - Metrics of good governance (e.g. accountability, legitimacy, representation)

Factor C: 'A successful biodiversity corridor is one in which … the local landscape fuels place-based cultural identity and economic development.'	Cultural-historical scenery	Territorialized place	- Protection of culturally valuable landscapes and species - Creation of economic opportunities for local communities - Socially inclusive, local control of ecological assets and services	- Involvement of communities in decision-making and agenda-setting - Employment figures - Poverty rates - Equality indexes

Table 4. The three factors frame nature and biodiversity corridors in different ways, and consequently prioritise different visions and measures of success. This table is merely illustrative, and should not be taken to mean that the categories are necessarily mutually exclusive or oppositional.

4.1. *Nature as biodiversity, humans-in-ecosystems, cultural-historical scenery*

Nature is framed differently in each factor. Participants loading on Factor 1 discussed nature in terms of biodiversity, emphasizing concepts widespread in traditional conservation biology discourse, including biomes, the red data list of endangered species, representative samples of biodiversity, and centres of endemism (e.g. Soulé 2013). Biodiversity was framed primarily in terms of species rarity, with participants frequently highlighting the high number of endemic species in the CFR. However, while participants noted the special biodiversity of the CFR, this was an abstracted biodiversity particularly valuable at the global scale. As one participant commented, "it is phenomenal biodiversity, and the sense of obligation to the global arena is significant." Human activities were viewed as external, hostile threats to biodiversity and participants frequently deplored the "depressing" loss of habitats and species to human residential and industrial development, particularly in and around Cape Town. This perception of existential threat and sense of loss was often coupled with an emphasis on the inherent 'rights of nature' as a basis for the preservation of biodiversity: "biodiversity is there, it's inherent … [and has] as much of a right on this planet as we do." Despite this emphasis on the inherent rights of biodiversity, the Factor 1 perspective equated conservation with "scientific stuff" – in opposition to the perceived "political" statements referring to, for instance, the creation of jobs. As one participant clarified (indicating the highly ranked statements), "that's all the scientific stuff, and that's why we do conservation – we don't do conservation for the people! I mean we buggered up biodiversity and we need to fix our problems." This sense of immanent threat, together with a belief in the intrinsic value of biodiversity, help explain the willingness of Factor 1 participants to pursue corridors in the face of scientific uncertainty as a 'pragmatic way of preserving at least something.' Participants appeared to envisage science as an instrumental means to achieve the ultimate end-goal of the preservation of species.

Participants loading on Factor 2 framed nature in what they saw as the broader terms of ecological functioning: "Because we can lose some species … the focus is on ecosystem functioning and ecosystem health. It's a more holistic way of looking at it." Factor 2 participants considered humans to be intricately enmeshed within ecosystems, and concepts of ecosystem health and ecosystem services – incorporating ecological, cultural and social services – were used to illustrate the links between human wellbeing and biodiversity. Factor 2 participants tended to adopt a multi-scalar "landscape perspective" as a means of connecting what they saw as the "more important" local issues to global imperatives. Several Factor 2 participants explicitly framed their sorts in opposition to statements they associated with Factor 1 type perspectives, such as the idea of human activities as necessarily 'hostile' or an external 'threat' to biodiversity: "I think if you start off seeing 'hostile seas of human activity' then you won't get a successful corridor, do you see what I mean? I mean if you believe it – just seeing the world in that way is going to shoot yourself in the foot before you've even started!" In contrast to the Factor 1 perspective, then, Factor 2 participants were not primarily motivated by a sense of loss, but by a perceived need to find ways to bring together humans and biodiversity: "it's not about biodiversity for or against communities, but biodiversity with communities." While Factor 1 participants tended to frame their perspective as 'pragmatic' about human-nature relationships, Factor 2 participants were more likely to frame their response as 'visionary.' For instance, several participants argued for a "complete shift in how we think about conservation," towards a paradigm where ecosystem health is

understood as central to human wellbeing. "I think that is the message – that conservation can work for you."

Factor 3 participants framed nature in terms of cultural-historic scenery and landscape. Nature was discussed in decidedly local terms and as inherently tied to, even generative of, place. Participants often emphasized their long personal and family histories in the Cape and their pride in the Cape landscape and flora. Humans were considered part of the landscape, and the nature of the CFR as expressive of human histories of conflict, identity and belonging. Therefore, in direct contrast to Factor 1, conservation was seen as explicitly political. One community representative described his motivation for engaging in conservation: "I've been involved with politics since school. My passion is working with people … I've been staying in Chatsworth for twenty years now, like in the bush, and I just love it. I love working with the people, I love nature." Participants frequently emphasized the flora of the CFR, in contrast to fauna and particularly big game, which was associated with exclusionary conservation practices. This sensitivity to perceived elitist and exclusionary conservation practices was reflected in the way that participants would often compare the flora of 'lived-in, worked-in' CFR landscapes favourably to iconic South African sites associated with biodiversity, such as the Kruger National Park and Kirstenbosch Botanic Gardens. Participants frequently argued that local communities and landowners should be empowered to capture the value of what they perceived as *their own* landscapes – that ecosystem services should be preserved for the people of the Cape. In comparison to the 'pragmatists' of Factor 1 and the 'visionaries' of Factor 2, participants loading on Factor 3 portrayed themselves as 'local heroes' – keen to ensure that local communities capture the values of their natural heritage as a source of self-determination and autonomy.

4.2. *The biodiversity corridor as plan, process, place*

These three different understandings of nature presaged different understandings of the biodiversity corridor. Factor 1 participants framed the corridor as a conservation planning tool and a scientific concept, intended to restrict human activities in parts of a landscape to preserve particular species and ecological processes. The corridor in this sense provides a barrier against encroaching 'hostile' human activities and represents a last refuge for biodiversity. This framing was particularly evident among participants emphasizing conservation in Cape Town: "In 1970 Cape Town flipped between being a whole lot of little suburbs inside natural fynbos to being lots of little patches of fynbos, and now there's few patches of fynbos beside the human environment." For one participant, this rapid loss of fynbos revealed a "misconception" about corridors: "When people talk about corridors they think you are creating something. Actually, you're cutting away stuff so you're left with a little, narrower piece. A corridor is there, it's just getting ever smaller." Factor 1 participants therefore rejected the idea of a corridor being judged on the basis of 'putting the book away' and thinking creatively; instead they framed success in terms of vigorously implementing land-use plans and regulations in order to 'lock-up land for biodiversity.'

For Factor 2 participants, the biodiversity corridor was a very different entity. Rather than a strict plan for protection, the corridor was framed as a multifaceted governance process that mobilizes society to come together and develop a common vision for the landscape. The corridor in this sense constitutes a "messy space" where multiple goals, such as ecological health and functioning, economic development, and so on, are negotiated and 'traded off' against one another. In the words of one participant, a corridor is a "fulcrum institution, bringing people together, bringing systems together, creating a market or creating a dialogue around a table." This requires "collective visioning and collective action, which means dissolution of boundaries – social boundaries, economic boundaries, political boundaries and governance systems – and reformation of them." Therefore, rather than constituting a boundary between humans and the landscape, the corridor in Factor 2 is "about movement and flow, and that includes people." Factor 2 participants frequently rejected ideas that corridors entail control and planning, instead embracing the corridor as a means of fostering flexibility and creativity:

> "There is no book. There is no recipe on how to do this stuff, so it has to be a living process. You can't do it out of a textbook, it will be dead before it is started … Because it's true, you know, that thing about 'uncertainty is embraced' – we're not controlling these things, we're working with what 'is,' in the moment, at both a social and an ecological level."

While participants loading on Factor 2 viewed the corridor as a process of "visioning" and bringing people together, Factor 3 participants viewed the corridor as very tangible, territorialized place – a

material landscape lived-in and regularly traversed. One participant described how she became involved in a particular CFR corridor project: "I was born here." In direct contrast to Factor 1, participants loading on Factor 3 *did* view the corridor as creating something in the landscape (rather than stripping something away). For one, a corridor was a means to create a "destination" and an "identity" for a landscape: "There must be a lab [laboratory], or a monument, or something that ensures that [the] corridor is going to be there for a lifetime. Something to be built … that cannot be changed." For another, "I see the corridor as something like Kirstenbosch [Botanic Gardens], as the heritage of the people – you know like when you fly over Amsterdam in flower season and you see the carpet of tulips in one big trail across the landscape – that is what the corridor should be like."

4.3. *Contested visions of conservation success and links to global conservation debates*

The three framings of human-nature relationships and the biodiversity corridor also lead to quite different visions of success, and consequently what metrics to use in assessing progress. According to Factor 1, success is determined by the preservation of particular species, habitats and ecological processes, and is a product of, for example, the ability of a particular meter width of a corridor to sustain a particular species. From this perspective, quantitative metrics of success should be based on changes in the number of endangered species, and the percentage of land "locked up" under formal protection. Because the corridor is framed as a science-based tool to exclude harmful human activities, public participation is considered as a "nice to have" related to implementation rather than design, and as something to be arranged, if at all, *after* land has become legally protected. While Factor 1 suggests that human behaviour towards biodiversity is generally motivated by financial interest, it argues that financial incentives for biodiversity protection will undermine biodiversity's intrinsic value, and subsequently supports government regulation of human behaviour. In this framing, the provision of economic opportunities and skills becomes "politics-speak" – portrayed, at best, as an unfortunate but necessary way of selling the 'real' (scientific) work of biodiversity preservation to politicians and local communities or, at worst, a distraction from or even in direct conflict with the central tenets of conservation. As one participant put it (indicating the lower-ranked statements): "This is totally irrelevant [to a corridor] as far as I'm concerned – it might sell it to a politician, it might make a few poor communities feel good, but it's meaningless."

The closely linked commitments in Factor 1 to the intrinsic value of biodiversity, faith in control-oriented politics, and the importance of scientific understandings of biodiversity, resemble 'traditional' or 'protectionist' conservation biology perspectives – characterized by Mace (2014) as a 'nature for itself' or 'nature despite humans' framing. Soulé (1985: 731) identifies a belief in the intrinsic value of biotic diversity as the "most fundamental" normative postulate of conservation biology. Factor 1 participants rejected what they saw as a "social science" or "economic" turn in conservation thinking towards a prioritisation of instrumental value, present in South Africa and beyond:

> "I think we've seen [this] even internationally with the change in the IUCN – it got high-jacked from being conservation for conservation's sake and science, so we could understand the ecosystem and protect it and manage the ecosystems of the earth, to an economic opportunity. And if it can't pay for itself then it doesn't exist. So the economists have got in and have highjacked the whole programme as far as I'm concerned."

This perspective echoes Soulé's (2013: 895) rejection of the 'new conservation,' characterized as promoting "economic development, poverty alleviation, and corporate partnerships as surrogates or substitutes for endangered species listings, protected areas, and other mainstream conservation tools." Soulé (2014: 637) claims that a 'consensus viewpoint' of conservation biologists is a "gloomy vista" in which "for the foreseeable future, biodiversity (flora, fauna, and ecosystems) will continue on a downward, dissipative slope." While this claim to consensus might be challenged, Soulé's "gloomy vista" certainly reflects the general pessimism of Factor 1, with participants speaking of mounting a "rearguard action," and of conservation as "depressing stuff, but we do what we can."

In the factor 2 framing, a successful corridor preserves ecological functioning while simultaneously meeting a range of social goals, such as improving local communities' quality of life. Quantitative metrics of success here would differ quite radically from Factor 1, including monitoring ecosystem functioning and the provision of ecological "services" to different social groups. Because the corridor is framed as an on-going process of negotiation and making 'trade-offs,' public participation is reframed from a "nice to have" to a critical measure of success. Factor 2 suggests that human behaviour towards nature is rooted in the pursuit of wellbeing (defined broadly to include health and

happiness), rejecting financial interest as the primary determinant. Consequently, Factor 2 is averse to top-down control – both over land in the corridor (which should enter into more collective ownership) and over the planning process (which should be an open process of "collective visioning") – and instead argues that a successful corridor will emerge from self-organization. Participants acknowledged the intrinsic value of biodiversity, but maintained that a successful corridor will appeal to multiple values, including the instrumental value of biodiversity to human wellbeing and economic development. Consequently, the "politics-speak" of Factor 1 is, for Factor 2, a crucial means to "unlock" these values and make conservation, as one participant put it, "something everyone does."

The emphasis in Factor 2 on humans as "embedded" within ecosystems indicates clear affinities with a social-ecological systems (SES) perspective (Berkes et al. 2003), or what Mace (2014) identifies as a 'people and nature' framing. Indeed, the priority afforded to shared visions, participation and simultaneous achievement of multiple goals reflects the managerial, consensus orientation of SES research (c.f. Swyngedouw 2009). Factor 2 participants experienced ambiguities in the politics of this approach. On the one hand, participants viewed the statements relating to linkages between rich and poor and the heritage of apartheid as "overtly political" and "narrower" perspectives than, for instance, developing a shared vision: "we are working across all levels of society, not just rich and poor. There's gender issues, there's age issues, there's urban-rural divide issues, there's race issues …" Yet on the other hand participants often framed their own perspective as an explicit challenge to traditional conservation approaches that they linked to apartheid-era South African governance, and even to particular South African conservation organizations. The Factor 2 insistence that successful biodiversity corridors must address a range of goals, including poverty alleviation, indicates some similarity to the 'new,' people-centred conservation. However, participants were uneasy about statements reflecting the corporate focus of new conservation. As one explained, "I do think that [biodiversity] is an asset, but what worried me about that is in terms of the engine of economic growth. It's not just about growth – it's about jobs, it's about equity, sustainability …" Another argued for a "humanitarian" rather than an economic conservation paradigm, suggesting that this approach "doesn't speak to money and it doesn't speak to government, it speaks to society..." Framing nature to include humans and ecological functioning, rather than biodiversity *per se*, means that Factor 2 appears more optimistic than Factor 1. As one participant remarked, "The statement about corridors being a 'pragmatic way of preserving at least something' is a defeatist way of thinking … I just don't think like that."

Factor 3 articulates a more explicitly politicized and localized vision of a successful biodiversity corridor that highlights some of the ambiguities in the more generalized visions of Factors 1 and 2. Factor 3 frames nature in terms of cultural-historical landscape and scenery, and the corridor as a tangible, lived-in place. A successful corridor creates "a destination across a landscape," as a basis for inclusive and sustainable economic development. From this perspective, a quantitative metric might include the protection of culturally valuable sites, together with employment figures, economic output, and measures of social inclusion. Specific examples of success provided by participants, such as honey making and the commercial harvesting of invasive alien vegetation, conflict with Factor 1. For instance, one Factor 1 participant responded that honey-making is "very problematic for conservation areas as we have many endemic bee species that are outcompeted by Cape Honey bee if it is introduced in artificial hives." From the Factor 3 perspective, a corridor is a mechanism to address the historic social exclusion of poor and marginalised communities, so participation is a key aspect of success. However, the specific emphasis on the empowerment of marginalised communities stands at odds with Factor 2's embrace of participation as a means to achieve broadly defined shared visions:

> "But … communities must be more important than the other stakeholders. Because you must know communities are there, they need to put bread on the table, they need to create businesses. If you get linkages between rich and poor you will get rich people coming here and seeing that this person needs financing to start his business, they [the rich] will start buying into this thing."

Factor 3 evinces a determination to harness intrinsic, cultural value in biodiversity as a means to gain access to instrumental economic values. Participants rejected open access to land, which was associated with community disenfranchisement –– either at the hands of powerful actors such as government or multinational corporations, or at the hands of illegal "squatters" and plant harvesters: "Once you're going to open your land in the corridor - it must be controlled! Otherwise people are just going to come, take all your plants, and that is actually, at the end of the day, there's not going to be your

heritage anymore!" Participants were keen to point out that control should be exercised through collective forms of community ownership, rather than top-down government intervention, or through private property rights (associated with exclusionary practices of big game reserves).

The Factor 3 emphasis on community empowerment, control over land, and histories of marginalization and disenfranchisement, reflect to some extent the concerns of the environment and development and political ecology literatures (e.g. Leach et al. 2010; Robbins 2012). Unlike these literatures, however, Factor 3 located the basis of empowerment in an embrace of biodiversity as an asset. This dovetails with Mace's (2014) 'nature for humans' framing and, to some extent, new conservation perspectives. But while participants were keen to stress that a successful biodiversity corridor delivers economic development to local people, they were equally keen to point out that a desire for financial gain alone was not the main driver for their interest in conservation. Rather than the corporate investments and partnerships of new conservation, Factor 3 vehemently lays claim to biodiversity as a community asset, rooted in local pride and sense of place. Therefore, education was a crucial measure of success: "Education is also absolutely essential for creating the sense of place in a biodiversity corridor – so the children can understand what the corridor is and know what it is to be part of one."

Taken together, these framings reflect a diversity of ways in which a CFR biodiversity corridor may be judged to be successful. While the framings relate to existing perspectives such as 'protectionist' and 'new' conservation, they cannot be reduced to them – suggesting that real-world cases are composed of complex mixes of positions, values and criteria for success. In their call for inclusive, pluralistic conservation, Tallis and Lubchenco (2014: 28) call for an end to the philosophical 'fighting' and a move towards "rigorous assessments of the effectiveness of actions." But our results show that understandings of effectiveness emerge within particular value-based perspectives on desirable means and ends. This implies that practical manifestations of inclusive conservation may not be simply about 'ending the fighting,' but rather about making it productive. Facilitating modes of management and governance where diversity is recognized and the connections between alternative framings and concurrent indicators of success may be explicitly negotiated is critical. This includes discussing the values embedded within particular types of intervention – e.g. national parks, corridors, biosphere reserves – and also recognizing that different actors will have legitimately different understandings of what any of these are or should be in a particular ecological, political and historical context. Some values may be reconciled and others may not, but making them explicit encourages the development of context-sensitive metrics that capture the diverse dimensions along which success may be judged.

5. Conclusions

Debates about conservation success have been dominated by requests for quantitative and comparable metrics. But while quantitative metrics are essential, it is also essential to unpack the inherently normative, contested choices about what to measure. This paper has contributed to this research field by exploring what participants perceive to constitute success in biodiversity corridor projects in the Cape Floristic Region. The paper has identified three framings that each emphasizes a different set of criteria for a successful biodiversity corridor, and has demonstrated that behind these framings lie contrasting – inherently normative – ideas about conservation, including diverse perspectives on human-nature relationships, economics, control over land, and the boundaries between science and politics. While each of our identified framings relate to and appear to be informed by global conservation discourses, they are also influenced by distinctly local dynamics. This suggests that while global discourses certainly influence local perceptions of success, they are also contested and transformed by the intricacies of local conservation contexts. Moreover, the results support recent calls for recognition of plurality and reflexivity in conservation (i.e. awareness of how contestable value commitments underlie ideas of success), in the context of increasingly fractious global debates and high-stakes local imperatives (Tallis and Lubchenco 2014).

This paper contributes to efforts to expand social science contributions to conservation science. While it might be argued to fit in the broad category of research *on* conservation, rather than research *for* conservation (Sandbrook et al. 2013), the paper provides a useful demonstration of the mutually constitutive nature of research on and for conservation – and demonstrates how both are essential for improving conservation practice. Research on conservation may transform what conservation is considered to *be*, thus affecting the nature of research *for* conservation. For instance, if research *on* conservation highlights the normative choices embedded in quantitative metrics of success, research *for*

conservation may expand to include research on how negotiation of these choices might be most productively facilitated. This may result in the design of conservation interventions that simultaneously address multiple objectives prioritised by different actors. For instance, Karp et al. (2015) argue that it is essential to make underlying value commitments explicit if multiple conservation objectives are to be met in a single intervention. Discussions of what constitutes success are necessary for any such vision to be successful, when contrasting perspectives are inevitable and constitutive of the social context in which conservation action takes place. It is in this sense that intrinsic, even philosophical discussions about conservation can also be instrumentally useful – and it is here that social sciences have much to offer the science and practice of conservation.

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References

Axford, J. C., Hockings, M. T., Carter, R. W. 2008. What constitutes success in Pacific island community conserved areas? *Ecol. Soc.* 13, 45.

Bennett, A.F. 2003. Linkages in the Landscape: The Role of Corridors and Connectivity in Wildlife Conservation. IUCN, Gland, Switzerland.

Berkes, F., Colding, J., Folke, C. (Eds.). 2003. Navigating Social-Ecological Systems: Building Resilience for Complexity and Change. Cambridge University Press, Cambridge.

Brechin, S.R., Murray, G., Mogelgaard, K. 2010. Conceptual and Practical Issues in Defining Protected Area Success: The Political, Social, and Ecological in an Organized World. *J. Sus. For.* 29, 362 – 389.

Brown, S.R. 1980. Political Subjectivity: Applications of Q Methodology in Political Science. Yale University Press, New Haven.

Brown, S.R. 1993. A primer on q-methodology. *Operant Subjectivity*, 16, 91 – 138.

Cairns, R., Sallu, S.M., Goodman, S. 2013. Questioning calls to consensus in conservation: a Q study of conservation discourses on Galapagos. *Environ. Conserv.* 41, 13 – 26.

Cairns, R., Stirling, A. 2014. 'Maintaining planetary systems' or 'concentrating global power?' High stakes in contending framings of climate geoengineering. *Global Environ. Change*, 28, 25 – 38.

Chetkiewicz, C.L.B., St. Clair, C.C., Boyce, M.S. 2006. Corridors for Conservation: Integrating Pattern and Process. *Annu. Rev. Ecol. Evol. Syst.* 37, 317 – 342.

Cowling, R.M., Pressey, R.L., Rouget, M., Lombard, A.T. 2003. A conservation plan for a global biodiversity hotspot – the Cape Floristic Region, South Africa. *Biol. Conserv.* 112, 191 – 216.

Crooks, K.R., Sanjayan, M. 2006. Connectivity Conservation. Cambridge University Press, Cambridge.

Evans, J.P. 2007. Wildlife Corridors: An Urban Political Ecology. *Local Environ.* 12, 129 – 152.

Fahrig, L. 2003. Effects of Habitat Fragmentation on Biodiversity. *Annu. Rev. Ecol. Evol. Syst.* 34, 487 – 515.

Fischer, J., Lindenmayer, D.B. 2007. Landscape modification and habitat fragmentation: a synthesis. *Global Ecol. Biogeogr.* 16, 265 – 280.

Fisher, B., Christopher, T. 2007. Poverty and biodiversity: Measuring the overlap of human poverty and the biodiversity hotspots. *Ecol. Econ.* 62, 93 – 101.

Frantzi, S., Carter, N.T., Lovett, J.C. 2009. Exploring discourses on international environmental regime effectiveness with Q methodology: A case study of the Mediterranean Action Plan. *J. Environ. Manage.* 90, 177 – 186.

Gilpin, M. E., Diamond, J. M. 1980. Subdivision of nature reserves and the maintenance of species diversity. *Nature*, 285, 267 – 268.

Goldblatt, P., Manning, J. 2002. Plant diversity of the Cape Region of South Africa. *Ann. Missouri Bot. Gard.* 89, 281 – 302.

Graham, M., Ernstson, H. 2012. Comanagement at the fringes: examining stakeholder perspectives at Macassar Dunes, Cape Town, South Africa—at the intersection of high biodiversity, urban poverty, and inequality. *Ecol. Soc.* 17, 34. http://dx.doi.org/10.5751/ES-04887-170334

Harrison, K. 2013. Scoping Report for the SANParks Rural Development Programme: West Coast Corridor. South African National Parks.

Haila, Y. 2002. A conceptual genealogy of fragmentation research: from island biogeography to landscape ecology. *Ecol. Appl.* 12, 321 – 334.

Holmes, P. M., Rebelo, A. G., Dorse, C., Wood, J. 2012a. Can Cape Town's unique biodiversity be saved? Balancing conservation imperatives and development needs. *Ecol. Soc.* 17, 28. http://dx.doi.org/10.5751/ES-04552-170228

Holmes, P., Stipinovich, A., Purves, A. 2012b. City of Cape Town Biodiversity Network: Methods and Results Technical Report. City of Cape Town.

Howe, C., Milner-Gulland, E.J. 2012. Evaluating indices of conservation success: a comparative analysis of outcome- and output-based indices. *Anim. Conserv.* 15, 217 – 226.

Kapos, V., Balmford, A., Aveling, R., Bubb, P., Carey, P., Entwistle, A., Hopkins, J., Mulliken, T., Safford, R., Stattersfield, A., Walpole, M., Manica, A. 2008. Calibrating conservation: new tools for measuring success. *Conserv. Lett.* 1, 155 – 164.

Kapos, V., Balmford, A., Aveling, R., Bubb, P., Carey, P., Entwistle, A., Hopkins, J., Mulliken, T., Safford, R., Stattersfield, A., Walpole, M., Manica, A. 2009. Outcomes, not implementation, predict conservation success. *Oryx*, 43, 336 – 342.

Kareiva, P., Lalasz, R., Marvier, M. 2011. Conservation in the anthropocene; beyond solitude and fragility. *Breakthrough J.*, 29 – 37.

Karp et al. 2015. Confronting and resolving competing values behind conservation objectives. *Proc. Natl. Acad. Sci.* 112, 11132 – 11137.

Leach, M., Scoones, I., Stirling, A. 2010. Dynamic Sustainabilities: Technology, Environment, Social Justice. Earthscan, London.

Mace, G.M. 2014. Whose conservation? Science 345, 1558 – 1560. DOI: 10.1126/science.1254704

Moon, K., Blackman, D. 2014. A Guide to Understanding Social Science Research for Natural Scientists. *Conserv. Biol.* 28, 1167 – 1177. DOI: 10.1111/cobi.12326

Murray, G. 2005. Multifaceted measures of success in two Mexican marine protected areas. Soc. Nat. Resour. 18, 889 – 905.

Myers, N., Mittermeier, R.A., Mittermeier, C.G., da Fonseca, G.A.B., Kent, J. 2000. Biodiversity hotspots for conservation priorities. *Nature* 403, 853 – 858.

Newing, H. 2010. Conducting research in conservation: social science methods and practice. Routledge, Milton Park, Oxfordshire.

Pence, G. 2009. Climate Adaptation Scenarios for the Cape Floristic Region. Technical Report. Table Mountain Fund.

Robbins, P. 2012. Political Ecology: A Critical Introduction, second ed. Wiley-Blackwell, Oxford.

Salafsky, N., Margoluis, R., Redford, K.H., Robinson, J.G. 2002. Improving the practice of conservation: a conceptual framework and research agenda for conservation science. *Conserv. Biol.* 16, 1469 – 1479.

Salafsky, N, Salzer D., Stattersfield, A.J., Hilton-Taylor, C., Neugarten, R., Butchart, S.H.M., Collen, B., Cox, N., Master, L.L., O'Connor, S., Wilkie, D. 2008. A standard lexicon for biodiversity conservation: unified classifications of threats and actions. *Conserv. Biol.*, 22, 897 – 911. DOI: 10.1111/j.1523-1739.2008.00937.x

Sandbrook, C. 2015. What is conservation? *Oryx* 49, 565 – 566. DOI: http://dx.doi.org/10.1017/S0030605315000952

Sandbrook, C., Adams, W.M., Buscher, B., Vira, B. 2013. Social Research and Biodiversity Conservation. *Conserv. Biol.* 27, 1487 – 1490. DOI: 10.1111/cobi.12141

Schmolck, 2002. PQMethod 2.11. Available at: http://schmolck.userweb.mwn.de/qmethod/index.htm (accessed 26.11.15).

Soulé, M. 1985. What is Conservation Biology? *BioScience*, 35, 727 – 734.

Soulé, M. 2013. The "New Conservation." *Conserv. Biol.* 27, 895 – 897.

Star, S.L., Griesemer, J.R. 1989. Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39. Soc. Stud. Sci. 19, 387– 420. DOI: 10.1177/030631289019003001

Stephenson, W. 1953. *The Study of Behavior: Q-technique and its Methodology.* University of Chicago Press, Chicago.

Stern, M. 2001. Parks and Factors in Their Success. *Science* 293, 1045 – 1047.

Sutherland, W.J. 2005. How can we make conservation more effective? Oryx 39, 1 – 2.

Swyngedouw, E. 2009. The Antinomies of the Postpolitical City: In Search of a Democratic Politics of Environmental Production. *Int. J. Urban Reg. Res.* 33, 601 – 620.

Tallis, H., Lubchenco, J. 2014. A call for inclusive conservation. *Nature* 515, 27 – 28.

Watts, S., Stenner, P. 2012. *Doing Q Methodological Research: Theory, Method and Interpretation*. Sage Publications, London.

Webler, T., Tuler, S., Krueger, R. 2001. What Is a Good Public Participation Process? Five Perspectives from the Public. *Environ. Manage.* 27, 435 – 450.

Webler, T., Danielson, S., Tuler, S. 2009. Using Q method to reveal social perspectives in environmental research. Social and Environmental Research Institute, Greenfield MA.

Young, A., Fowkes, S. 2003. The Cape Action Plan for the Environment: overview of an ecoregional planning process. *Biol. Conserv.* 112, 15 – 28.