# Ethics in conservation: the use of philosophical value theory to inform ethical decisions in conservation

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# Abstract

Conservation work frequently features ethical challenges, but the conservation movement appears to make little use of ethics in decision-making compared to other principle-driven work such as healthcare and historic artefact conservation. With a focus on the place of the natural capital concept in conservation, this thesis aims to understand this problem and investigate solutions through the following three steps.

First, the relationship between conservation and ethics is empirically established through thematic analysis of interviews with staff in UK-based conservation organisations. Perceptions of ethics are examined, ethical challenges present and barriers to addressing them are characterised, and the relative position of natural capital approaches to these topics is established.

Second, new conceptual insights into an ethical challenge, selected from those characterised in the first step, are gained by subjecting it to an analysis based on principles of philosophical value theory and environmental ethics. The chosen ethical challenge is unresolved concern about the ability of natural capital approaches to capture values of nature that conservationists deem important. Participant expressions of such values were identified then assessed and categorised using a value theory framework. The ability of different theories of environmental ethics to defend the resultant categories of value is established.

Third, these insights are made relevant to conservation decision-making by using them as the basis for an ethical critique of the natural capital concept as a conservation tool. An account of the current understanding of the natural capital concept is established through document analysis of systematically selected examples of recent or influential academic literature. The concept is tested by identifying the extent and ways in which it can or cannot support the empirically established and ethically understood values of nature that are important to the conservation movement.

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# Declaration

I, Vanessa Berrie, declare that this thesis is a presentation of original work and I am the sole author. This work has not previously been presented for an award at this, or any other, University. All sources are acknowledged as References.

# 1 – Introduction

## 1.1 Overview

The discipline and movement of biological conservation has long featured a tension between human-orientated and nature-orientated goals and motivations in the search to establish a suitable relationship between people and the environment. This currently takes the form of debates over the turn towards conservation approaches that advocate increased prioritisation of social and economic interests in conservation actions, in contrast to conservation focusing on nature protection for its own sake. One such form is the use of natural capital approaches, an economic concept in which aspects of nature are considered as a form of capital. In parallel with this tension in conservation discourse, the field of environmental ethics features extensive discussion about the existence of intrinsic values in nature and debate over the relative merits of focusing on intrinsic or instrumental values in pursuit of nature conservation. There is increasing acknowledgement that a better understanding of the underlying ethical concerns and philosophical values could facilitate better resolution of debates and allow more effective conservation actions.

There are several challenges associated with ethical concerns about economic approaches in conservation that will be addressed by this project. The first is that conservation practitioners' experience of ethical challenges in conservation are not well understood, both in general and regarding natural capital approaches. The second is that ethical concerns about economic approaches to conservation require clarification and insight from applied philosophy and environmental ethics. The third is that the ethical compatibility of natural capital approaches and nature conservation has not been tested.

To address these challenges, this project begins by investigating how ethical problems manifest and how ethics is perceived by those engaged in strategic level conservation practice, and where natural capital approaches fit in. Insights and understanding from the fields of environmental ethics and applied philosophy are then used to better understand and clarify ethical concerns regarding the use of natural capital approaches. Finally, the current versions of the natural capital concept are identified and its ethically-relevant features examined, so that these ethical concerns can be better addressed.

### 1.11 Definitions and meanings of terms in this thesis

The words 'ethics', 'moral', and 'value' are closely associated with the topics of this thesis. These words, and those that derive from them, have multiple meanings in general use, many of which relate to and overlap with each other. They can be used and interpreted multiple ways, sometimes with very

different implications, and with variation across disciplines concerned with environmental protection and management. This can be a source of confusion in discourses in the interdisciplinary space this thesis operates within (IPBES, 2016; Gunton et al., 2017; Tadaki et al., 2017). This section summarises the relevant definitions of these words then explains how they are used in this thesis. All meanings below are adapted from definitions in the *Oxford Dictionary of English*, 3rd edition (Stevenson, 2015) unless otherwise cited.

**1.111 'Ethics' and 'moral' – definitions**

'Ethics' and 'moral' and their derivatives are very closely related sets of words that concern questions about right and wrong. Most words in each set of derivatives have a synonym or near-synonym in the other set.

'Ethics' can refer to: the branch of knowledge and philosophical study of questions and rules about right and wrong behaviours ('moral philosophy' is a near-synonym); principles or a set or system of principles concerning right and wrong, that can inform or judge behaviours ('ethic' usually refers to this meaning, e.g. 'the land ethic' in Aldo Leopold's work, and 'morality' is a near-synonym); or the correctness of an action in view of such knowledge or principles ('morality' is a near-synonym). The noun 'moral' refers to principles or standards of right and wrong behaviour and does not have a direct analogue derived from 'ethics'.

The adjectives 'ethical' and 'moral' both have a very similar pair of meanings; they can mean that something is about questions of right and wrong behaviour, or that something holds and/or correctly adheres to high standards of right and wrong behaviour. 'Ethical' may alternately or additionally mean that something is about or based on the philosophical field that studies questions of right and wrong behaviour.

**1.112 'Value' – definitions**

Concepts of value are an important part of this thesis and are at the centre of key debates across the related disciplines (Tadaki et al., 2017; Costanza, 2020). As a word, 'value' can be either a noun or a verb, both with multiple meanings.

As a noun, 'value' has two meanings that are relevant to this thesis; it may refer to a type of worth, importance, or significance that something has, or a principle or standard held by a person or community that informs their judgement of what is important. The two meanings can be closely related to each other, such as when an item's worth ('value' in the first sense) is a result of a person holding a particular principle ('value' in the second sense). Both meanings, and more nuanced variations within each, are prominent features in discourses about nature conservation (IPBES, 2016; Gunton et al., 2017). The academic disciplines contributing to these discourses – including philosophy,

economics, conservation science, social sciences, and ecosystem services research – also have specialised meanings for 'value' (Gunton et al., 2017; Tadaki et al., 2017) and differ in which of the two main meanings is most relevant and emphasised (compare Calhoun, 2002; Blackburn, 2016; Hashimzade et al., 2017).

**1.113 Meanings as used in this thesis**

'Ethics', 'moral', 'value', and their derivative words articulate aspects of three interconnected concepts: questions of right and wrong; issues of worth and importance; and principles and standards. Among these words there are synonyms derived from different root words and individual words with multiple meanings. While it is neither possible nor useful to strictly separate these words and concepts, these overlapping connections and further complications from variable use across disciplines have the potential to introduce confusion. With this in mind, effort has been made to use consistent meanings for these words and their derivatives when writing this thesis.

Decisions about how to use the set of words in question in this thesis have been made with the goal of minimising the number of words used to articulate similar concepts and the number of concepts articulated by the same word, and while bearing in mind the relative importance and frequency of these words and concepts to this thesis. The two main choices about how to use these words in this thesis are described below.

First, meanings of 'ethics', 'moral', and 'value' as nouns that articulate the concept of principles and standards are *not* used in this thesis, as far as possible. Instead, 'principle' is the default word used to articulate these concepts. This is modified to 'ethical principles' or similar as necessary. More specific words, such as 'attitude' or 'belief', are used where appropriate. This decision was made to create a clearer distinction between the two potential meanings of 'value' as a noun and because words from all three root words can be used as synonyms or near-synonyms to refer to some kind of principle, standard, attitude, view, or belief.

The most notable impact of this choice is on the meaning of 'value' as a noun. In this thesis 'value' as a noun is only used to mean types of worth, significance, or importance something has or might have. 'Principle' is used to mean standards, views, attitudes, and beliefs about behaviours and what is important that are held by a person, people, or community. These principles may concern questions of right and wrong, or be relevant to them, but not necessarily. Clarifications or explanatory notes are included occasionally as some of the disciplines related to this thesis regularly use 'value' to refer to both concepts. A lesser impact of this choice is that 'moral' is only used as an adjective, not a noun. 'Ethics' is still used when referring to *sets or systems* of ethical principles, especially formalised ones (e.g. 'professional ethics'), or branches of philosophical study that such principles are based on or

developed by (e.g. 'environmental ethics'), but it is not used to refer to individual principles themselves.

Second, analogous words derived from 'ethics' and 'moral' are treated as essentially synonymous, but the set derived from 'ethics' is generally preferred in most cases and words derived from 'moral' are used to connotate a weaker connection to the philosophical field of ethics. Both sets of words refer to concepts related to questions of right and wrong behaviour.

These meanings are applied throughout the thesis, including references to cited works that may have used a different term (conveying the core meaning, but not necessarily the term used). The exception is in direct quotations from participants or cited works, in which case the original phrasing is retained (and the meaning clarified if it is not readily apparent from the context). Table 1 is a glossary that explains how each word is used in this thesis.

**Table 1: Definitions of 'ethics', 'moral', 'value', and derived words and how they are used in this thesis.** Synonyms or near-synonyms derived from different root words are listed in the same row. Words and definitions that are not used or only used rarely in this thesis are shown in italics. Definitions are based on entries in the *Oxford Dictionary of English*, 3rd edition (Stevenson, 2015). Abbreviations used: n. = noun; adj. = adjective; v. = verb.

| Synonyms or near-synonyms | | | | |
|---|---|---|---|---|
| **from 'ethics'** | **from 'moral'** | **from 'value'** | **Definition** | **Use in this thesis** |
| ethics, n.1 | *moral philosophy, n.* | – | The philosophical study of questions and rules about right and wrong behaviours. | Only 'ethics' used. As defined, including subtypes (e.g. 'environmental ethics'). |
| ethics, n.2 | *morality, n.1* | – | Set or system of principles concerning right and wrong, that can inform or judge behaviours. | Only 'ethics' used. As defined, usually with an adjective, for formal or informal systems of ethical principles with some basis in the branch of philosophical study (e.g. 'professional ethics'). |
| *ethics, n.3* | *morality, n.2* | – | *The extent to which an action is right or wrong.* | *Rarely used.* |

| | | | | |
|---|---|---|---|---|
| ethical, adj.1 (antonym: non-ethical) | moral, adj.1 (antonym: amoral) | – | Concerning questions of right and wrong behaviour (and/or the philosophical field that studies them, more so for 'ethical'). | As defined. 'Ethical' preferred unless connotating a weaker connection to the branch of philosophical study. |
| ethical, adj.2 (antonym: unethical) | moral, adj.2 (antonym: immoral) | – | Holding or correctly adhering to high standards of right and wrong behaviour. | As defined. 'Ethical' preferred unless connotating a weaker connection to the branch of philosophical study. |
| – | – | value(s), n.1 | A type of worth, importance, or significance that something has. | As defined. |
| – | *moral(s), n.* | *value(s), n.2* | *Principle or standard of right and wrong behaviour; Principle or standard held by a person or community that informs their judgement of what is important.* | *Not used – 'principle(s)' is used instead, with modifiers where applicable (e.g. 'moral principles', 'ethical principles', 'social principles').* |
| – | – | value, v.1 | To estimate the worth of something. | As defined; clarified where necessary. |
| | | value, v.2 | To consider something to be important or beneficial. | As defined; clarified where necessary. |

## 1.2 Context

This section provides an overview of three disciplines relevant to the topics of this thesis: nature conservation; environmental ethics; and economics of the environment. The contemporary Western history of each discipline is outlined, describing their development during the period of rapidly changing environmental impacts and awareness in the latter half of the twentieth century. Each discipline's key questions of relevance to this thesis and the debates that continue today are described. In nature conservation, these questions concern human-orientated and nature-orientated

approaches to conservation. The philosophical field of environmental ethics features parallel debates about the relevance of intrinsic and instrumental values. In economics, the subdisciplines of environmental economics and ecological economics differ in their treatment of the natural capital concept, a concept that has recently become prominent in environmental policy and human-orientated approaches to conservation. After these accounts of the individual disciplines' parallel histories and debates comes an overview of research attempting to bridge the gaps between them.

## 1.21 Variation in approaches to nature conservation

The objective of nature conservation, broadly speaking, is to protect and manage features of the natural environment (Park & Allaby, 2017). However, which features to conserve, for whom (or for what) to conserve them, and why we ought to are recurring topics of debate. Different motivations and changing pressures throughout the history of conservation mean that there is not a universally accepted definition for the discipline, resulting in tensions between those holding different underpinning views (Mace, 2014; Sandbrook, 2015; Kopnina et al., 2018a).

### 1.211 Contemporary history of conservation

In the 1960s and earlier, conservation work focused on protecting intact natural habitats and species for their own sake, with actions based on ecological principles. As the extent of human impacts on the environment rapidly increased from the 1970s and awareness of environmental problems increased, conservation in the 1970s and 1980s became more focused on protecting nature from human activities and reversing the damage, bringing questions about how to balance these goals with human use of environmental resources to the fore (Mace, 2014).

Conservation endeavours continued to be closely associated with ecological science research during this time (Soulé, 1985). Ecologists in the late 1970s, also responding to growing awareness of the scale of human-induced environmental damage, began linking their studies of ecosystem functions with the importance of those functions to people (Braat & de Groot, 2012). A variety of terms for these human-benefiting functions were used before the 1977 paper 'How much are nature's services worth?' by ecologist and gay rights campaigner Walter E. Westman, published in *Science*, introduced the term 'nature's services' to describe them (Westman, 1977). This area of study consolidated into the field of 'ecosystem services' in the 1980s (Baveye et al., 2013, 2016) and continued to be developed primarily by ecologists (e.g. those cited by Gómez-Baggethun et al. (2010), a review of the history of ecosystem services research). The goal of this early work in developing and highlighting the ecosystem services concept was to emphasise the importance of the environment for sustaining human wellbeing in an effort to halt its destruction. It also started to shift the conservation narrative away from a stewardship

ethic and towards a utilitarian framing in which human benefit was the primary objective (Heydinger, 2016).

Conservation priorities both influenced and were influenced by environmental policy and political factors in the 1980s and 1990s. Sustainable development became an important political concern during the 1980s, following the publication of the *World Conservation Strategy* by the International Union for the Conservation of Nature (IUCN) in 1980 (Pearce, 1988; Westman, 1990) and the publication of the report *Our Common Future* (also known as The Brundtland Report) by the World Commission on Environment and Development (WCED) in 1987 (Åkerman, 2003; Ang & Van Passel, 2012). The resulting developments in ecosystem services and economics research contributed to the ecosystem services concept becoming prominent in policy-making and ecological science in the 1990s. Two works published in 1997 were especially significant in this shift: 'The value of the world's ecosystem services and natural capital', a paper in *Nature* by ecological economist Robert Costanza and colleagues; and *Nature's Services: Societal Dependence on Natural Ecosystems*, a volume edited by environmental scientist Gretchen Daily (Heydinger, 2016). By the late 1990s, the vital importance of nature in providing essential goods and services for people was widely acknowledged and the focus of conservation shifted towards ways nature could provide benefits to people in the form of ecosystem services (Mace, 2014). The publication of the Millennium Ecosystem Assessment in 2005 reinforced the understanding in environmental policy that humans rely on and benefit from nature (Gómez-Baggethun et al., 2010).

In outlining this period of conservation history, Mace (2014) identifies four conservation perspectives that arose from the mid-twentieth century onwards, beginning with 'nature for itself' and 'nature despite people' followed by the rise in 'nature for people' approaches. In the early 2000s, this strong 'nature for people' perspective existed alongside the continued presence of 'nature for itself' and 'nature despite people' thinking in conservation. An understanding of the relationship between people and the natural environment that better characterises its complex, interconnected nature began to develop – a 'people and nature' perspective – and conservation work moved towards including more interdisciplinary research and placing a greater emphasis on the role of culture (Mace, 2014).

**1.212 Human-orientated and nature-orientated conservation approaches**

Renewed debate about conservation approaches emerged in the early 2010s when these plural perspectives coincided with changes in conservation activities. Some conservation organisations, researchers, and practitioners had begun to move away from approaches that aimed to protect nature for its own sake and towards an emphasis on benefits for humans by considering economic concerns

to a greater extent in conservation actions (Soulé, 2013; B. Miller et al., 2014; Doak et al., 2014). The large US-based non-governmental organisation The Nature Conservancy moved towards a model of corporate partnerships (Mace, 2014). Calls to prioritise human interests in conservation received mainstream news coverage (Doak et al., 2014) and were supported by several US-based foundations (Soulé, 2013). Meanwhile, the underlying goals and motivations for conservation described above continued to exist as a diverse set of viewpoints among conservationists (Hunter et al., 2014; Mace, 2014; Holmes et al., 2016; Sandbrook et al., 2019). Although debate within conservation about human interests and the interests of nature is not new (T. R. Miller et al., 2011), these developments prompted an intense period of debate among conservation researchers about the purpose, goals, and methods of conservation.

This debate, regularly labelled the 'new conservation debate', has often been framed as a conflict between human-orientated and nature-orientated approaches (T. R. Miller et al., 2011; Soulé, 2013; Mace, 2014; Sandbrook, 2015). The 'new conservation' refers to forms of nature conservation where human interests are strongly prioritised as the guiding force of conservation, including an emphasis on human benefits from ecosystems and greater alignment with economic and corporate interests (Kareiva & Marvier, 2012). The development and adoption of these approaches were especially influenced by a series of articles published in 2012 by environmental scientists Peter Kareiva and Michelle Marvier (Holmes et al., 2016; Kopnina et al., 2018a). They use ideas from the Brundtland Report (B. Miller et al., 2014) and are compatible with principles of neoliberal economics by embracing unlimited economic growth (Kopnina et al., 2018a) and technological solutions to environmental problems (Marris, 2014). Kareiva and Marvier, with an article titled "What is Conservation Science?" (2012), placed their proposals in contrast with the version of conservation proposed by conservation biologist Michael Soulé in a classic article titled "What is Conservation Biology?" (1985). Soulé responded with arguments for the continued importance of conservation approaches that prioritise biodiversity protection and ecological integrity in their aims and methods (2013).

Whether the goal of making conservation more human-orientated expands (Scharks & Masuda, 2016) or reduces (Doak et al., 2014; Kopnina et al., 2018b) the range of acceptable conservation activities is disputed. Those advocating for a more human-centred conservation argue that previous iterations of conservation wrongfully neglect human wellbeing (Kareiva & Marvier, 2012) and that a human-centred conservation is necessary because previous nature-centred conservation efforts have been ineffective in achieving its goals of reducing biodiversity loss and habitat destruction (Doak et al., 2014). Those advocating for more nature-orientated approaches argue that improving human wellbeing is an established objective of conservation endeavours (Soulé, 2013) and that claims of conservation's failure to prevent losses do not acknowledge that losses would have been far greater

without conservation interventions (Doak et al., 2014). There are ethical arguments that the interests of non-humans should also be taken into account (Batavia & Nelson, 2017), practical arguments that protected area approaches are essential to conserving ecological integrity (B. Miller et al., 2014), and pragmatic arguments that nature-orientated approaches would result in policies with more successful conservation outcomes (Kopnina et al., 2018a; Washington et al., 2021). In arguments for nature-orientated conservation approaches, the paradigm of constant economic growth is seen as a threat for conservation to combat rather than a goal by which to set objectives (Soulé, 2013; Kopnina et al., 2018a).

This framing of discussion about conservation approaches as a conflict between two 'sides' is an over-simplification of a range of issues and debates in conservation, which many of the authors cited here argue or acknowledge. It especially obscures discussion about the place of social issues in conservation (Holmes et al., 2016), a topic that finds much more common ground among conservationists (Marris, 2014; Sandbrook, 2015; Sandbrook et al., 2019). (This is discussed further in section 1.33.) Nonetheless, it was for a time a frequently-seen framing and the debates around it exemplify multiple points of contention in conservation. Although the 'new conservation debate' progressed to include more nuanced discussions (Batavia & Nelson, 2016) and a more accurate understanding of which issues were most in question among conservationists (Watson & Jones, 2019), major questions about the orientation and focus of conservation remain a topic of significant debate (Büscher & Fletcher, 2019; Taylor et al., 2020; Sanborn & Jung, 2021; Washington et al., 2021).

**1.213 Who are conservationists?**

'Conservationist' is used here to mean someone engaged in the work of nature conservation and who endeavours to contribute towards its goals of actively protecting, managing, and/or establishing good relations with nature, which are broadly shared across conservation movements despite differences in perspective and preferred methods of achievement (Soulé, 2013; Mace, 2014; Sandbrook, 2015).

Conservation research has been dominated by natural science disciplines, mainly ecology and biology, throughout much of its history, and many conservationists have a background in natural sciences. As an indicative example, the Future of Conservation study – a large scale study of the global conservation community – surveyed over 9,000 conservationists, of whom over half had a training specialism in biological sciences, around a quarter had a training specialism in interdisciplinary studies, and less than 10% had a training specialism in social sciences (though the authors note that European and North American conservationists are most likely over-represented in the sample) (Sandbrook et al., 2019). As recognition of the importance of conservation social science has increased alongside the prominence of social conservation objectives, conservation has turned to social science methods more

frequently and recruitment and training of social scientists has increased within conservation research and practice (Moon & Blackman, 2014; Pooley et al., 2014; Bennett et al., 2016; Bennett & Roth, 2019).

Many demographics are likely to be underrepresented in conservation due to systemic inequalities and discrimination. While there appears to be some (mixed) progress in terms of gender balance in conservation (Tallis & Lubchenco, 2014), there remain barriers to a career as a conservationist on the basis of disability (Fenney, 2017), race and ethnicity (Nxumalo & ross, 2019; Cronin et al., 2021; Rudd et al., 2021), economic privilege (Vercammen et al., 2020; Rudd et al., 2021), and – based on evidence about professionals in scientific fields in general – most likely sexual orientation and gender identity (Gibney, 2019; Cech & Waidzunas, 2021). This may affect how debates about social and economic priorities in conservation develop as the personal characteristics of conservationists, such as life histories and ethnicity, are associated with variation in their views on these priorities (Luque-Lora et al., 2022).

## 1.22 Parallel debates in environmental ethics

Environmental ethics is a field of applied ethics that studies the ethical reasoning that informs how people should act towards nature (Stålhammar & Thorén, 2019). Like the conservation movement, it developed in the latter half of the twentieth century (Jamison, 2008). Many of the differences between nature-orientated and human-orientated conservation approaches are underpinned – explicitly or otherwise – by different ethical stances (Minteer & Miller, 2011; T. R. Miller et al., 2011; Hunter et al., 2014; Loreau, 2014; Sorgen, 2020) and the debates around them find strong parallels in environmental ethics. The history of environmental ethics and the main components in its discourses about values in nature are outlined below.

### 1.221 Contemporary history of environmental ethics

Environmental ethics is a discipline of philosophy that studies the moral status of the environment and humans' moral relationship with it (Brennan & Lo, 2022). It was established as a sub-discipline of philosophy in the 1970s (Rolston III, 2012; C. Palmer, 2013; Sorgen, 2020; Brennan & Lo, 2022) in response to concerns about unmitigated economic and population growth and the environmental crisis of the 1960s and 1970s. Its initiation was prompted in part by widely influential environmental writings of the 1960s, most notably the 1962 environmental science book *Silent Spring* by marine biologist and conservationist Rachel Carson. Ideas from the earlier essay 'A Land Ethic' in the 1949 book *A Sand County Almanac* by ecologist and forester Aldo Leopold were also influential in the field's development (Rolston III, 2012; Marques da Silva, 2019; Stålhammar & Thorén, 2019; Brennan & Lo, 2022).

Early works in the field's first decade explored whether new approaches to ethics were required to address questions raised by the environmental crisis. A distinction between anthropocentric and non-anthropocentric approaches to the field became apparent during this period. In anthropocentric approaches, ethical treatment of nature is determined exclusively on the basis of human interests. In non-anthropocentric approaches, of which there are several sub-types, the interests or moral status of non-human entities are also taken into consideration (Kawall, 2017). Both types of approach have been present in the field since its earliest stages, but non-anthropocentric approaches were initially most prominent (Minteer, 2012) and challenges to anthropocentric ethical stances about nature were defining features of environmental ethics as a field (O'Neill et al., 2012). In the 1980s, anthropocentric approaches rose in prominence as environmental ethicists responded to academic and political developments by endeavouring to incorporate social concerns (Kawall, 2017; Marques da Silva, 2019). This led to the development of 'environmental pragmatism' in the 1990s, in which environmental ethicists placed a greater importance on practical issues than theoretical ones when developing ethical understandings of nature (Minteer, 2012).

As the problems of human impacts on the environment intensified and became better understood, many researchers in environmental ethics and closely related fields continued in this direction by turning their attention more closely to contributions to practical issues; some of this work is explored in Section 1.24. Calls for environmental ethicists to move further from abstract theoretical debates to allow for work that is more likely to be effective in moving attitudes and policies forward continued to be made (Snyder, 2017; Sorgen, 2020), while others, often interdisciplinary environmental researchers rather than environmental ethicists as such, argue for and demonstrate the usefulness of these theoretical concepts in decisions about environmental protection (e.g. Batavia & Nelson, 2017; Piccolo, 2017; Kopnina et al., 2018b)

**1.222 Intrinsic value and instrumental value**

Intrinsic value in nature has been the topic of extensive debate in environmental ethics research and has been central or relevant to many of the field's main questions (Minteer, 2012; C. Palmer, 2013; Stålhammar & Thorén, 2019; Brennan & Lo, 2022). Broadly speaking, intrinsic value refers to a value of something in and of itself, rather than in relation to any other entity. Several variations in meaning within this general definition have been used across environmental ethics research and a range of arguments for the existence of intrinsic values in nature have been developed (O'Neill, 1992; Jamison, 2008). However, their existence (Belshaw, 2001; Jax et al., 2013) and relevance to ethical decision-making about the environment are disputed (Callicott, 2002; Tenen, 2020). Non-anthropocentric positions, including biocentrism (focusing on the value of life) and ecocentrism (focusing on the value of ecosystems and interconnected ecological processes), typically accept that some aspects of nature

hold some form of intrinsic value (Jamison, 2008). Non-anthropocentric ethical stances are likely to be present in the conservation approaches centred on nature itself (T. R. Miller et al., 2011; Hunter et al., 2014; Taylor et al., 2020).

The classic counterpoint to intrinsic value in environmental ethics discourse is instrumental value (Minteer, 2012; Lee, 2020). Something with a role in bringing about something that is a good in itself has instrumental value. For example, knitting needles, yarn, and the act of knitting itself could have instrumental value because of their role in improving the mood and mental health of a hobbyist knitter. Goods-in-themselves can be variously defined and may include things like human wellbeing, pleasure, fulfilment of personal interests, ability to function correctly – but whether or not such goods really are valuable for their own sake (i.e. they have intrinsic value) is a topic of much debate and therefore so too is whether the instrumental values that bring them about matter or not (Belshaw, 2001). Instrumental and intrinsic value are not mutually exclusive; it is possible for something to have both. For example, the wellbeing of a family pet could have instrumental value due to making the human family members happy in addition to the intrinsic value that a sentient being's wellbeing has. Broadly speaking, instrumental values of nature are the basis for an anthropocentric position in environmental ethics (Minteer, 2012; Lee, 2020). Anthropocentric ethical stances underpin the more human-centred conservation strategies (T. R. Miller et al., 2011; Hunter et al., 2014; Taylor et al., 2020).

Some environmental ethicists argue that the application of environmental ethics ought to abandon or downplay reliance on intrinsic value arguments as the basis for environmental protection in favour of focusing on the more tangible, and still compelling, arguments from instrumental values (Norton, 1984; Justus et al., 2009). The existence of any intrinsic value of nature is difficult to establish (Sorgen, 2020) and values cannot always be fully separated into intrinsic and instrumental values (Jamison, 2008). There are related arguments that, in order to move environmental discourse forward, environmental ethics should move away from intrinsic-instrumental value debates and towards a pluralistic approach that incorporates some aspects of intrinsic value alongside instrumental values and can accommodate multiple types of value (Norton, 2008; Minteer, 2012; Sorgen, 2020). However, questions of intrinsic value of nature are perennial in environmental ethics (Jamison, 2008), with the nuances of the concept and its place in environmental discourse continuing to be a subject of philosophical examination (e.g. Tenen, 2020; Smith, 2022)

## 1.23 The natural capital concept in environmental and ecological economics

Natural capital approaches are an important current expression of human-orientated environmental decision-making, and are relevant to questions about conservation approaches. Natural capital

approaches are applications of the natural capital concept, in which 'natural capital' is the stock of parts of nature that provide ecosystem services that benefit people. This stock includes biotic and abiotic components, such as species, minerals, and ecosystem processes (Natural Capital Committee, 2014; Maris, 2015). The services include both the provision of inputs to human production processes and the provision of materials and functions that benefit people directly (Costanza et al., 1997; Hein et al., 2016). Natural capital approaches include natural capital accounting (Turner et al., 2019), biodiversity offsetting (Jacob et al., 2016), and payments for ecosystem services (Fletcher et al., 2019).

The contemporary natural capital concept originated in economics in the late 1980s (Åkerman, 2003) and natural capital approaches are now widely used by financial institutions, corporations and governments in developing their policies (Schaefer et al., 2015; Farrell et al., 2021). Improvement of natural capital stocks have being used as a guide for environmental and development goals in developing countries (e.g. Sarukhan et al., 2015; Sacande & Berrahmouni, 2016; Lourdes et al., 2021), which may have a considerable amount of their capital in the form of natural capital (The World Bank, 2020).

The development of the natural capital concept and approaches in economics and their applications beyond economics are associated with similar discourses about how to approach environmental protection and management as seen in conservation and environmental ethics. This section begins with a primer on the pre-contemporary history of the natural capital concept to provide context for its place in the interdisciplinary landscape. Next, the place of the natural capital concept in the development of ecological economics and environmental economics during the contemporary history of economics is outlined. Finally, the different views of the natural capital concept in ecological economics and environmental economics are explored to illuminate some of the key differences in approach taken by the two fields.

*Primer: Origins of the natural capital concept in eighteenth to early twentieth century economic thought*

The natural capital concept has deep roots in the history of Western economic thought. Early versions can be identified in major eighteenth nineteenth century economic works, including *An Inquiry into the Principles of Political Economy* and *The Wealth of Nations* by Scottish Enlightenment economists James Stuart and Adam Smith in 1767 and 1776, respectively, *The Principles of Political Economy* by English philosopher and economist John Stuart Mill (also known for his contributions to the ethical theory of utilitarianism) in 1848, and *Das Kapital* by German philosopher, economist, and sociologist Karl Marx in 1867 (DesRoches, 2015b). The phrase 'natural capital' itself began to appear regularly in the nineteenth century. A search of digitised literature databases for the term 'natural capital', or

analogues in other European languages, found the earliest example in a 1849 essay by the socialist-associated British publicist and lampoonist Ebenezer Jones (Missemer, 2018).

The modern version of the natural capital concept emerged from its nineteenth century precursors at the beginning of the twentieth century. In studies of the history of the concept, both DesRoches (2015b) and Missemer (2018) distinguish the modern version from its precursors when the idea of unassisted nature as a direct producer of products for human benefit is included as part of the economic interpretation of nature, without necessarily requiring labour to realise any economic value (though this may also happen). Smith, Mill, and Marx, writing in the nineteenth century, give accounts of this idea, but attribute much more importance to the idea of nature providing inputs to human production processes (DesRoches, 2015b). Wolloch (2020) argues that Smith's account in *The Wealth of Nations* – a highly influential work which is widely considered to mark the beginning of modern economics – of agricultural land as able to self-generate value after human modification can be interpreted as a kind of cultivated natural capital. Although Smith's work does not make all the steps towards the modern form of the concept (as human input remains an essential part of the understanding), this suggests the ideas that became the modern natural capital concept have been present in the field since the start (Wolloch, 2020). The term 'natural capital' followed a similar trajectory, with nineteenth century examples of the term most often referring to land or natural resources that labour can act on to produce economic value[1]. One of the earliest English-language examples of the term 'natural capital' describing an idea resembling the modern form was by American economist Alvin S. Johnson in the 1909 edition of his textbook *Introduction to Economics*. This work made a key step in the evolution of the natural capital concept by linking the term 'natural capital' with the concept of nature as a producer in itself without including labour as a necessary part of the definition – that is, closer to a capital concept of nature than a resource concept of nature in which it is a supplier of resources from which labour produces economic value (Missemer, 2018).

The term 'natural capital', now with a meaning close to its modern form, spread through American economics in the early twentieth century after Johnson's description was cited and embraced by influential American economist Frank W. Taussig in his 1911 book *Principles of Economics*. It was increasingly integrated into economic theory in the early twentieth century and by 1928 had become "common economic terminology", according to a paper in the *American Economic Review* at the time (Missemer, 2018). When Western economists shifted away from environmental issues in the 1930s

[1] The earliest known use of 'natural capital', in Jones' 1849 essay, was also as a synonym for land, but in a rhetorical sense as part of a criticism denouncing the concentration of wealth among few people under capitalism (Missemer, 2018).

(Crocker, 1999), further evolution and use of the concept fell by the wayside for several decades (Missemer, 2018).

**1.231 Contemporary history of economics and the environment**

As awareness of environmental problems increased in the 1960s and 1970s, the attention of economists returned to topics of environmental policy. Different economic subdisciplines debated their ability to evaluate connections between the economy and the environment, or the economy and social institutions, and characterised and attempted to address environmental problems within their own frames of understanding (Åkerman, 2003). Initially, most efforts focused on developing methods for monetary valuation of environmental resources (Tinch et al., 2019). When sustainable development became an important political priority in the 1980s, economists (re-)introduced the natural capital concept as a means to bring about its policy goals (Åkerman, 2003). This began with David Pearce's 1988 article 'Economics, Equity and Sustainable Development', published in *Futures* journal, and Pearce and colleagues' 1989 book *Blueprint for a Green Economy*, which built on Robert Solow's paper 'On the Intergenerational Allocation of Natural Resources', published in 1986 in *Scandinavian Journal of Economics* (Åkerman, 2003; DesRoches, 2015b). The definition of natural capital introduced by Pearce (1988) describes it as a stock of natural assets that performs ecosystem functions that directly and indirectly provide benefits to humans (consistent with the historic criteria of the modern concept identified by DesRoches (2015b) and Missemer (2018)).

At the same time as this introduction of the natural capital concept in the late 1980s, 'ecological economics' was being developed as a new field of economics with a more interdisciplinary stance, in response to criticisms that economics was inadequately equipped to address multifaceted environmental problems. Robert Costanza and Herman E. Daly were key researchers in the inception of the field and incorporated the natural capital concept in its early stages (Åkerman, 2003; Maris, 2015), including with a now well-known paper titled 'Natural Capital and Sustainable Development', published in 1992 in *Conservation Biology*. The field of economics that descended directly from the existing field (i.e. the field from which ecological economics sought to distinguish itself) is known as 'environmental economics' (Tinch et al., 2019).

Following these developments, environmental economics and ecological economics diverged in the 1990s into two subdisciplines of economics that both worked with the natural capital concept as they took on the task of reconciling economics and environmental issues. As the two subdisciplines took different approaches to this task, they conceptualised and used the natural capital concept in different ways, which contributed to the evolution of multiple understandings of the concept. While the concept in its contemporary iteration was first introduced in environmental economics, it was

explored more extensively in ecological economics during this time (Åkerman, 2003) and continues to be most strongly associated with ecological economics (Buonocore et al., 2018; Wolloch, 2020). Although the boundaries between the subdisciplines have blurred at times (Maris, 2015; Tinch et al., 2019), they remain institutionally and paradigmatically distinct (Illge & Schwarze, 2009; Tinch et al., 2019) and several points of difference between them are relevant to current debates about the natural capital concept.

### 1.232 Different views of natural capital and sustainability in ecological and environmental economics

Ecological economics and environmental economics operate under different paradigms about the relationship between the environment and the economy, which affects the interpretation and application of the natural capital concept. Environmental economics operates within the frameworks of neoclassical economics, where the basis of value is consumer choice under perfect information (Gómez-Baggethun et al., 2010) and the environment and economy are distinct entities (Ang & Van Passel, 2012), and uses the natural capital concept within standard economic theories to help them include environmental concerns (Åkerman, 2003; Maris, 2015). Ecological economics uses an ecological modelling view of the natural capital concept, interpreting it as a set of interacting systems that determine the capacity of ecosystems to provide ecosystem services (Pelenc & Ballet, 2015), as a way to apply ecological constraints to economics. By doing so, ecological economics aimed to challenge mainstream economic thinking and bring about a more substantial change in economic thought by framing economic systems within wider social and ecological systems (Åkerman, 2003; Gómez-Baggethun et al., 2010; Maris, 2015; Missemer, 2018). In principle, the dominant system in environmental economics theories is the economy, and natural capital is a way to represent the environment within it, while in ecological economics theories the dominant system is the global ecosystem, and natural capital is a way to view it through an economic lens.

Another important issue raised by the divergence between environmental economics and ecological economics is the extent to which natural capital can be substituted with other forms of capital, including manmade forms of capital such as technology or financial capital, with implications for the approaches to valuation of natural capital. Environmental economics treats natural capital as generally substitutable with other forms of capital in principle, an approach which became known as ‘weak sustainability’, and ecological economics considers natural capital to be at least partially non-substitutable with other forms of capital, which became known as ‘strong sustainability’ (Gómez-Baggethun et al., 2010; Maris, 2015). This distinction has implications for achieving the intergenerational equity objectives of sustainable development, in which development “meets the needs of the present generation without compromising the ability of future generations to meet their

own needs" (the definition proposed in the WCED's *Our Common Future* report (1987, p. 43), which has become the standard definition (Kates et al., 2005)). In environmental economics' weak sustainability approach, intergenerational equity is achieved by the maintenance of benefit streams. Ecological economics' strong sustainability approach achieves this by the maintenance of natural capital itself. With the objective of maintaining benefit streams, environmental economics focused on questions of the commensurability of natural capital with other forms of capital (i.e. monetary valuation of environmental goods), emphasising market values over ecological processes. Towards their objective of maintaining natural capital, ecological economics rejected the idea that the ecological limits of nature could be overcome with technological innovation, argued against unlimited economic growth, and emphasised biophysical evaluation of natural capital (Åkerman, 2003).

## 1.24 Ethics in conservation

Conservation has multiple and competing ethical obligations (Robinson, 2011; Biasetti & de Mori, 2020) and there is a need for greater consideration of ethical issues and more nuanced ethical understanding in conservation decision-making (Perry et al., 2012; Ramp & Bekoff, 2015; Nelson et al., 2016; Saner & Bordt, 2016; Vucetich et al., 2021b). Research in and between a variety of disciplines has aimed to address this need directly and other work provides ethical or otherwise useful insights that can contribute to decision-making around conservation questions with ethical aspects to them. This section gives an overview of this research.

### 1.241 Integrating ethical theory with conservation

Several multi- and interdisciplinary academic efforts to integrate ethical theory with conservation decision-making have been made in the past fifteen years. Attempts to increase the consideration given to animal rights and welfare in conservation include expanding ethical frameworks about laboratory animals to fit ecological research (McMahon et al., 2012; Curzer et al., 2013) and the development of the field of 'compassionate conservation', which aims to bring this consideration to wider conservation practice (Hampton & Hyndman, 2019; Beausoleil, 2020). For example, compassionate conservationists have challenged the ethical basis for lethal control and debated the ethical justification for alternatives such as fertility control and translocation (Ramp & Bekoff, 2015; Hampton et al., 2019; Coghlan & Cardilini, 2021). Research on 'biocultural ethics' has aimed to reintroduce ethical principles into environmental management by integrating cultural and biological diversity (Rozzi, 2012, 2019), including the founding of an environmental philosophy field site (Rozzi et al., 2008, 2012). Philosophical argument analysis has been explored as a way to understand ethical aspects of trophy hunting (Vucetich et al., 2019) and lethal control (Batavia & Nelson, 2018b; Yanco et al., 2019). As conservation dilemmas often feature multiple trade-offs (Leader-Williams et al.,

2010), the formation of 'ecological ethics' has been proposed, as a new field capable of addressing the complex nature of these issues and for use by conservationists, analogous to the role of bioethics in medicine. Ecological ethics aims to develop a pluralistic framework drawing from normative ethical theory, research ethics, animal ethics and environmental ethics, emphasising the application of these theories based on context rather than providing a conceptual set of ethical rules for conservation (Minteer & Collins, 2005a, 2005b, 2008). A number of case studies demonstrating and developing this framework have been published (McCoy & Berry, 2008; Parris et al., 2010; Albrecht et al., 2013).

**1.242 Ethical aspects of debates about conservation tools or approaches, and related topics**

Studies of areas of shared concern between conservation and environmental ethics have highlighted the relevance of various ethical values in conservation. Conservationists have been found to hold personal views that nature can have both intrinsic and instrumental values (Butler & Acott, 2007; Sandbrook et al., 2011), but with a considerable amount of variability and no single consensus among conservationists about which values should form the basis of conservation (Hunter et al., 2014; Sandbrook et al., 2019; Vucetich et al., 2021a). The increase in social and economic conservation approaches has been accompanied by applied ethics research exploring the value dimensions of 'new conservation' policy debates and how these relate to environmental ethics debates (e.g. Norton, 2008; T. R. Miller et al., 2011; Minteer & Miller, 2011; Saner & Bordt, 2016; Batavia & Nelson, 2017; Muniz, 2019).

Research exploring the types of value that ecosystem services may have provides useful insights for examining ethical aspects of environmental decision support tools. This research includes attempts to capture non-instrumental values in ecosystem services approaches by including various values of 'cultural ecosystem services', such as from nature that has spiritual significance or that people value for the fact that it exists (McCauley, 2006; Chan et al., 2012; Davidson, 2013; Schröter et al., 2014). These values are sometimes described as 'intrinsic value', but whether they truly encompasses a type of intrinsic value is debatable (Davidson, 2013) and some prominent ecosystem service assessment systems are clear that they do not attempt to directly assess intrinsic value (Millennium Ecosystem Assessment, 2005; TEEB, 2010). Either way, values of cultural services and similar concepts attempt to account for aspects of nature that are not clearly instrumental in bringing about a tangible benefit for people but are vitally important for humanity nonetheless (Russell et al., 2013; Cooper et al., 2016; Kenter, Bryce, et al., 2016). Other work has introduced concepts of 'relational value' as potential solutions to the difficulties in understanding and capturing values of ecosystem services that fall between definitions of intrinsic value and instrumental value. Relational value has multiple definitions within ecosystem services research (Chan et al., 2012, 2018) (and is understood somewhat differently in environmental ethics (Stålhammar & Thorén, 2019)), in part due to the different meanings of 'value'

as a noun described in Section 1.1. 'Relational values' can refer to people's principles – moral or otherwise (Chan et al., 2018) – regarding human relationships with nature (Chan et al., 2016; Kenter, 2016; Tadaki et al., 2017) and/or values in nature that are based on people's relationships with nature (Stålhammar & Pedersen, 2017; Himes & Muraca, 2018; Jax et al., 2018).

Concerns about the feasibility of incorporating some kinds of values of nature and/or principles about nature into approaches that rely on economic valuations of ecosystem services have been raised consistently throughout their contemporary history. The value of ecosystem services that do not provide material benefits to people are difficult to measure with monetary valuation techniques (Small et al., 2017) and some hold the view that many ways in which people value nature cannot be sufficiently, validly, or appropriately captured through monetary valuations of ecosystem services (McCauley, 2006; Luck et al., 2012). Monetary valuation is not the only metric used in the assessment of natural capital (Farrell et al., 2021), but it is widespread (Maris, 2015) and heavily emphasised in the concept's application (Banerjee et al., 2020). This includes approaches based on willingness to pay (WTP) or willingness to accept (WTA). WTP represents a measure of people's preferences to protect nature or receive certain benefits from it and WTA represents the amount of compensation required before they would accept it being damaged or lost. These are measured using techniques such as contingent valuation and choice experiments (Tinch et al., 2019). WTP and WTA valuation techniques may be incompatible with how people think about nature, as suggested by the prevalence of 'protest' responses (answering with zero, very high, or infinite amounts of money) (Parks & Gowdy, 2013; Bartkowski et al., 2015), which have been a phenomena in attempts to estimate the monetary value of nature since the 1980s (Vadnjal & O'Connor, 1994; Spash, 2000). There are concerns that the tangibility and ease-of-use of economic valuation methods will cause these to become dominant in discussions and those values less easily measured in this way will be left behind (Luck et al., 2012; Jax et al., 2013). Multi-metric valuation methods have been developed with a view to addressing this (O'Connor & Kenter, 2019).

The place of moral arguments relative to economic approaches to environmental policy is also debated. Economic valuation methods may be considered to represent people's moral principles about nature (e.g. Menzel & Wiek, 2009; Sacchi et al., 2014), but economic approaches are also put forward as a way to make decisions free from moral reasoning (Spash, 2015). Concerns that trading systems such as biodiversity offsetting are used to justify rather than prevent environmental harm have been raised (Spash, 2015; Maron et al., 2016), and so too has the importance of treating economic approaches as additional or complementary to philosophical ones, lest they replace or undermine them (Scharks & Masuda, 2016).

# 1.3 Problem

This project addresses three problems relating to ethical issues in conservation decision-making, with a focus on the use of natural capital approaches. First, the ways in which ethical problems are experienced by conservation practitioners are not well understood. Second, understanding from environmental ethics and applied philosophy is required to provide clarity and insight into ethical concerns about values in economic approaches to conservation. Third, although ethical concerns about the use and methods of human-orientated approaches to conservation have been raised, the ability of natural capital approaches to meet the ethical objectives of conservation practice has not been examined. These problems are described in more detail below.

## 1.31 Conservation practitioners' experiences of ethical questions are not well understood

As conservation increasingly turns to human-orientated approaches, ethical clashes between nature-orientated conservation and social justice considerations, economic concerns or other human-orientated priorities remain prominent in conservation decision-making (Chan et al., 2007; Robinson, 2011; Hunter et al., 2014; Saner & Bordt, 2016; Taylor et al., 2020). There are questions about the strategic goals of conservation as a mission-driven endeavour (Sandbrook, 2015; Skandrani, 2016) and the right way to achieve them (Skandrani, 2016; Vucetich et al., 2018; Washington et al., 2018; Vucetich et al., 2021b). Although ethical questions are inherently present in these areas of conservation decision-making, there appears to be little engagement with environmental ethics (Hale, 2011; Baard & Ahteensuu, 2019) and continued shortcomings in adequately tackling ethical questions (Karlsson & Edvardsson Björnberg, 2020; Vucetich et al., 2021b). Despite a fast-increasing body of interdisciplinary academic literature examining these questions, there is little empirical research on how they are experienced and addressed by conservation practitioners.

A picture of which ethical questions and considerations are faced and how they are addressed in conservation practice can be found in attempts to understand and resolve conflict in conservation decision-making and studies of the values held by those involved in contentious decisions. The need for better integration of social context to improve outcomes when ecological concerns seem to be at odds with social concerns in conservation has been recognised (Chan et al., 2007) and subsequent research efforts have reflected this. One approach has been to study conflict itself, working to understand the nature of conflicts in conservation and the nuances of the views of different stakeholders, aiming to de-escalate conflicts by doing so (Redpath et al., 2013; Whitehead et al., 2014). A review of contentious debates around a conservation management goal, invasive species

management, found that differences in value systems of stakeholders was a main cause of conflict (Estévez et al., 2014).

Other research has directly investigated these stakeholder value systems and suggested how better understanding of them could be used to improve decision-making. This includes studies of differences in ethical perspective between social science and environmental science (Shoreman-Ouimet & Kopnina, 2015; Bennett et al., 2017; Bennett & Roth, 2019) with a view to reconciling these differences and facilitating agreement through improved understanding of these ethical perspectives. Empirical research has investigated how the people's principles held by students of different disciplines affect their opinions and decision-making about contested conservation issues (Hermann et al., 2013; Sulemana & James, 2014; Batavia et al., 2020). There is now a substantial area of research investigating how to identify the principles held by communities and integrate these into environmental decision-making (Jacobs et al., 2016; Ranger et al., 2016; Raymond et al., 2019; Zander et al., 2021). Research on the conservation community gives insights into the internal dynamics within conservation around issues for which there are clashes between the moral viewpoints of conservationists themselves. This includes investigations into the moral opinions of conservation managers (Clark, 2015), the personal principles of conservationists and their perspectives on the shift towards socially-orientated conservation priorities (Holmes et al., 2016; Sandbrook et al., 2019).

The research outlined above indicates the presence of debated topics that implicitly feature ethical aspects in conservation practice. A few studies take a closer look at how these are experienced in conservation practice. Incidental insights can be gleaned from the description of case studies in research on the ethics of individual conservation problems (e.g. McCoy & Berry, 2008; Parris et al., 2010; Gore et al., 2011; Palmer & Larson, 2014). One study includes insights into the social mechanisms within a conservation group surrounding decisions about a conservation action with ethical relevance, primarily highlighting the means by which ethical issues were not considered (Clark, 2015). An empirical study of conservation scientists in the USA in 2014 examines how they experience ethical tensions in their role as advocates for at-risk species (Stuart & Rizzolo, 2019).

However, there remains little research into how underlying ethical questions about conservation objectives and approaches manifest as problems for conservation practitioners or how the ethical aspects are addressed in practice. As the natural capital concept and its application through various natural capital approaches feature several ethically-charged issues, its increased presence in environmental policy and conservation decision-making is likely to bring further complications into these processes. Understanding conservation practitioners' perspectives on how ethical issues

manifest, cause difficulties, and are addressed in conservation decision-making is a crucial step in understanding how ethical issues can be better identified and resolved.

## 1.32 Ethical concerns about economic approaches in conservation require philosophical insights and clarification

Questions about values of nature are at the heart of practical, social, and ethical concerns about environmental policy and the ways to understand these values are numerous and complex (Biasetti & Mori, 2016; Hejnowicz & Rudd, 2017; Kenter et al., 2019). Applied philosophy and environmental ethics have underused potential for providing insights into some of the ethical concerns associated with economic approaches to conservation approaches, especially with regard to values of nature and why they should or should not be protected.

A great deal of debate about values of nature has taken place in ecosystem services research (Spangenberg & Settele, 2016) and environmental and ecological economics (Hanley & Perrings, 2019), as it has in environmental ethics. Economic approaches to environmental decision-making are primarily concerned with instrumental values of nature, typically the instrumental value of ecosystem services in bringing about benefits to humans (T. R. Miller et al., 2011). However, the idea that nature has some kind of intrinsic value is persistent (Jamison, 2008; Batavia & Nelson, 2017), present in people's moral intuitions about nature (Jax et al., 2013) and held by many within and outwith conservation (Butler & Acott, 2007; Justus et al., 2009; Sandbrook et al., 2011; Batavia et al., 2020). The prevalence and persistence of the idea of intrinsic value in nature means that it cannot be easily dismissed in decisions about conservation approaches (Batavia & Nelson, 2017).

Central to many attempts by ecosystem services, economics, and environmental ethics research to establish typologies of the values at stake in environmental decision-making are values of nature that do not fall easily into instrumental or intrinsic categories. These 'in between' values have been categorised, conceptualised, and named in various ways across the different disciplines weighing in on this topic, including as: 'cultural values' (Millennium Ecosystem Assessment, 2005), 'social values' (Kenter, 2016), and 'relational values' (Klain et al., 2017) in ecosystem services research[2]; 'non-use values' such as 'bequest value' and 'existence value' in economics (Baum, 2012; Scholte et al., 2015); and 'inherent value' in environmental ethics (Pouteau, 2014). These types of value stem from the many and complex ways humans relate to nature, which contributes to the difficulty in categorising

[2] Ecosystem services research frequently uses the word 'value' in the sense of principles and standards held by a person or community – that is, the meaning of 'value' that is avoided and for which 'principles' is used where possible in this thesis, as described in Section 1.1. In cases where a cited work refers to this meaning, the word 'value' is intended for the purposes of this introduction to mean forms of worth in nature that would be derived from these principles. For example, 'social value' is used here to mean value in nature based on social principles.

them, and they usually cannot be satisfactorily measured using economic methods (Chan et al., 2016; O'Connor & Kenter, 2019). Features of nature with a value that is neither fully intrinsic nor fully instrumental could include land that is sacred to a group of people for religious reasons (Muraca, 2011), habitats that people want to pass on to future generations (Tinch et al., 2019), species that people feel satisfied to know exist (Davidson, 2013), places that help people feel connected to the past or their culture (Gould et al., 2015), and landscapes appreciated for their beauty (Cooper et al., 2016) or their quality of being relatively undisturbed by humans (O'Neill, 1992).

The typologies and understandings developed in these endeavours are not necessarily intended to be applicable to all contexts or attempts to describe the same things, but there are several areas of overlap in the value concepts engaged with and terms used for them. These areas of research have a range of goals that guide their approach to defining and categorising values of nature, from developing foundational philosophical understandings of all values in nature (e.g. Muraca, 2011) to developing frameworks to interpret the ways people assign value to nature for application in specific policy contexts (e.g. O'Connor & Kenter, 2019). Several articles compare value typologies of multiple disciplines or outline novel interdisciplinary value typologies to provide a basis for cross-disciplinary communication and understanding (e.g. Swart et al., 2001; Hejnowicz & Rudd, 2017; Tadaki et al., 2017; Stålhammar & Thorén, 2019). Others engage with fundamentally different concepts of value to one another, working with value typologies that may be technically compatible by virtue of being sufficiently separate (Baum, 2012) or compatible only with great care due to their closely related goals and applications (Spangenberg & Settele, 2016). This range of goals and disciplinary paradigms mean that a range of terms are used for similar concepts (e.g. those listed in the previous paragraph) and some terms are understood and applied differently across disciplines. The type of values discussed above (associated with people but not based on material benefits, and difficult to categorise as either intrinsic or instrumental) are sometimes named in conservation biology and ecosystem services articles as 'intrinsic value' (Justus et al., 2009; Davidson, 2013), though they may not meet a philosophical definition of intrinsic value (Justus et al., 2009; Baum, 2012) and arguments are made that many of these values *can* be understood as instrumental values (Birnbacher, 1998; Tadaki et al., 2017; Costanza, 2020).

Philosophy can provide useful insights and clarity to environmental problems – especially when, rather than simply describing and resolving problems from a philosophical perspective, it is applied through inter- or trans-disciplinary work that explores emergent questions in practice and policy (Nelson, 2008; Hale, 2011). The bodies of literature outlined above provide numerous frameworks and contexts in which to examine values in environmental decision-making. However, there is little empirically-grounded analytic research available about the values that are important in conservation

practitioners' ethical concerns about natural capital approaches. Applying principles from philosophical value theory – the formal study of value in its many forms (Hirose & Olson, 2015) – to empirical data could cut through the various concepts of value to identify and characterise the most important values in conservationists' ethical concerns around natural capital approaches. An improved understanding of the values relevant to this specific situation would allow these ethical concerns to be better characterised, which would help resolve difficulties in addressing an ethical problem in conservation practice by allowing searches for solutions to be directed appropriately.

## 1.33 The ethical compatibility of natural capital approaches and conservation has not been tested

The ostensible context for ethical concerns in conservation about the use of natural capital approaches in environmental decision-making is the increasing prominence of human-orientated approaches to conservation and the environment since the 1980s, and its contrast with 'traditional' nature-orientated approaches. However, unsurprisingly and as authors cited in section 1.212 note, discussion in conservation about the approaches and tools to use is more complex than a debate with two sides. 'Human-orientated conservation approaches', as they have been collectively termed in this introduction so far, include a wide range of approaches to the environment and the use of tools with a variety of goals, among them economic growth (Dietz & Neumayer, 2007; Groom & Turk, 2021), fairness and environmental justice (Martin et al., 2013; Shoreman-Ouimet & Kopnina, 2015), development for poverty alleviation (Pelenc & Ballet, 2015), and broadening support for conservation (Costanza et al., 1997; Luck et al., 2012; Jacobs et al., 2016). For practical and ethical reasons, these approaches and tools are not all equally well-suited to making progress towards conservation objectives, and there is reason to question the ethical compatibility of natural capital approaches with conservation.

The shift towards human-orientated approaches to conservation has been accompanied by academic discourses about the ethical orientation of the conservation movement. Ethical arguments against anthropocentric orientations in conservation have been made and debated with regard to ecosystem services framings in environmental policy (Batavia & Nelson, 2017; Washington et al., 2021). There are pragmatic and practical concerns that framing nature in monetary terms will lead to commodification (Neuteleers & Engelen, 2015), narrow the scope of debate (Coffey, 2016) and crowd out of motivations for nature conservation (Neuteleers & Engelen, 2015; Rode et al., 2015), and result in poor outcomes for biodiversity conservation (Gomez-Baggethun & Ruiz-Perez, 2011).

The debates over human-orientated approaches to conservation feature repeated calls to return to or maintain ecocentric principles as a central objective in conservation; however, these calls place

social goals as a high priority in conservation due to the needs of humanity and the ways nature is important to people (Kopnina et al., 2018a; Piccolo et al., 2018; Taylor et al., 2020). Social justice and environmental protection have shared goals and are acknowledged not only as compatible but also dependent on each other (Hunter et al., 2014; Shoreman-Ouimet & Kopnina, 2015; Vucetich et al., 2018; Washington et al., 2018). Social orientations are a strong component of conservationist viewpoints (Holmes et al., 2016) and are a core part of conservation, not simply a new addition (Kopnina et al., 2018a).

However, the use of market-based, neoliberal, and/or capitalist economic approaches and tools in conservation, while far from a new phenomenon (Brockington & Duffy, 2010), is much more contentious and less fully accepted among conservationists compared to other human-orientated conservation approaches and tools (Kopnina et al., 2018a; Sandbrook et al., 2019; Dempsey, 2021; Vucetich et al., 2021a). Broadly-speaking, the natural capital concept and its applications are within this range of economic approaches and tools (Coffey, 2016; Millward-Hopkins, 2016). It has a long history in economics (DesRoches, 2015b) and its contemporary emergence and development has until recently taken place primarily within economics (Åkerman, 2003; Maris, 2015; Missemer, 2018). (The ecosystem services concept, for comparison, originated in conservation biology (Jax et al., 2013).)

There are long-running concerns that economic approaches will fail to achieve the goals of conservation or even work against them; these concerns are not only in regard to conservation's nature protection goals but also its social, human-orientated goals. One source of concern is the use of monetary and economic valuation methods, as they struggle to assess non-material benefits that people receive from nature (Justus et al., 2009; Jax et al., 2013; Maris, 2015; Cooper et al., 2016), overlook measures of human wellbeing beyond economic benefits (Ayres et al., 2001; Doak et al., 2014), and risk short-term economic benefits being prioritised over long-term ecosystem protection, to the detriment of future generations (Gomez-Baggethun & Ruiz-Perez, 2011; Costanza, 2020). Other features present in economic approaches to environmental management may further reduce their ability to contribute to conservation's long-term objectives by prioritising short-term benefits, such as the use of discounting in ecosystem service valuation (Braat & de Groot, 2012) and natural capital approaches that use weak sustainability principles (i.e. permitting extensive substitution between forms of capital) (Saner & Bordt, 2016). An important consideration across human-orientated conservation endeavours is which groups of people receive the benefits and costs of nature protection and environmental management activities (Daw et al., 2015; Vucetich et al., 2018; Thakholi, 2021) and how these can be distributed fairly (Chan et al., 2007). Framing environmental protection in economic terms may lead to inequitable access to benefits from nature (Gomez-Baggethun & Ruiz-Perez, 2011), with negative outcomes of economic approaches especially likely for people who are already socio-

economically disadvantaged (Rodríguez-Labajos & Martínez-Alier, 2013). An examination of the current form of the natural capital concept regarding features of ethical relevance to conservation would provide conservation practitioners engaging with these approaches, or with others using these approaches, with new perspectives to assess their ethical compatibility with conservation goals.

## 1.4 Response

This project explores the ethical landscape of conservation practice, examines an ethical concern encountered in conservation with an applied philosophy approach, and considers the implications of these insights for the source of these concerns in practice.

The following research questions are addressed in this project:

- What is the relationship between ethics and decision-making in conservation practice and what is the place of natural capital approaches relative to this relationship?
- What insights into ethical concerns about natural capital approaches in conservation can be generated by a philosophical value theory assessment?
- What do these insights reveal about the ethical compatibility of the natural capital concept with conservation?

This thesis is structured as follows.

The ethical landscape of conservation practice is explored in Chapter 2. Interviews with conservation practitioners are analysed to establish how ethical challenges are experienced in conservation practice, how ethics is perceived by conservationists, and how natural capital approaches fit into this environment.

Moving to the realm of applied philosophy, the philosophical aspects of concerns experienced as part of an ethical question in conservation practice is explored in Chapter 3. Participant accounts of values they expressed concern over in the use of natural capital approaches are examined through the lens of philosophical value theory and the extent to which these values are supported by different ethical theories is considered.

These insights are made more relevant to the wider ethical question in conservation practice in Chapter 4. The current presentations of the natural capital concept are identified with regard to features found to be of ethical relevance to conservation practitioners, and the ethical compatibility of these presentations of the concept with values important in conservation is examined.

# 2 – Understanding the ethical landscape of conservation practice

## 2.1 Introduction

### 2.11 Context

The ethics of conservation practice is the topic of a growing area of academic endeavour. It is important that ethical dimensions are carefully considered, thoroughly understood, and used in conservation decision-making (Minteer et al., 2008). The lack of such engagement with ethics is said to cause intense and protracted arguments and prevent these arguments being effectively resolved within conservation and when working with stakeholders (T. R. Miller et al., 2011; Perry et al., 2012; Nelson et al., 2016; Saner & Bordt, 2016). A more nuanced examination of ethical issues encountered in conservation questions could allow conservationists to respond to challenges more proactively and with greater certainty, and to better recognise human duties towards the natural world (Minteer & Collins, 2005b).

Several interdisciplinary approaches towards integrating ethical theory with conservation have been explored in the past two decades. 'Ecological ethics' has been proposed as an interdisciplinary field of applied ethics at the intersection of conservation biology and philosophy, with proponents advocating that it should prioritise context over theoretical concepts (Minteer & Collins, 2005b) to make it more suitable for addressing multifaceted ethical questions in conservation than existing fields of applied ethics (such as animal ethics or environmental ethics) (McCoy & Berry, 2008; Minteer & Collins, 2008; Perry et al., 2012). An ecological ethics approach has been explored in the context of several conservation policies and practices, including the role of zoos in conservation (Minteer & Collins, 2010), relocations and reintroductions (McCoy & Berry, 2008; C. Palmer & Larson, 2014), novel ecosystems (Minteer & Collins, 2010), and conservation ecology research (Parris et al., 2010) – though the field has seen less active development recently. The field of 'compassionate conservation' has developed as an interdisciplinary research movement that (re)considers ethical questions about the place and treatment of animals in conservation (Draper & Bekoff, 2013; Coghlan & Cardilini, 2021). Compassionate conservation has examined the ethics of specific conservation practices, such as game hunting as a form of sustainable use (Ramp, 2013) and the use of captivity in conservation (A. Palmer, 2018; Muka & Zarpentine, 2021), and has prompted considerable recent debate on foundational ethical issues about animals in conservation (Hampton et al., 2019; Bobier & Allen, 2021; Coghlan & Cardilini, 2021).

These research efforts imply that ethical questions are extensively present in conservation work and suggests difficulties in finding ethical clarity in the resolution of ethical challenges. However, despite the body of literature aiming to bring about a more explicit and thorough approach to decision-making about ethical issues in conservation, there appears to have been little engagement with ethics in practice. This is suggested by, for example, continued shortcomings in adequately dealing with ethical questions in conservation practice (Ramp & Bekoff, 2015; Ferraro et al., 2021), a lack of progress towards more comprehensive methods for resolving them (Crozier & Schulte-Hostedde, 2015a), mishandling of ethical concepts by conservationists in debates (Nelson et al., 2016), and a frequently shallow examination of underpinning ethical principles in even contentious and high-profile conservation issues (Batavia et al., 2018). This remains in contrast to fields such as healthcare, where practice-relevant research develops ethical insights that are part of decision-making in the working environment (Urzúa & Gaete, 2018), or cultural heritage conservation, where ethics are integrated into daily decision-making through professional codes of ethics (Henderson & Nakamoto, 2016; Giombini, 2021; Wei, 2021).

The use of economic tools in environmental decision-making is a topic of interest in the context of ethics in conservation. Tensions between human-orientated and nature-orientated approaches to conservation have been the subject of considerable historic and recent discourse in conservation (Mace, 2014; Sandbrook et al., 2019), raising practical and ethical questions about what to conserve, how to conserve it, and why (Batavia & Nelson, 2017; Kopnina et al., 2018a). Social and socioeconomic approaches based around ecosystem services concepts have increased in prominence in environmental policy since the Millennium Ecosystem Assessment (Hails & Ormerod, 2013). More overtly economic approaches to environmental policy and decision-making have also become increasingly prominent through the use of natural capital approaches (Claret et al., 2018). These approaches are applications of the natural capital concept, which was developed by economists from the late 1980s (Åkerman, 2003), and have a range of ethical considerations associated with them (Saner & Bordt, 2016; Matulis & Moyer, 2018). These developments in environmental policy and corresponding changes across conservation practice mean existing and new ethical questions about conservation approaches and the use of economic tools are likely to remain pressing.

## 2.12 Problem

Several research areas have worked towards the objective of improving the integration of ethical insights into conservation decision-making, but the persistence of difficulties in how ethical questions are engaged with in conservation indicates that substantial obstacles to achieving this objective remain unresolved. The task of incorporating ethics into conservation requires a good understanding

of the existing relationship between ethics and conservation practice, in order; however, there is a lack of empirically established understanding about this relationship, which is likely to undermine the ability to navigate these obstacles and direct research efforts appropriately. This section gives an account of understanding available from existing research and the remaining knowledge gaps for three key aspects of this relationship: first, the types and features of ethical challenges experienced by professionals working in conservation practice; second, the ways that the concept of ethics and its role in conservation are perceived by conservation practitioners; and third, where natural capital approaches fit into this relationship.

**2.121 Ethical challenges in conservation practice**

Some conservation activities where ethical challenges may be encountered by conservation practitioners can be inferred from existing research. Ethical challenges have been noted in conservation social science research (Brittain et al., 2020; Seidler et al., 2021), ecological research (Parris et al., 2010; McMahon et al., 2012; Sandbrook et al., 2021; Seidler et al., 2021), environmental policy development (Lodge & Shrader-Frechette, 2003; Luck et al., 2012; Steinwall, 2015), and working with local communities (Brittain et al., 2020; Yeager et al., 2020; Boyce et al., 2021; Seidler et al., 2021). Many of the examples in these papers concern conservation activities conducted in the Global South by conservationists from the Global North (e.g. Brittain et al., 2020; Sandbrook et al., 2021; Seidler et al., 2021) or in colonised landscapes (Boyce et al., 2021). Ethical concerns have been raised regarding conservation engagement with economics-based approaches, such as supporting biodiversity offsetting schemes (Ives & Bekessy, 2015; Muniz, 2019) or other economic tools in environmental decision-making (Spash, 2015; Maier, 2017), and working with corporations (Robinson, 2012).

Possible topics and considerations in ethical challenges that may be encountered by conservation practitioners are suggested by the recurring themes across this body of research and other existing work. Articles advocating for changes in how ethics is applied in environmental work frequently highlight the importance of accounting for the opinions, principles, and needs of local communities (O'Connor, 1994; Lodge & Shrader-Frechette, 2003; Rozzi, 2012; Brittain et al., 2020; Sandbrook et al., 2021; Seidler et al., 2021). A variety of nature-related conservation objectives are also proposed, argued for or against, or discussed in this type of article, including overarching objectives such as protecting biodiversity and ecological integrity (Robinson, 2011; Vucetich, Macdonald, et al., 2021), preventing habitat loss and species extinction (Ehrlich, 2009; Schwartz et al., 2012; Cafaro & Primack, 2014; Stuart & Rizzolo, 2019; Biasetti & de Mori, 2020; Muka & Zarpentine, 2021), and emphasising human-orientated and/or nature-orientated conservation approaches (T. R. Miller et al., 2011; Loreau, 2014; Batavia & Nelson, 2016, 2017; Maier, 2017; Piccolo, 2017; Vucetich et al., 2018), as well

as objectives that contribute towards them, such as scientific rigour in endangered species research (Minteer et al., 2014; Henen, 2016; Russo et al., 2017; Fischer & Larson, 2019), creating novel ecosystems (Minteer & Collins, 2010), and managing introduced species (Haider & Jax, 2007). Other information comes from research analysing policy debates, specific events, and conceptual questions in conservation, either from a philosophical perspective or including ethical aspects among other considerations from a cross- or interdisciplinary perspective (without necessarily arguing for a change in how ethics is applied in conservation more broadly). In addition to covering similar topics to those mentioned above, this type of research includes examinations of ethical aspects of framings and concepts used in conservation, such as 'invasive' species terminology (Clark, 2015; Inglis, 2020), 'naturalness' (Steinwall, 2015), and biodiversity (Mathews, 2016; Skandrani, 2016; Dereniowska & Meinard, 2021), which suggests these may be considerations within ethical challenges faced in conservation practice.

An overview of academic literature in the intersection between ethics and conservation suggests that the 'challenges' in ethical challenges discussed across this literature have a variety of formats. Many articles arguing for the importance of applying ethics in conservation (i.e. those cited above and related articles) describe inherently challenging questions about trade-offs or conflicts between a conservation objective and another factor (e.g. human interests, animal welfare, other conservation objectives). There are indications that ethical topics in conservation are associated with practical challenges in decision-making and conflict resolution, with references to intense, protracted, difficult to resolve conflicts across the various areas of literature on ethics in conservation (e.g. Minteer & Collins, 2005b; Gore et al., 2011; Perry et al., 2012; Crozier & Schulte-Hostedde, 2014; Nelson et al., 2016; Coghlan & Cardilini, 2021). A discourse analysis study of long-standing policy debates about of Swedish protected areas management by Steinwall (2015) suggests that the complexity of ethical concepts involved may contribute to difficulties in reaching agreement in a situation that involves ethical considerations. The recognition and resolution of ethical problems in conservation research involving human participants can be impeded by shortcomings of institutional ethics review boards, and legacies of the resulting poor treatment of participants may cause operational problems for future research (Brittain et al., 2020; Seidler et al., 2021).

Another potential source of challenge related to ethical issues in conservation practice may be the presence of unethical outcomes from conservation activities; unethical outcomes for animals or potentially vulnerable humans are especially apparent across existing literature. Negative impacts of conservation policies or activities on local communities are also well-documented. Poor treatment, negative livelihood impacts, and a lack of consideration for different outlooks for participants and local communities regularly occur during or after conservation research conducted with insufficient care

taken over ethical considerations (Brittain et al., 2020; Walker et al., 2020; Boyce et al., 2021; Seidler et al., 2021). Activities and policies of Western conservation in the twentieth century resulted in numerous instances of harm to indigenous people, especially through exclusionary strict protected area approaches (Dowie, 2009). Despite increased efforts to mitigate these impacts towards the end of the century, such as through inclusive and community-based conservation approaches (Berkes, 2004), failures to adequately consider the views and needs of local communities have remained a recurring problem (Chan et al., 2007), with legacies and present-day effects of colonialist conservation policies and attitudes continuing to result in negative equality and social justice outcomes (Friedman et al., 2018; Vucetich et al., 2018; Collins et al., 2021; Rudd et al., 2021; Archer et al., 2022).

This body of research overall gives some suggestions about activities during which conservation practitioners may encounter ethical challenges in their work, considerations that may be involved, and types of challenges that may be present. However, relatively little information available about the ethical challenges encountered in conservation is empirically established. The objective of many articles that discuss ethical challenges is to encourage more rigorous application of ethics in conservation, and so they often take a conceptual, explanatory, and/or persuasive approach, rather than an empirical one. In more conceptual articles, information about ethical challenges in conservation generally comes from illustrative examples (real and hypothetical) or inference from debates across academic literature, often focusing on conceptually interesting questions rather than challenges faced in practice. In more practice-orientated articles, information about ethical challenges often comes from researchers' personal reflections (e.g. Ehrlich, 2009) and anecdotal experiences (e.g. Brittain et al., 2020; Boyce et al., 2021; Seidler et al., 2021) or post hoc examination of previously documented events used as a structure for a wider discussion (e.g. Buckeridge, 2014; C. Palmer & Larson, 2014; Muka & Zarpentine, 2021).

A small number of empirical studies about ethical challenges in conservation exist, which go some way towards understanding the ethical challenges that conservation practitioners may face. Empirical case studies provide examples of the ethical challenges experienced by conservation practitioners in the UK, USA, and Southeast Asia engaged in primate rehabilitation and reintroduction (A. Palmer, 2018), invasive species managers in the USA responding to a novel threat (Clark, 2015), researchers and local participants involved in a community-based conservation research project (Walker et al., 2020), and policy-makers involved in a Swedish policy development debate (Steinwall, 2015). One empirical study explores North American conservation biologists' experiences of ethical challenges related to endangered species advocacy more broadly across their work (Stuart & Rizzolo, 2019). However, empirical studies about ethical challenges in conservation remain relatively scarce. The majority of empirical studies available are about a specific activity or event, which limits the possibility of

understanding experiences of ethical challenges across a wider context, and/or examine ethical challenges experienced by university-based researchers, which limits the possibility of understanding experiences of ethical challenges for conservation practitioners working in conservation organisations.

Empirically establishing the originating circumstances, topics, and features of ethical challenges that are experienced in conservation practice could improve the use of ethics in conservation by helping efforts to facilitate this to focus on issues that are known to be present. Finding out which types of challenges are experienced by conservation practitioners in relation to ethical considerations may help explain the apparently low uptake of ethical decision-support tools (e.g. if such tools do not focus on issues that are pressing for conservation practitioners in their working lives). An account of the main topics of ethical challenges experienced in conservation practice would provide context to allow theoretical and applied ethics work to be targeted at the most relevant ethical questions.

**2.122 Conservation practitioners' perceptions of ethics and its place in conservation**

There is debate among conservation scientists about how the discipline's foundational principles should influence the types of work they engage in. Conservation science is frequently described as 'mission-driven' – often citing Michael Soulé's influential 1985 article 'What is Conservation Biology?' (e.g. Fraser, 2010; Sandbrook et al., 2011; Albrecht et al., 2013; Saltz et al., 2019) – and normative and moral principles have been an inherent feature since its contemporary inception[3] (Baard & Ahteensuu, 2019). The overtness of this feature in conservation science is different to most other scientific disciplines (Biasetti & de Mori, 2020), but does not in itself undermine it as a scientific discipline – most philosophers of science now accept that science need not be separated from ethical and social principles and have moved on to examining how they can be integrated (Gillette et al., 2021). However, there has been extensive debate in academic literature over whether and how conservation scientists should engage in policy advocacy (Chan, 2008; Baard & Ahteensuu, 2019), where they may encounter tensions between scientific objectivity and principle-influenced advocacy (Horton et al., 2016). This debate began early in the discipline's history (e.g. Salzman, 1989) and has included coverage in special sections in *Conservation Biology* in 1996 (Noss, 1996) and 2007 (Meffe, 2007) and discussion in ethics literature (e.g. Odenbaugh, 2003, 2008; Norton, 2008). There is empirical evidence that conservation scientists have mixed opinions about the engaging in moral advocacy (Stuart & Rizzolo, 2019), which is discussed in the context of this chapter's findings in the chapter discussion section.

[3] The phrase 'value-laden' is typically used to describe this feature of conservation science in cited literature, which uses the meaning of 'values' that is referred to by 'principles' in this thesis (see section 1.11).

Recurring failures to prevent ethical problems around the impact of conservation policies and activities on local communities could imply that these problems are underacknowledged in conservation. Trends across conservation research literature and the experiences of conservation researchers suggest that conservation biologists overall do not adequately acknowledge or examine the normative principles that underpin their research or reflect on the differences between their own principles and those of others affected by conservation research and practice (Boyce et al., 2021). This can result in unethical impacts on local communities through disregard for their ethical and cultural principles (O'Connor, 1994; Rozzi, 2012; Woodhouse et al., 2021) and imposition of research agendas without their agreement (Brittain et al., 2020). Power imbalances and cultural differences frequently result in unethical outcomes for people affected by conservation research that involves human participants or working closely with local communities, according to the experiences of researchers involved (Brittain et al., 2020; Seidler et al., 2021). Ethical issues may arise from underfunding of research (Walker et al., 2020; Seidler et al., 2021) and shortcomings of institutional ethics review boards impede their recognition and resolution (Brittain et al., 2020). The ethical safeguards implemented in conservation social science research about sensitive topics are poorly documented in publications and there is insufficient pressure to report them in conservation journals (Ibbett & Brittain, 2020). Low engagement with social sciences has impeded the consideration of human dimensions in conservation activities and policies (Chan et al., 2007; Bennett & Roth, 2019) and there has been resistance to investigating impacts on human rights in international conservation policy arenas, with "powerful groups within the IUCN" perceiving such assessments as hostile to conservation (Brockington et al., 2006, p. 250). The recurrence of these impacts and the responses of conservationists suggest that these ethical concerns are underacknowledged or underaddressed in conservation.

Further hints about the possible place of ethics in conservation practice can be inferred from the reported place of ethics in conservation science and biology education, where it generally has a relatively low profile. There is a lack of dedicated, mandatory training on ethics in conservation science graduate programs (Saltz et al., 2019) and on animal ethics in biology and ecology degree programs (Crozier & Schulte-Hostedde, 2015a, 2015b; Zemanova, 2017). There are few conservation-specific resources on the ethics of research with human participants (Brittain et al., 2020) or methodological tools and training for conservation biologists to identify the ethical principles and normative beliefs that influence their research (Boyce et al., 2021).

Several quantitative or mixed quantitative-qualitative studies have empirically investigated the opinions and beliefs of conservationists through analysis of surveys of conservationists, including surveys conducted at academic conferences (Sandbrook et al., 2011; Holmes et al., 2016) and a large

scale online survey in the Future of Conservation study (Sandbrook et al., 2019), find distinct groupings of principles and views among conservationists with areas of consensus and difference. Comments in articles about animal welfare considerations in wildlife research hint that ecologists may have a negative opinion about the subject of animal ethics. Authors suggest biologists have historically been sceptical or hostile to the topic due to past interactions with animal activists (Crozier & Schulte-Hostedde, 2015b) or that they view ethical enquiry as impractical and too subjective (Parris et al., 2010). There is anecdotal evidence that concerns about animal ethics among ecologists are seen as 'invalid' and 'taboo' and that ecologists are discouraged from pursuing them (Crozier & Schulte-Hostedde, 2015a, p. 579). Avoidance of animal ethics questions has also been observed among on-the-ground practitioners, with an empirical study finding that people carrying out lethal species management used various justifications for their lack of discussion or meaningful consideration of animal welfare (Clark, 2015).

Taken together, this body of research shows a mix of acceptance and rejection of ethical discussion and questioning across various areas of conservation, suggesting that tensions may exist around this topic. However, there are similar limitations and gaps in this research for understanding conservation practitioners' perceptions of ethical enquiry and its place in conservation as there are for understanding the ethical challenges encountered in conservation practice. That is, relatively few studies contributing to this understanding are empirical (though more are available than there are for ethical challenges themselves). Most empirical studies available are about individual case studies (e.g. Clark, 2015; Steinwall, 2015), conservation researchers working in academic settings (e.g. Stuart & Rizzolo, 2019; Walker et al., 2020), or closely related but adjacent topics, such as conservationists' opinions about conservation more broadly and/or the content of their moral stances (e.g. Butler & Acott, 2007; Sandbrook et al., 2011, 2019; Holmes et al., 2016; Bruskotter et al., 2019) or ethics training in conservation-related degrees (e.g. Crozier & Schulte-Hostedde, 2015a, 2015b; Zemanova, 2017; Saltz et al., 2019). Overall, there is relatively little empirical information about how conservationists perceive ethical enquiry or the relevance of ethics to conservation, especially for conservation practitioners working in conservation organisations.

The distinction between conservationists engaged in academic research and those working in conservation organisations may be significant for understanding conservationists' perceptions of ethics and its place in conservation. Several of the conservation biologists interviewed by Stuart and Rizzolo (2019) commented on the complementary roles of conservation scientists and conservationists in advocacy organisations, with those in advocacy organisations implied or stated to be better placed to engage in moral advocacy around conservation policy. Meanwhile, several studies of conservationists or others engaged in practical and/or policy development aspects of

environmental management indicate avoidance or disapproval of ethical discussion in their work (Butler & Acott, 2007; Clark, 2015; Steinwall, 2015).

Establishing how conservation practitioners view the concept of ethical enquiry and how they see the place of ethics in conservation practice could give insights into barriers to more substantial engagement with ethics in conservation decision-making, which would help future research to be better placed to overcome them. It is especially important to investigate this for conservationists working in conservation organisations due to their potentially important role as moral advocates for nature conservation in policy development, which professional conservationists in other sectors, such as academic scientific research, are unwilling or unable to engage in. This information would also allow future research endeavours to target empirically identified gaps when investigating ways to connect ethical theory with conservation practice.

**2.123 The place of natural capital approaches relative to ethical challenges in conservation**

The natural capital concept has raised ethical questions since its emergence in economics in the late 1980s (e.g. Beckerman, 1994; Holland, 1994; Daly, 1995; Martinez-Alier et al., 1998; Glotzbach & Baumgärtner, 2012; DesRoches, 2015a; Beau, 2019) and is now a prominent force in environmental policy (Claret et al., 2018). Applying the concept through natural capital approaches is sometimes presented as a way to make decisions about the environment without appealing to arguments based on contested and intangible ethical concepts like intrinsic value (Spash, 2015; Bolt et al., 2017), perhaps giving them potential as alternative solutions to stalled ethical debates. The use of economic valuation, which is a prominent feature of natural capital approaches (Maris, 2015; Banerjee et al., 2019), in environmental decision-making can also be considered to be complementary to valuation based on ethical and social factors (Schröter et al., 2014; Scharks & Masuda, 2016). However, ethical concerns about their use continue to be raised in academic literature (Sorgen, 2020; Washington et al., 2021).

Studies of conservationist opinions indicate that the acceptance of natural capital approaches is not a settled matter among conservationists or wider society. The Future of Conservation study found that the statements ‘Conservation should work with not against capitalism’ and ‘The best way for conservation to contribute to human wellbeing is by promoting economic growth’ were among the most polarising in a global survey of over 9,000 conservationists (Sandbrook et al., 2019, supplementary figure 2). A survey of conservationists in England found that there is a mix of openness and resistance to natural capital approaches in conservation (Dempsey, 2021) and the topic of natural capital has received mixed responses from the general public online (Pan & Vira, 2019). Supportive engagement with natural capital approaches by conservation organisations is associated with an

increase in neoliberalism and corporate influence in conservation (Brockington & Duffy, 2010; Coffey, 2016) and has drawn protests from anti-capitalist activists in Scotland and online (Matulis & Moyer, 2018).

It remains unknown if natural capital approaches function as a potential solution to challenges of engaging with ethical considerations in conservation practice or as a new ethical challenge that conservation practitioners may struggle to resolve. There is a risk that they could be overlooked as potential tools for negotiating difficulties around ethical questions or that ethical concerns about their use will not be addressed by conservation practitioners. Establishing an empirical account of the place of natural capital approaches in the relationship between conservation practice and ethics could help identify and mitigate these risks, and could be used alongside contextual understanding about this relationship to inform research to help move long-standing debates forward.

### 2.13 Response

The section above outlines several research gaps in the understanding of the relationship between ethics and conservation, especially a lack of knowledge that is empirically established and about conservationists working in conservation organisations. To address these research gaps, this study uses social science methods to investigate the views of such conservationists with the aim of establishing empirical knowledge and understanding of this topic. This study focuses on strategic level conservation, as questions of overarching conservation policies and practices are of the most relevance to understanding the place of natural capital approaches.

The following research question is addressed: What is the relationship between ethics and decision-making in strategic level conservation practice and what is the place of natural capital approaches relative to this relationship? In answering this question, the following specific objectives are pursued:

- To identify and examine the characteristics of ethical challenges experienced by conservation practitioners who are involved in strategic level decision-making.
- To explore the place of ethics and how it is perceived within conservation organisations.
- To identify the place of natural capital approaches in this ethical landscape.

## 2.2 Methods

A qualitative approach is taken to exploring the relationship between ethics and conservation decision-making, with a study design that uses social science research tools and methods of analysis. Conservation professionals working in strategic level positions in conservation organisations based in the UK were recruited as participants in individual semi-structured interviews, which were transcribed

and analysed using thematic analysis. This section describes in detail the research strategy selected in terms of philosophical position and quality (2.21), the choice of specific research instruments employed (2.22), the process of selecting and recruiting study participants (2.23), the participant sample and data collection (2.24), and the method by which data were analysed (2.25).

## 2.21 Research strategy

### 2.211 Ontological and epistemological positions

This study adopts the following positions about what exists (ontology) and how we can know about it (epistemology). The features of interest in the relationship between ethics and conservation (ethical challenges, place and perception of ethics, and relevance of natural capital approaches) are considered to be part of an inherently socially constructed reality, which can be viewed and explored through the experiences and perspectives of people who are embedded within it and contribute to its construction. The ontological position combines elements of realism (according to which there is a real world that exists independently of people's views of it) and constructivist idealism (according to which the world is comprised of multiple, socially constructed realities) (Gibbs, 2018) by framing the 'reality' being studied as a broader social reality that exists beyond any single social construction of it. The epistemological position is that knowledge about this reality can be accessed through interpretation of these constructions. This combination of ontological and epistemological positions places this study's theoretical approach closest to 'critical realist' approaches to qualitative research (Gibbs, 2018).

Informed by these positions, this study takes an interpretivist, subjective approach to the process of obtaining knowledge about the 'reality' (i.e. the features of the relationship between ethics and conservation in question) by involving interpretation by study participants and the researcher at various levels. This is in contrast to a positivist approach to social science research, which follows the natural sciences in striving to obtain knowledge through objective measurement and analysis of observable phenomena (Bryman, 2012). In interpretivist approaches, the ways that people view and experience features of their world and the meanings they attribute to events and objects are most important (Rubin & Rubin, 2005). This study seeks to discover and understand conservationists' perspectives and experiences of the relationship between ethics and conservation as a crucial aspect of this relationship; it is appropriate to study these inherently subjective items with an approach that allows the role of interpretation to be usefully acknowledged, rather than attempting the unhelpful and potentially-impossible task of removing subjectivity entirely (Rubin & Rubin, 2005), and so an interpretivist approach to obtaining knowledge is most suitable in this case.

Knowledge in this study is formed from a mostly inductivist analytic direction; that is, patterns and explanations are informed by the data (induction) more than existing theories and concepts (deduction) (Bryman, 2012; Gibbs, 2018). The approach is not purely inductivist; the study design and method of analysis are informed by existing concepts to some extent, but not primarily determined by them, and emergent themes are more important in this exploratory study (see section 2.25 for further discussion).

### 2.212 Quality and rigour

Qualitative research that embraces the role of subjectivity as an inextricable and necessary part of knowledge formation requires different standards of quality assessment than the standards familiar to quantitative research. By outlining the positions taken regarding what exists, how we can know about it, and the approach to obtaining that knowledge, criteria for the quality and rigour of research can be established, aimed for, and measured against.

This study strives for a set of criteria based on those described by Frambach et al. (2013) and Bryman (2012), who identify links between quality criteria familiar to quantitative research (validity, objectivity, reliability) and quality criteria that are appropriate for qualitative research. Based on these, this study uses credibility, transferability, reflexivity, confirmability, and dependability as quality criteria. The objective is not necessarily to maximise each of these features directly, but to use them as guides to assess and improve the overall rigour of the research at all stages of this study.

## 2.22 Research instruments

### 2.221 Semi-structured individual interviews

Semi-structured individual interviews were used as the main data collection tool, with interview participants who were conservation professionals working at a conservation organisation (details of participant selection, recruitment, and final sample can be found below in sections 2.23 and 2.24). The objectives of this study focus on the discovery and understanding of conservationists' experiences and views about the complex topic of ethics in their world and work; research interviews were chosen as an appropriate method to contribute to reaching these objectives as they are one of the primary methods of studying lived experiences (Brinkmann, 2013) and are well-suited to obtaining detailed, nuanced information about people's experiences and perceptions (Rubin & Rubin, 2005), and because no suitable pre-existing sources of this information were found during the extensive literature review process.

Individual interviews were chosen as a more appropriate research tool for this study than group interviews or focus groups. Although group interviews and focus groups can be useful to obtain information quickly in exploratory studies and to understand norms and attitudes, there is a risk that

less senior or less dominant voices will be overshadowed (Gillham, 2005). As this study focuses on decision-making around conservation strategy and the views of conservation professionals, many potential participants are likely to hold medium to high seniority positions in conservation organisations. There is a high chance of pre-existing professional connections between them – they will be professionals working in the same or closely connected fields as each other and in some cases they may be colleagues – and that there will be a mix of seniority levels. This context, especially in combination with suggestions from existing research that ethics may be a sensitive or taboo topic for conservation professionals to discuss (e.g. Parris et al., 2010; Crozier & Schulte-Hostedde, 2015a, 2015b), means there is a reasonable expectation that some – perhaps even most or many – participants would feel inhibited in a group setting, which would impair the quality of data that could be obtained this way. Conversely, participants may feel pressured to exaggerate how 'ethical' they or their department are when in a group setting, impairing the quality of data for this study's purposes. Pre-existing professional connections and mixed seniority may also introduce a risk of negative professional repercussions for participants, which would not be justified (in terms of research ethics) by the study's overall goals. Individual interviews are therefore preferred for this study, as they can be used to seek the rich data that can be obtained from research interviews in a way that also facilitates greater openness from participants by allowing a higher degree of confidentiality (Brinkmann, 2013).

Interviews were semi-structured, rather than minimally structured or rigidly structured (as in a questionnaire or survey). Semi-structured interviews are structured by the topics covered, the questions and types of questions asked, and the time taken for each interview, but some degree of flexibility is permitted the application of these structuring elements. This balances flexibility, which facilitates discovery of nuances and unexpected directions, and focus, which facilitates inductive analysis across groups and is more engaging for participants (Gillham, 2005). These features make semi-structured interviews an appropriate choice for obtaining suitable data on which an appropriate form of analysis could be performed, in order to meet the exploratory and investigative study objectives.

**2.222 Topic guide**

The semi-structured aspect of interviews was primarily implemented by using a topic guide developed for this purpose. This section describes the development and content of the topic guide. The final version of the topic guide, which was used in all interviews conducted for this study, is included in the Appendix.

A draft topic guide was developed with sections on the ethical considerations and questions participants were aware of, how ethical issues are addressed, decision support requirements for ethical issues, and the effects of natural capital approaches on ethical questions, all with regard to conservation practice. These sections were based on the original research objectives, which evolved and changed slightly over the course of the study for reasons outlined in section 2.31 of the Results. The draft topic guide was used in three pilot interviews, with participants who worked in conservation-related fields but were outwith the selection criteria (see section 2.231). Participants in pilot interviews were known to the project supervisors and recruited less formally than participants in the final sample, but the same informed consent and confidentiality procedures were followed (see section 2.232). The transcripts of pilot interviews were reviewed and the experience of the interview reflected on by the interviewer, including reflection on comments in the experience made by pilot interview participants before and after the interview recording. Informed by these, the topic guide was revised in order to improve the flow of discussion points in the interview, maximise the coverage of the topics of interest, clarify any confusing questions, and remove redundant questions (Gillham, 2005) to form the final version of the topic guide used in the main set of interviews. The main changes were removing two questions that were found to be redundant (participants tended to have already answered or mostly answered them in their answers to previous questions) and moving the section about natural capital approaches to an earlier point in the interview, from fourth of four to second of four, to invite discussion of natural capital approaches throughout a greater proportion of the interview.

The final topic guide began with an introductory preamble and some general biographical questions, followed by four sections with questions on a set of related subtopics, and ended with a closing question inviting the participant to discuss anything else they felt was relevant to the topics covered in the interview. The introductory preamble explained the background to the study and goals of the interviews, mentioning the focus on conservation strategy and planning and on natural capital approaches. (This information was also made available to participants in advance of the interviews; see section 2.232.) The subtopics of the four main sections were ethical considerations and questions the participant was aware of, the effects of the natural capital approach on ethical questions, how ethical questions are addressed, and decision support requirements around ethical matters. It did not have a specific section on the perception of ethics in conservation because this was not part of the original set of objectives for the research question. This topic became apparent as an important element during interviews and so was incorporated into the study. The topic guide was not changed in response to this during the main interview data collection phase, in order to avoid adding an

unnecessary complicating factor to the analysis when the existing questions appeared to be sufficient to elicit this information.

Each of the main sections in the topic guide had two or three main questions, most of which were followed by one to four optional questions. The majority of questions asked for the participant's experiences around specific aspects of ethical issues in conservation practice, rather than their attitude or personal opinion toward the topics, as their experience as conservation professionals is the primary interest in this study (this was unchanged during the revisions to the research objectives). The majority of questions, both main and optional, were open questions. The main questions aimed to elicit material on the topic of key elements relevant to the research objectives and were intended to be asked of all participants (this was generally adhered to in practice; see 2.242). Optional questions were follow-up or probing questions that could be added to seek additional details, clarification, examples and so on; these could be added or omitted based on the answers given by participants and the interviewer's awareness of the research goals. This combination of main and optional questions was used to initiate, focus, and maintain discussion across all necessary topics, and to do so in a way that facilitates exploration and elaboration of relevant ideas (Rubin & Rubin, 2005; Bryman, 2012).

In some interviews, participants asked questions of the interviewer that required responses beyond the points in the pre-written topic guide; the two most common examples and associated interviewer responses are as follows. The introductory preamble stated that the interest of the study lay with their individual view as someone working in conservation; if participants asked for clarification, the interviewer reiterated this and added that their views as an individual were sought, rather than their statements as a representative of the organisation. If participants asked for clarification about what was meant by 'ethical considerations' or similar, they were advised that any topics where they felt there was a question over the morally right or wrong thing to do were of interest. Previous research suggests the possibility of a disciplinary language barrier for conservationists discussing ethics (e.g. Butler & Acott, 2007; Steinwall, 2015; Zemanova, 2017), which could cause challenges in discussing the interview topics but also limits the ability to fully remove such a barrier. However, these terms are part of everyday language, not only part of the language of various academic disciplines, and the ways they are understood by participants is more relevant to this study than ensuring that participants are able to 'correctly' identify issues that would meet a strict philosophical definition of 'ethical' or 'moral'. The tactic of only lightly defining these terms allows the meanings and definitions used by participants to be emphasised rather than imposing the interviewer's definitions, which is an appropriate tactic in a study using an interpretivist approach (Rubin & Rubin, 2005). It is also part of the attempt to mitigate the impacts of the possible disciplinary language barrier by aiming to capture the fullest range of ethical issues and identifying relevant topics in responses during the analysis stage.

The intended length of the interviews – another semi-structuring element, additional to the topic guide – was approximately 30 to 40 minutes. The topic guide itself did not state the intended length, but it was planned in advance and stated to participants in the invitation to take part in the study. This was chosen as an appropriate amount of time to balance the requirement to achieve a suitable breadth and depth of discussion against the need to minimise the risks that longer interviews may incur, such as difficulties in recruiting participants, undue imposition on participants, or a drop in data quality due to interviewer and participant fatigue (Gillham, 2005).

**2.223 Researcher**

In qualitative social science research, the researcher themself can be considered to be one of the research instruments (Brinkmann, 2013). They are a key figure in the data collection process (Holstein & Gubrium, 2012) and are the main instrument conducting the analysis and interpretation, especially when using an inductivist, constructionist research strategy (Rubin & Rubin, 2005; Bryman, 2012). This introduces an element of subjectivity to the research. It is not possible or even desirable to eliminate the influence of subjective factors from social research; instead, the potential effects of the researcher's influence should be acknowledged, examined, and reflected on at several points throughout the research, an endeavour known as 'reflexivity' (Bryman, 2012; Brinkmann, 2013; Gibbs, 2018). Only by recognising these effects can the extent to which they have or have not influenced the research and its findings be assessed, which contributes to the confirmability of the research (Bryman, 2012).

At this stage, it is useful and important to identify my own positions on the research topics and characteristics relevant to the research process so that these can be reflected on over the course of the research (Brinkmann, 2013; Kara, 2015). I consider myself to be 'a conservationist', both personally and professionally: I care about nature and think its conservation is important; my educational background is in conservation science and ecology; and I worked or volunteered in several entry-level, short-term roles with conservation organisations in Scotland and England prior to my PhD studies (mainly the RSPB and Scottish Wildlife Trust, some with Scottish Natural Heritage). My motivation for researching the relationship between ethics and conservation began with my curiosity about how ethical issues were discussed among my immediate colleagues during these roles. These were mostly fieldwork or ranger positions at field sites or nature reserves, meaning I had relatively little direct prior experience of the strategic level work that the study participants were involved in and little direct engagement with staff at their level of seniority when working in these roles. I had no direct personal or professional connection to any of the study participants and, to the best of my recollection, had not met any of them prior to commencing the recruitment process. I had relatively little awareness of natural capital approaches before beginning this project, but a reasonably

thorough, if mostly theoretical, understanding of ecosystem services approaches. My personal opinion about natural capital approaches and their use in conservation has changed multiple times over the course of my PhD studies and I have made conscious efforts to remain open-minded and neutral in my research.

The approach taken in this study is to minimise the effect of any potential biases on the study design, data collection, analysis, and presentation of the research as far as possible, and to recognise and reflect on the extent to which this is not possible. This involves identifying potential sources (above), continuing to be alert to them and new potential sources, taking care to mitigate their effects (e.g. avoiding leading questions and statements in interviews), being transparent about their possible remaining influence (e.g. reporting instances of leading questions and statements and accounting for them when analysing responses), and critically reflecting on this process.

## 2.23 Participant selection and recruitment

### 2.231 Selection criteria

The quality of relevant information is prioritised over objectivity and generalisability in this study's approach to data collection, which is in keeping with the research strategy employed and typically the most appropriate approach for qualitative studies (Brinkmann, 2013). Participant selection is based on expectations about the likely quality of relevant information that can be obtained from any particular source (Flyvbjerg, 2006), and so participant selection aims to include people who are expected to have experience and knowledge about the topics of interest in this study (Rubin & Rubin, 2005). These expectations are informed by researcher knowledge about the field (Brinkmann, 2013). In this study, the participant selection included people who held a strategic level role within a UK-based conservation organisation. These criteria and their additional details described below were based on the researcher's knowledge of UK conservation, the project supervisors' knowledge of UK conservation, and a grey literature review of the networks and types of UK-based conservation organisations.

The focus was on those in strategic level roles because these participants were thought to be most likely to have an overview understanding of different processes within the organisation and insights into decision-making about far-reaching conservation goals than those working in more 'on the ground' roles. Strategic level roles were considered to be those in which the post holder would be involved in decision-making around conservation strategy, such as chief executives, directors or heads of departments involved in active conservation management and other senior staff in these departments. Those at similar levels but involved exclusively in research, marketing, partnerships, membership, fundraising and similar areas (i.e. their department's involvement with active

conservation management was less direct) were not included. This was to focus the study on ethical issues arising either in management of land or other habitats for nature conservation or in the operation and steering of a conservation organisation overall as these are likely to be the issues most closely associated with the knowledge gaps outlined above.

The organisations from which potential participants were selected were chosen based on the following criteria: the organisation carries out environmental management for the purposes of nature conservation (i.e. not working solely through partners or as an advocacy organisation); and nature conservation and associated aims were the primary goals of the organisation without another major, non-conservation interest. The types of organisations involved in conservation and environmental work vary widely in terms of the issues they are concerned with and the nature of their activities, so these criteria were used to narrow the focus of this study to give the best chance of providing useful information. Suitable organisations with a range of sizes, scales and scopes and both governmental and non-governmental organisations (NGOs) were considered in the participant search process.

Only organisations that were based in the UK (either primarily or via a branch or headquarters) were included in order to improve the feasibility and focus of the study. Feasibility was restricted by practical concerns such as the availability of financial resources and the limitations of time and energy, which should be accommodated in the design of qualitative research (Rubin & Rubin, 2005). This study was planned in 2017-2018 and the fieldwork conducted in 2018. At that time (i.e. before the COVID-19 pandemic raised the level of access and acceptance of remote communication formats as an alternative to in-person meetings), in-person interviews were considered preferable for this study over distance interview formats, such as telephone and online video interviews, as they provide better opportunities for building rapport and encourage greater engagement in the complex, nuanced discussion that is vital to qualitative research (Shuy, 2002; Gillham, 2005). The practical limitations and preference for in-person interviews meant that most participants had to be located within a day's train and bus travel distance from the researcher's location in either Edinburgh or York, which informed the decision to limit participant selection to those working at organisations with a physical base in the UK. This restriction was also adopted to keep the scope of the study more focused. The priorities and pressures of conservationists and conservation movements in different regions vary widely because of a complex range of social, political, and geographic factors (e.g. Bryant, 2000; Brockington et al., 2006; Chan et al., 2007; Mace, 2014; Tallis & Lubchenco, 2014; Skandrani, 2018; Sutherland et al., 2018), and so the relationship between ethics and conservation is likely to have a high degree of variation as a result of complex factors between regions too. Adequately accounting for this level of variation while also attempting to achieve the study objectives would be beyond the

scope of this study, which contributed to the decision to focus only on conservationists who are part of the conservation movement in the UK.

### 2.232 Recruitment process

Potential participants were identified by searching lists of organisation staff available online (e.g. on LinkedIn and organisation websites) and from recommendations by participants, other potential participants, and supervisors.

Potential participants were individually approached by email to invite them to take part. The project background, reasons for the study, and voluntary nature of participation were made clear during the recruitment process, via a participant information document provided when they were initially approached and in the consent form provided to participants who agreeing to take part. Written consent for taking part in the interview, use of interview data for the purposes of this study, and audio recording of interviews was obtained before each interview began. The participant information document was supplied again when obtaining written consent. Ethical approval for the study was granted by the University of York's Department of Environment Ethical Review Committee in February 2018, prior to commencing the recruitment process.

The number of participants to interview was not decided in advance, which is rarely possible in qualitative studies, and was guided by the commonly-used principle of 'saturation'; that is, the amount of new themes that arose in interviews was observed and a sufficient sample size considered to have been reached when few or no new themes were found with additional interviews (Baker & Edwards, 2012). Multiple participants were sought from larger organisations to try to gather a fuller set of information, based on the assumption that individual participants from large and/or broad scope organisations are more likely have knowledge of a proportionally smaller amount of the organisation's functioning compared to a participant from a small and/or specialist organisation. National and international NGOs with a broad conservation remit and governmental organisations were considered to be 'larger organisations'.

## 2.24 Data collection

### 2.241 Characteristics of study participants and organisations they were recruited from

A total of 72 potential participants from 33 conservation organisations were contacted with an invitation to take part in the study. From these, 33 participants from 23 conservation organisations accepted the invitation and took part in the study. The majority of participants (28 of 33) were identified through online lists of organisation staff. Four participants were approached as a result of personal recommendations – one by another participant, one by a potential participant who declined to take part, one by both another participant and a potential participant who declined to take part,

and one by a supervisor. Those recommended by participants or potential participants were their colleagues from the same organisation.

The positions held by participants include: fourteen directors; seven heads of department; five chief executives or chief officers; four other senior managers or advisors; two natural capital specialists; and one economist (Table 2.1a). Other than the natural capital specialists and economist, their roles covered a wider range of conservation activities, sometimes with a focus on research or policy. The majority of participants had a primary or substantial background in general conservation work within conservation organisations (22 of 33) or in conservation science and research (nine of 33). One participant's primary background was economics and another's was non-conservation charitable sector work. Eight participants had a notable secondary or additional background in another field, including environmental law, non-conservation environmental management or civil service, commercial forestry, business, other charitable sector work, and/or higher education (Table 2.1b). The year participants began working in conservation ranged from the 1960s to the 2010s, with most participants (22 of 33) starting their career in conservation in the 1980s or 1990s (Table 2.1c).

**Table 2.1. Details about the set of participants in the study.** Details include (a) the positions held in the organisations they were employed at, (b) their general career background, and (c) the year they started working in conservation (by decade).

| Participant characteristics | No. of participants |
|---|---|
| *(a) Position held within organisation* | |
| Director | 14 |
| Head of department | 7 |
| Chief executive or Chief officer | 5 |
| Senior manager or Senior advisor | 4 |
| Natural capital specialist | 2 |
| Economist | 1 |
| *(b) Background* | |
| Conservation practice or general conservation | 22 |
| Conservation science and research | 9 |
| Economics | 1 |
| Another charitable sector | 1 |
| *(c) Year started working in conservation* | |
| 1960-1969 | 1 |
| 1970-1979 | 1 |
| 1980-1989 | 9 |

| | |
|---|---|
| 1990-1999 | 13 |
| 2000-2009 | 6 |
| 2010-2018* | 3 |

*Study was conducted in 2018.

The set of participants included (categories overlap): seven participants from three governmental organisations and 26 participants from 20 NGOs; seventeen participants from eight broad remit organisations and sixteen participants from fifteen specialist NGOs (Table 2.2a); and six participants from three organisations working in the UK and internationally, 21 participants from fourteen organisations working at a national level, and six participants from six regional organisations (Table 2.2b). The proportion of contacted potential participants who ultimately took part in the study varied slightly between groups of organisations with different characteristics. It was around 50% or higher for most groups of organisations, with the following exceptions that had lower acceptance rates: Welsh organisations (four potential participants from three organisations approached, none accepted – though one participant had relevant experience in Welsh conservation organisations, see note in Table 2.2); zoological societies (three potential participants from two organisations approached, none accepted); and marine habitat and/or marine species specialist NGOs (five potential participants from two organisations approached, one took part in the study).

Eight of the organisations that the set of participants worked at were considered to be 'larger organisations' according to the criteria described above. Multiple participants were included from six of these organisations. Multiple potential participants from one of the other large organisations were contacted with an invitation to participate but only one accepted. No further potential participants from the remaining large organisation were identified and had contact details available online. Multiple participants from one specialist NGO were included because the first participant recruited from this organisation had valuably unique but somewhat limited perspective on the organisation's work so a second participant from the organisation was recruited, based on recommendations from the first participant and an earlier potential participant who declined to take part. In total, there was one organisation that four participants were drawn from, one organisation that three participants were drawn from, five organisations that two participants each were drawn from, and the remaining sixteen participants were all drawn from different organisations (Table 2.2c).

**Table 2.2. Characteristics of the organisations at which participants in the study were employed and the number of participants from each.** Part (a) shows the types of organisations by governmental or non-governmental status and type of specialism, and the number of participants from each. Part (b) shows the geographic ranges of the organisations and the number of participants from each. Part (c) shows the distribution of participant numbers across the different organisations from which they were drawn. Abbreviations used: NGO = non-governmental organisation; RSPB = Royal Society for the Protection of Birds; FFI = Fauna and Flora International. List items indented and below totals are subtypes contributing to the total above them.

| Organisation characteristics | No. of organisations | No. of participants |
|---|---|---|
| *(a) Type* | | |
| Government (total) | 3 | 7 |
| Non-government (total) | 20 | 26 |
| Broad remit NGO | 5 | 10 |
| Specialist NGO – region | 6 | 16* |
| Specialist NGO – taxa | 4 | |
| Specialist NGO – habitat | 3 | |
| Specialist NGO – conservation theme | 2 | |
| *(b) Geographic range* | | |
| International or UK and international (total) | 3 | 6 |
| National[§] (total) | 14 | 21 |
| Whole UK | 6 | 7 |
| Scotland | 4 | 6 |
| England | 1 | 4 |
| England, Wales, and Northern Ireland | 2 | 3 |
| Northern Ireland | 1 | 1 |
| Regional (total) | 6 | 6 |
| English region | 5 | 5 |
| Northern Irish region | 1 | 1 |
| *(c) Participant distribution* | | |
| One participant per organisation (total) | 16 | 16 |
| Multiple participants per organisation (total) | 7 | 17 |
| Natural England (government) | | 4 |
| RSPB (NGO, UK and international) | | 3 |
| FFI (NGO, international) | | 2 |
| National Trust (NGO, national) | | 2 |
| Scottish Natural Heritage† (government) | | 2 |

| | |
|---|---|
| Scottish Wildlife Trust (NGO, national) | 2 |
| Specialist NGO‡ (NGO, national) | 2 |

*Total; listed instead of individual numbers to maintain participant anonymity.
§One participant currently held a secondary board role and formerly held a directorial role at conservation organisations in Wales.
†Known as NatureScot since August 2020.
‡Organisation name and specialism not listed due to comparatively greater risk to participant anonymity.

Participants were each assigned a random two-digit number which is used to refer to them when reporting and discussing the results of the interview analysis (Table 2.3).

**Table 2.3. The number codes used to refer to individual participants in this study and the type of organisation they worked at when interviews were conducted in 2018.** The participant's area of expertise is shown for those with a role related to economics. Organisation details are reduced to a minimum for participants whose anonymity could otherwise be unacceptably compromised by the combination of details about them included in this thesis. Number codes were randomly generated and randomly assigned to individual participants; they do not indicate any other features about the participant, the organisation they work at, or their relationship to other participants or organisations. Abbreviation used: NGO = non-governmental organisation.

| Organisation type | Participant codes |
|---|---|
| Governmental | 19, 46, 53, 65, 66, 70 (economist), 74 (natural capital specialist) |
| NGO, broad | 33, 43, 63, 68, 71, 84, 89, 92, 98 |
| NGO, habitat specialism | 12, 28 |
| NGO, regional | 10, 26, 83, 90, 93, 94 |
| NGO, taxa specialism | 23, 56, 67, 78 |
| NGO, thematic specialism | 47, 85 |
| NGO (not otherwise specified) | 17, 32 (natural capital specialist), 73 |

### 2.242 Interviews and transcription

Individual interviews with each of the 33 participants were conducted in February-October 2018. Interviews lasted between 31 and 88 minutes, with a mean length of 54 minutes and the majority (25 of 33) lasting 42-66 minutes. All interviews were conducted by the same researcher. Most interviews (19 of 33) were conducted in-person. These were held in a closed meeting room, usually within the organisation's offices, with the exception of two interviews held in a quiet public space in or around the organisation's offices. The remaining interviews were conducted by video call (five of 33) or telephone (nine of 33). All interviews were audio recorded.

Participants were all asked all of the main questions in the topic guide (or main questions were only skipped when a participant was deemed to have covered them in previous answers, which happened

occasionally), with a minority of exceptions where participants had limited time available for an interview. These exceptions included several of the participants with specialist knowledge of natural capital approaches and so they were asked the questions about this topic first and questions about ethical considerations in general if there was time.

Interviews were transcribed using a modified verbatim approach – in which interviews are transcribed essentially verbatim, but 'tidied up' by omitting filler words, false starts to sentences, words corrected mid-sentence etc. – rather than a strict verbatim approach – in which interviews are transcribed as close to exactly what was said as possible, including stalling words, grammatical errors, non-standard pronunciations, hesitations, etc. Compared to modified verbatim transcription, strict verbatim transcription costs more time and money (Brinkmann, 2013) and produces transcripts that are more difficult to analyse (Gibbs, 2018). As the research objectives and study design prioritise analysis of the experiences and perspectives expressed through the content of participants words rather than analysis of participants' manner of speaking, modified verbatim transcription is an appropriate approach because it captures what was said at a sufficient level of detail for the demands of this type of study without the drawbacks of a strict verbatim approach (Brinkmann, 2013; Gibbs, 2018).

Interviews were initially transcribed by the researcher. However, after transcribing three interviews this was found to be an unsustainable approach[4], so the majority of interviews (22 of 33, 71% of total interview data by time) were transcribed by the professional transcription service UK Transcription Ltd. The remaining interviews were transcribed by the researcher (11 of 33 in total, including the three interviews already transcribed and eight interviews with lower quality audio recordings – mostly phone interviews – that made them unsuitable for professional transcription due to the additional cost). UK Transcription Ltd. are one the University of York's approved suppliers of transcription services and entered into a non-disclosure agreement prior to receiving audio recordings for transcription. Consent for interviews to be professionally transcribed by someone other than the researcher was not obtained before interviews were conducted as the need to use professional transcription services was unanticipated, but was sought and obtained via email from participants whose interviews were suitable before proceeding, making it clear that this was an additional request that they were free to decline without impacting their participation in the study.

Approximately 30 hours of interview data were collected, which were converted to approximately 242,000 words of transcript data.

[4] Due to personal circumstances, it was not possible for me transcribe all interviews myself within a suitable timeframe.

## 2.25 Analysis

The interview data were analysed using an inductively-orientated thematic analysis method, in order to establish the knowledge and understanding about the relationship between conservation and ethics sought by the exploratory research objectives. This section outlines the theoretical background and reasons for using this method (building on the discussion of research strategy above, in sections 2.21 and 2.22) and describes the stages of the analysis.

### 2.251 Direction of analysis

This study attempts to develop knowledge in a mostly 'bottom up', inductive direction, with some influence from a 'top down', deductive direction. The exploratory, investigative nature of the research objectives and the interest in participant experiences about a topic about which relatively little is known mean that an inductive approach is appropriate, and preferable in this case to a strongly deductive approach, which may obscure interesting and useful findings. Additionally, there is no suitable pre-existing theoretical framework about the relationship between ethics and conservation that could be used in a 'top down' approach, so an inductive approach is also more feasible (Brinkmann, 2013). The analysis is not exclusively inductive; it is guided to some extent by the research objectives, which are informed by existing literature, and existing ideas and understanding influence how participants' accounts are interpreted by the researcher. This is in contrast to a grounded theory analysis where prior ideas are eliminated as far as possible (Glaser & Strauss, 1967; Charmaz, 2014; Flick, 2018). Some of the useful principles of grounded theory are used – such as an open-minded approach to identifying elements, frequent comparison of elements, and staying relatively 'close' to the data by beginning with line-by-line reading, which can help minimise the influence of preconceptions and biases – but without introducing a requirement to meet the stricter theoretical demands of grounded theory. This type of intermediate approach is widely used in qualitative research (Gibbs, 2018), and is used in this study to balance exploration and minimising biases with the benefits of appropriate use of wider understanding.

### 2.252 Thematic analysis

The analysis in this study incorporates principles about themes and thematic analysis initially laid out by Braun and Clarke (2006), in one of the most highly cited and influential foundational works for qualitative researchers developing and applying thematic analysis (Joffe, 2016; Bailey, 2018). Thematic analysis is "a method for identifying, analysing, and interpreting patterns of meaning" in qualitative data (Clarke & Braun, 2017, p. 297). It does so by working with units of analysis that have been generated from the data, beginning with small units of analysis that represent interesting and potentially relevant features in the data and using these to build more complex units of analysis that

represent patterns of meaning around core ideas, which are used to identify and interpret relevant key features of the data (Clarke & Braun, 2017). These stages overlap with one another in an iterative, recursive process, rather than a linear sequence (Braun & Clarke, 2006; Fereday & Muir-Cochrane, 2006).

Thematic analysis is a highly flexible method that can be applied in both inductive and deductive approaches (Braun & Clarke, 2006; Joffe, 2016; Clarke & Braun, 2017), or used to integrate features of each type of approach (Fereday & Muir-Cochrane, 2006). It is compatible with a range of epistemological and ontological paradigms, including 'critical realist' approaches that incorporate the interconnected roles of social constructions and a broader social context in the search for knowledge, which makes it an appropriate choice for research that attempts both to reflect participants' experiences of their world and to investigate its underlying factors and mechanisms (Braun & Clarke, 2006; Fereday & Muir-Cochrane, 2006; Joffe, 2016).

**2.253 Analysis procedure**

Three overlapping stages of analysis were used, based on the coding methods described by Saldaña (2009) and Gibbs (2018) and the principles of thematic analysis described by Braun and Clarke (2006; 2017): descriptive coding; analytic coding; and establishing overarching themes and connections. These stages are described below and summarised in Table 2.4. Administrative tasks of the analysis, such as managing the dataset text, applying and organising codes, and retrieving and sorting coded data, were carried out in NVivo 12 and NVivo stable release 2020 (QSR International), a computer-assisted qualitative data analysis software package.

Descriptive coding marked sections of interview data according to *the topic being discussed*. The descriptive coding step proceeded in the following format. An initial descriptive coding index was developed by reading several transcripts and creating and applying codes as required, which were organised into collections of related codes to form the coding index. At this stage, code relatedness was mostly based on surface level meanings of participants' words. This used a mostly inductive approach in which codes and the coding index were based primarily on the data and guided but not strictly constrained by the research objectives (as discussed above). As more transcripts were reviewed, the coding index was regularly reviewed for redundant, missing, and overly broad or narrow codes, which were removed, added, split, or combined as necessary. This process continued until all transcripts were descriptively coded. Analytic coding marked descriptively coded data according to the opinion, account, or experience a participant was expressing about that topic. During the analytic coding step, an initial analytic coding index was developed by reviewing text coded to a descriptive code across several transcripts and creating and applying analytic codes to this text. These codes were

organised into groups of thematically related codes, at this stage taking deeper underlying meanings into account as well as surface level information. Again, this took a mostly inductive approach informed by the research objectives (as discussed above). This process was repeated for most descriptive codes – some descriptive codes were not analytically coded as they were deemed to have low relevance to the study objectives – and the analytic coding index was regularly reviewed in the same way as the descriptive coding index. This continued until relevant descriptively coded data across all transcripts were analytically coded. Themes present in groups of analytic codes were interpreted and connections between themes across the research objectives were identified and examined.

A small set of context codes were also created and applied as necessary. These were used to mark sections of text with additional information to take into account during other stages of analysis – for example, leading statements and questions by the interviewer and subsequent responses or comments indicating uncertainty or caution in participant responses.

**Table 2.4. Summary of stages of analysis used in this chapter.** These are based on the coding methods described by Saldaña (2009) and Gibbs (2018) and the principles of thematic analysis described by Braun and Clarke (2006; 2017).

| **Analysis stage** | **Data level conducted across** | **Element identified** | **Depth of analysis** | **Breadth of analysis** | **Complexity of analysis** |
|---|---|---|---|---|---|
| **Descriptive coding** | Transcripts | Topics of discussion; topical relatedness between these. | Surface meanings | Narrow, close-up | Relatively simple |
| **Analytic coding** | Content of descriptive codes; descriptive coding index | Opinion, account, experience etc. expressed about a topic; thematic relatedness between these. | | | |
| **Establishing overarching themes and connections** | Content of analytic codes; analytic coding index | Patterns, connections. | Underlying meanings | Broad, overarching | Relatively complex |

# 2.3 Results

Participant discussions covered challenges related to a variety of ethically-charged decisions, ethical questions, and ethical considerations related to strategic level issues in conservation practice. The type of challenges, the visibility of ethical aspects, and conservationist responses to them were found to vary depending on the ethical considerations at stake and the different power dynamics that were present across decision-making contexts.

## 2.31 Challenges in defending nature

Participants across the interviews spoke about significant barriers to achieving nature conservation objectives that they encountered in the course of their work. These raised questions for participants and their colleagues about how navigate these barriers without unacceptably compromising their moral objectives and principles. This section examines the contributing features, conservationist responses, and the place of ethical aspects in this environment.

### 2.311 Barriers to achieving conservation objectives

*Problems with longstanding methods*

Participants often spoke about legislative tools they relied on to protect habitats and species, especially designations and regulations stemming from the EU Habitats Directive and Birds Directive. However, several expressed frustration about times when these regulations had failed to protect the feature in question.

For example, participant 56 described a situation where legislation to protect the habitat of a critically endangered invertebrate species was overridden in favour of supplying public utilities. This situation involved an application for drought order by planning authorities to extract drinking water from the reservoir supplying the river habitat of a pearl mussel population, which would lower the water levels and put the population at risk. Participant 56 spoke emphatically about the species' rarity and risk of extinction, using multiple phrases to express this point.

56 *The River Ehen [in Cumbria] is the only river in England that has a viable population of pearl mussels. Pearl mussels are globally critically endangered. They're going down the pan, basically. The UK has got some of the last remaining good populations. That, and Russia. This was the last population in England […]*

The River Ehen is a Special Area of Conservation (SAC) on the basis of the pearl mussel population (JNCC, 2023). Participant 56 cited strong actions taken in the past to protect the pearl mussel population's habitat due to this designation as evidence of its effectiveness.

56 *Whereas before that, there was an issue. The reason they're doing a new supply is because they want to take that offline because they need to protect the pearl mussels. There was an almost enforcement action on the water company because a couple of years ago they'd nearly killed off all the pearl mussels. In one sense you're doing all that work to stop the pearl mussels being functionally extinct in England. On the other hand, when we need the water, we can just turn it off.*

These statements suggest that participant saw these regulations as a key tool for representing the importance of preventing species extinction in environmental planning. They expressed frustration at how the conservation concern and accompanying regulation had apparently carried too little in the planning authority's decision and could be easily overridden, characterising this as a flippant decision that other parties did not feel the need to justify further.

56 *There's this fantastic term in planning about overriding public interest, where you can basically do anything you like if you can show it's got overriding public interest. [… …] Which means that it's like, 'Yes, it may be the last population. It may go functionally extinct, but hey, we need drinking water so let's just do it anyway.'*

They were not unsympathetic to the need to maintain the drinking water supply, but reiterated their view that something of great significance had been undermined by the decision.

56 *[The pearl mussel population] was considered, but the water supply was seen as the overriding point. Which, I can understand that. But you are going to lose something that has been there – these pearl mussels live for over 100 years. You've got something that has lived in that river for 100 years that you could wipe out at a stroke.*

The variety of ways participant 56 attempted to express how important it was to prevent the loss of this species population and their frustration at how easily action that increased the risk was taken gives a sense that they felt let down by the regulations designed to represent this conservation objective.

Participants described finding UK-based legislation to be ill-suited to the conservation features they wished to protect or ineffective at protecting them – another way that legislative tools were lacking. For example, Participant 17 indicated how achieving nature conservation objectives relied on formal protection, speaking about how nature without it "can be destroyed very easily", but explained the shortcomings of available legislation.

17 *[…] ancient trees can be felled, unless they've got a Tree Preservation Order that stands up. Because not all of them do, and very few of them have got a Tree Preservation Order, and there's*

*no such thing as a Tree Woodland Order. So you can't actually protect a whole woodland. […] [Individual trees] might get a TPO, and they're rare. So ancient woodland is being lost all the time, because if I'm a landowner, and I get planning permission, planning permission trumps any kind of protection for ancient woodland or any other kind of woodland. So they can just chop it down. It's extremely bad practice, but the fines are non-existent – just a few hundred quid.*

Participant 17 gave many reasons why the available legislation did not provide adequate protection from the threat of destruction – the orders do not cover the relevant feature (whole woodlands), are rarely assigned, can be easily dismissed, and do not result in sufficient repercussions when the protected item is destroyed. They found the available legislation less useful in the first place, compared to participants who spoke of problems despite otherwise strong legislation, but conveyed a similar a sense of frustration and dismay about struggling to protect species and habitats using some of the main tools intended for that purpose.

Other tools at conservation organisations' disposal were also found to be ineffective at defending habitats from other parties' development plans by some participants. For example, participant 90 described their organisation's campaign against the UK government's High Speed 2 railway line (HS2) proposals.

*90 With HS2, when that was first proposed the [organisation] objected to it. We lobbied parliament, we ran a petition, we provided scientific evidence as to why it was a bad idea. We suggested an alternative plan and developed our own vision. All of that was ignored by the government.*

Participant 90 listed multiple tools the organisation had used in their campaign, which covered a range of persuasive angles (political, social, and scientific opposition, as well as trying to find an outcome that was acceptable to both parties). They did not describe a counterargument from those the campaign was directed at, instead bluntly stating that it was ignored – once again giving the impression of a frustrating process where nature protection was easily dismissed. Although these were not universal experiences (several participants also spoke of successful use of designations and regulations for protecting species and habitats, as seen elsewhere in the Results), challenges in effectively defending nature by these long-standing means were a relatively common theme, and part of the wider pattern of barriers to achieving conservation objectives.

*Funding pressure*

Financial pressure appeared as another factor contributing to an environment where conservationists faced difficult choices. Funding difficulties and strategic challenges associated with resolving them were discussed by the majority of participants from charities (fifteen of 26 participants working at charities, from fourteen of 20 charities in the study). These pressures were perceived to be common

across non-governmental organisations – highlighted by the following comment from participant 78, for example.

78 *[…] in nature conservation at the moment there's less resources to go around. You may pick this up from other folks you speak to in NGOs but it's getting trickier to resource our organisations and so I suspect there may be more ethical questions emerging as a result.*

In addition to raising difficult strategic questions for conservation organisations, this financial situation meant that conservation organisations were often in a less powerful position than parties that might have impacts on the environment.

*Politically and financially powerful external parties*

Participants from both governmental and non-governmental organisations described some types of external parties with very high financial and/or political power, which were the source of another set of barriers to achieving conservation objectives. These external parties were usually groups the conservation organisation was working with (e.g. in a multi-party planning process or a direct partnership) or opposed to because of their environmentally damaging activities – and often the subject of questions about which relationship was most ethically appropriate.

Wealthy developers were the main type of powerful external party that posed problems for achieving species and habitat protection objectives. For example, participant 56 spoke about the proposal to build a golf course at Coul Links in Sutherland. They explained how a coalition of conservation organisations (including several with participants in this study) were working together to oppose it using the kinds of tools described above (multiple international designations, petitions, attempts to engage with the developer). Despite this, the proposal was not changed and continued to make progress through the planning approval process due to the developer's wealth and priorities.

56 *There's no reason why you can't put your golf course on the land behind the dunes and keep the dunes safe. The developers feel that it's a dunes course, they want a Links course, this is what's going to draw people to the place. They've got the money to throw at it.*

Several other examples where participants described how large developers were able, or potentially able, to resist opposition due to their financial means are shown below.

Another type of powerful external party was owners of large areas of land, with politically influential grouse moor owners being a notable example.

26 *These are very, very rich people. [... ...] Do we as an organisation come out against the moorland owners and very strongly criticise them for burning their moors, for damaging their moors,*

*reducing water quality, increasing flooding and so on? The problem might be that they would get pissed off at us and throw us off the moors. Or do we say actually the important thing is to work with the moorland owners, not annoy them, and get the hydrology sorted out?*

Grouse moor owners were an example of potential partners or adversaries that highlighted how conservation organisations could be in a potentially vulnerable position when engaging with powerful external groups. Several participant accounts implied that opposing such a wealthy and politically powerful group might bring negative consequences for the organisation. This was shown, for example, by language suggesting volatility or hostility ("pissed off at us and throw us off the moor" above) and extra caution expressed by two participants (one from a governmental organisation and the other from a large charity) over discussing this topic in a recorded research interview, such as the following comment:

-- *In some cases, particularly if you get grouse moor managers, some of those folks are big landowners, very influential, and can get quite political if they have people in high places. That escalates massively. I would need to see what you've written about that, Vanessa, to make sure [the organisation] is not put in a compromising position by the comments I've made there because it's so sensitive.*

**2.312 Strategic options explored for potential solutions**

Participants frequently discussed a set of interrelated strategic options available help to conservation organisations achieve their species and habitat protection objectives despite the highly challenging circumstances outlined above. Most options involved closer engagement with the kinds of forces that contribute to these barriers, in the hope of improving conservation organisations' ability to navigate the challenges presented by them. These options were discussed frequently in the interviews because participants often found them to be a source of ethical questions. This section gives a brief overview of these options and an idea of the morally-charged questions they presented for participants and their colleagues, as a precursor to the next section where the ways conservation practitioners view and respond to the associated ethical considerations is explored.

Working directly with developers to mitigate harmful impacts by advising on development plans was a commonly mentioned option. For participants from charities, this option was usually choice between advising from the inside with some impact or opposing from the outside with limited impact.

10 *In [large city], perhaps much more than some of our rural counterparts, we've got the whole issue of development and regeneration. [...] Where those houses are going to go? Do we influence those developments from inside or do we stand outside and throw stones? And so we are working with a number of developers, and it's quite clear that a number of our colleagues*

*and a number of our supporters find that awkward, difficult, would prefer that not to happen.*

Working with developers was often not a preferred option for conservation charities because it was seen as an imperfect fit with the objectives or ideals of the people the charity represented, such as in the above example from participant 10 where it was 'awkward' and 'difficult' to both staff and supporters. However, this imperfect match was sometimes accepted as the better option than the alternative, which was framed in this example as choosing to be excluded and ineffective. The option of working with developers was sometimes the only one left after trying other options. For example, this was the option taken by participant 90's organisation after their campaign against HS2, discussed above, did not change the UK government's plans.

90 *Once [the HS2 plan] was agreed we had to move to a position of trying to influence them and work with them to get the best outcome for our local communities. We know that HS2 could be a real catastrophe for the natural world, but there's a sliding scale and if we can influence them to move towards the ideal outcome that we're looking for as opposed to probably the bare minimum of what they would do if we didn't do anything, that would be a better outcome for wildlife than if we weren't involved.*

This was clearly not the organisation's preferred option, but minimising harm to wildlife on behalf of the local communities they represented was still the goal and so the option was taken in this case. These choices were sometimes about major housing, transport, or development projects, as in the above two examples from participants working at regional charities, so there was potential for significant impacts by working with developers, even if it was only a 'less bad' outcome. Working with large corporations in extractive industries was discussed in a very similar way by several participants, which likewise raised questions for participants and their colleagues due to tensions between the outcome and the means of achieving it.

Funding, investments, and financial partnerships were a common topic across the interviews, and were also discussed both as potential solutions to financial limitations and as a source of ethical questions. The challenge of balancing moral integrity with the need for funding to carry out their work was apparent across participant discussions about current, new, and potential funding sources.

92 *[...] the main [problem] is you're cutting off a source of funding. But if you're an organisation with particular charitable objectives then you have to maintain your morals around those. But you are cutting off, possibly, quite lucrative funding streams.*

Participants were mostly concerned about reputational risk to the conservation organisations and the ethical implications of greenwashing as a result of the organisations they accepted funding from or

entered into financial partnerships with, which was in tension with the need for funding to carry out their work. Most participants who discussed ethical challenges around funding issues referred to external guidance about ethical funding and investments or internally developed policies to guide these decisions. Along with animal ethics (and human research ethics for some organisations), this was one of the topics where participants were most likely to refer to formalised policies related to ethical issues. Lethal control and animal welfare policies had usually undergone most of their development in the past and were now fairly stable, rarely raising significant ethical questions at a strategic level. However, the financial pressure conservation organisations were under meant that acquiring funds usually remained an active source of morally-charged questions, as noted by participant 78 in the previous section and participant 17, who pointed out: "It's a dominating area for any charity, to be honest, no matter what area they're working in."

Some participants discussed the possibility of regulator-managed damage offsetting schemes presenting conservation organisations with a decision to accept or decline funding from a source they have an existing policy decision against, or would otherwise prefer not to accept funding from.

*98* *We were approached by the Environment Agency saying: would we accept money to do works on our reserves to offset that damage [to a species, by nuclear power stations]? We have a policy where we will not take money from nuclear. If that has been brokered by the regulator where the regulator has decided that solution is in the public interest, do we refuse it?*

This example from participant 98 was a real example where regulator mediation had caused some internal challenges in the organisation as their protocols had not been tailored towards ethical questions about funding coming up in this way. Participants 98 and 90 speculated that natural capital approaches could be a complicating factor in decisions about accepting funding for similar reasons (i.e. by allowing it to potentially bypass existing funding ethics policies). Participant 98 also predicted that natural capital approaches would highlight problems from the kind of gaps in conservation organisations' fundraising ethics protocols that had been flagged up by their organisation's experience following the above example.

On the other hand, natural capital approaches were considered a potential solution to the challenges around financial partnerships in at least one case:

*92* *What we try to do with some [prospective financial partner] organisations is to see to what extent they're willing to sign up to things like the Natural Capital Coalition and to take their business model through that. We will also process companies through an ethics investments standard and we'll try and get a more objective assessment as to whether or not we should be engaging with them.*

Participant 92 described encouraging potential partner organisations to use private sector natural capital approaches as a way of mitigating the other organisation's drawbacks as a financial partner, in addition to using external guidance as other participants did. Previous experience of direct links between natural capital approaches and funding and/or corporate partnerships were relatively rare among participants in general, but these examples give an idea of their varied relationship with ethical questions about the strategic options discussed in this section and the range of responses to them.

Various applications of natural capital and ecosystem service concepts in environmental decision-making and policy were another set of strategic options discussed by participants as ways that the challenges faced in protecting habitats and species might be mitigated. Generally speaking, participants cited their potential usefulness as tools to improve communication with developers or decision-makers in planning processes or to appeal to policymakers, in order to persuade them to minimise damage to nature or create a policy environment that would facilitate and remove obstacles to conservation goals – in keeping with the original intent of these concepts. Like all of the above options (working with developers, seeking additional funding), the use or potential use of natural capital approaches raised or highlighted a host of ethical questions for participants and their colleagues – some similar to the ones above, as well as some new questions and more fundamental questions. These are shown within the discussions in the next section.

For context, this paragraph gives an overview of participants' experience with natural capital approaches. Around half of the participants had not worked with natural capital approaches at all or a lot, but were aware of wider discussions about them in their organisations, conservation practice in general, the media, or academic forums. A small number of participants stated that their organisation had little interest or engagement with natural capital approaches, around a third were aware of some level of engagement and interest (such as conducting natural capital assessments on their reserves), and a small number spoke about their organisation actively promoting the use of natural capital approaches to non-conservationists at some point, with the Scottish Wildlife Trust being the most prominent example (several participants from other organisations also referred to the Scottish Wildlife Trust's work in this area). A greater number of participants spoke about some level of current or past promotion of ecosystem services as a factor in decision-making (these were seen as near-equivalents by some participants or natural capital approaches were seen as the 'new' version of ecosystem services approaches, so it was not always possible to separate these). Around a third of participants had contributed their expertise to research or tools related to ecosystem services and/or natural capital approaches at some point in their career, such as the UK National Ecosystem Assessment, agri-environment schemes, biodiversity offsetting schemes, and Scotland's Natural Capital Assessment Index.

The previous section gave an overview of the multiple barriers faced by conservation practitioners when attempting to achieve their nature protection objectives. This section gave an overview of some of the strategic options available to conservation practitioners that might help navigate these challenging circumstances. These mostly involve working more closely with forces that create the barriers and so these options generate and morally-charged decisions about how far these options can be taken without unacceptable moral compromise. The next section examines how conservation practitioners respond to the ethical considerations and questions presented by this decision-making environment.

## 2.32 Responses to power-boosting strategic options

### 2.321 Pragmatic code-switching

The idea that politicians, businesses, or developers were driven by other motivations, often financial ones, was regularly cited as a reason for using the language of natural capital or economics, as participants had often found that influential external parties were unmoved by moral motivations, rendering useless any arguments based on them.

85 *I can revert to fundamental truths if people want, but actually I've got to persuade politicians to do something, and that doesn't work.*

32 *One that I saw […] was a water company who had gone with a reedbed filtration plant or something like that as opposed to the traditional grey concrete system because it was the same cost. […] Those people [the executive level of a business], they deal in numbers and they deal in money. […] those guys [the (privately-owned) water company in England], they're not saints, they're not going to do the right thing just because it's the right thing to do.*

Meanwhile, there was a common perception among participants that conservationists were likely to have moral motivations for protecting the environment.

26 *In our hearts we absolutely believe that ethical imperative [to conserve wildlife]. […] Deep within our hearts that's what we feel in nature conservation. The problem is the head of Barclay's probably doesn't. I mean, I don't know the head of Barclay's. But let's assume he doesn't, that actually he's going to sit there saying, 'No, the only thing that matters to me is shareholder value. That's my number one key performance indicator. I don't really care about wildlife conservation, it's not an issue for me.'*

These motivations were explained by participant 26 in terms of heartfelt beliefs (and explicitly identified as 'ethical' in this case) and placed in sharp contrast with the financial, amoral, and sometimes external (i.e. shareholders) motivations of others. This was a contrast frequently made by

participants when discussing natural capital approaches. For many this was a source of ethical difficulty, which is discussed below. However, several participants were comfortable with these differences and did not experience them as ethical challenges, or referred to colleagues or other conservationists who seemed to feel this way. For some, the practical outcomes of taking a pragmatic approach to appeal to certain groups made them compatible with conservation aims. In the following excerpt, participant 28 cites their experience of natural capital approaches working to involve others in conservation and sees this as additional to other motivations, not contradictory.

28 *My personal view is that it's a helpful tool to drive conservation activity. A helpful way of talking about things which will engage some people who would not traditionally want to be involved in nature conservation. They just won't see the benefit of it. I think the natural capital way of thinking will engage more people. I've seen it. It does. I think that's true. As an organisation, of course, we are very interested in the intrinsic value of nature as well. If we just put value on everything and decided to take decisions around that we would find that very uncomfortable. We wouldn't support it. As a means to an end we believe that natural capital arguments are very powerful and we'll engage in them.*

Participant 28 points out at the end of this excerpt one of the main lines of reasoning seen in examples of this attitude towards strategic options that did not match moral drivers for conservation: that the ends *do* justify the means.

The idea of speaking the language of financially-motivated groups and people was often seen when participants spoke about natural capital and ecosystem services. For those who were morally comfortable with using economic approaches, this was again seen as an expansion or addition rather than changing the underlying points.

90 *It's a great idea. From my perspective, and being somebody who had left the sector and gone to work in other sectors and come back to the environmental sector, this was the thing that was missing when I left. I was really excited to return to go, 'Okay, now we've finally got something that I can talk to people who don't care about the environment but do care about money and gives us an opportunity to talk to them in their terms and place a value on something that we've known for years is valuable but to the man on the street isn't necessarily.'*

26 *I think from our perspective it's useful to talk that language for wildlife, because of course those people, it helps them understand. So if you talk about investing, 'CapEx or RevEx investment into nature conservation, you will deliver return on investment in natural capital.' Now, that's a weird way to talk about wildlife conservation, completely weird from our perspective. But it isn't weird from their perspective, it's exactly how they talk. So why not use that?*

Participants were generally aware that not all conservationists shared their view, as indicated by the above two participants specifying that they are speaking 'from their perspective'. Participant 26 was clear that language of investment did not resonate with them, and several participants noted that monetary language was the point where they or other conservationists became uncomfortable. This lack of resonance may provide a sense of separation that could explain why some participants were comfortable with this language, rather than uncomfortable with it. For participant 26, the language of natural capital was ultimately less meaningful than that of conservation, shown by them referring to it as 'arcane' (quote not shown) and giving several examples of what this language might look like that implied they see it as jargon-filled and obtuse.

26 *[Environment Agency economists] sit there and say, 'So for a CapEx of five million pounds we need an 8 percent return on investment in terms of flood protected properties at a 1-in-200-year event, blah blah blah.' What the hell does that mean? It's kind of weird language, isn't it? This is this other language that they use and we sit there and say, 'OK, if you spend 0.5 million CapEx on natural flood management in these different sub catchments, we've hydrologically monitored that and that will reduce by flooding 10 percent which means in a 1-in-200-year flood you get a return investment at 5 percent which is over the figure that you need to get, dih-dih-dih-dih.'*

'Speaking the language of natural capital' appears like mimicking a style rather than adopting a mindset in this excerpt. This participant seemed view this language like a 'front', and the language change did not need to change the meaning behind them. In the excerpt below, they spoke about 'dropping into' this language, while the meaning behind their words was that of habitat and species conservation.

26 *You've dropped into their language, you're no longer talking about wildlife conservation even though that you know actually what we're talking about. We're talking about [participant listed four ways habitats would be improved and how mayflies, kingfishers, otters, water voles, insects, flowers, mosses, liverworts, and so on would benefit]. So: fantastic. In your head you're talking wildlife conservation. But from your mouth you're talking natural capital and a completely different language. Great! As long as they give us the money: brilliant!*

(Participant 26 was among the more expressive participants – most participants who were morally comfortable with financial approaches used more formal, neutral language – but their comments are generally representative of the ideas within these views and express them particularly vividly.)

Relatively few participants spoke about real examples of environmental management projects that took place via engagement on natural capital terms, but those who did tended to explain how multiple

conservation objectives would be achieved through the project. For example, when a participant from the Wetlands and Wildfowl Trust discussed a project where the organisation was working with a large privately owned utilities company to develop a wetland[5], they cited contributions to the organisation's goal of facilitating access to nature for people to enjoy and be inspired by it as benefits of this project, in addition to direct species and habitat conservation benefits. Some participants from government organisations spoke positively about the impacts of engaging with policymakers using natural capital framings, as another example of experiences of positive outcomes from using them.

65 *I think it has huge benefits. I think where it is at the moment, it has been very useful in influencing decision makers, government policy thinking. I think where there are real potential benefits is if we can get it built into decision-making frameworks.*

Referring to the different-mindedness of groups that conservationists should or might wish to appeal to was common across interviews. In some cases, this difference was so stark that participants were uncomfortable or averse to engaging, which can be seen in some of the upcoming discussions. For economically-minded groups, this difference was often very stark, and this was the case even for those who felt morally comfortable with engaging with others on financial terms – a strong sense of distance from other parties can be seen in participant 32's reference to 'those guys' and participant 26's references to the strangeness of their language.

For some of these participants, this distance was a reason to engage with these groups, rather than to disengage. One reason for this was pragmatic: because they hold so much power.

26 *I think one of the features of a Western capitalist society is it's so unequal that the investment decisions are made by a very, very small group of people. So politicians, of course. But increasingly the rich elite. And these people talk the language of investment […]*

In addition to pragmatic reasons, some of these participants also expressed the idea of wanting to reach out to others and make conservation's ethical imperative relevant to them. This is suggested by participant 28's comments, for example, where they spoke about *engaging* others, not merely *persuading* them. In the following excerpt, participant 26 made comments that suggested their engagement with others via financial approaches came from a place of empathy and a wish to share their ethical motivation with them by reaching out in this way.

26 *But [wildlife conservation] is an issue for him [the hypothetical head of Barclay's bank], because if he destroys the wildlife around him, his shareholder value will decline [in the long term]. […] So we've got to promote that ethical imperative to other people. I think one of the things that*

[5] This may have been the example participant 32 referred to.

*we're starting to do […] is to say, 'Well, actually, if we can discuss that ethical imperative in the language of those decision makers, for those people and why it's important to them, then we can broaden the ethical imperative out.'*

(Two closely related ideas were that natural capital and ecosystem services approaches could help bring other people's views *into* conservation or that they were an evolution of existing people-focused goals.)

As noted earlier, participants who were favourable or morally comfortable with natural capital approaches were generally aware of opposition to them or their potential drawbacks, several of which are discussed in the upcoming sections. Participant 33 summarises another feature of the pragmatist viewpoint:

33 *You set your goals with biodiversity and that then creates a subset of solutions for which natural capital approaches might actually help you decide further. [Discussed reasons that some conservationists are averse to natural capital approaches.] But it's like many tools: it's how you use it that's important.*

**2.322 Moral discomfort and crowding-out**

The vulnerable position of conservation organisations in some ethically-charged decision-making situations was highlighted above. Several participants referred to a perception among conservationists that the use of natural capital approaches by others could place conservation organisations in a disadvantageous position with less power than other parties in multi-stakeholder decisions about development:

74 *This is an absolutely classic ethical issue that relates to natural capital [...] say something like airport expansion, a really big development, and they would do an assessment and it will look like they are really trying to think about the multiple benefits that are provided by a place but ultimately they will end up with a financial figure at the end and that figure will be peanuts compared to the economic benefit that can be demonstrated by a really big development of that kind. I think there's issues in that as well, and I think that's really important.*

94 *The main one I've come across is people saying, 'Once you start saying it's of value only in terms of what its human use is [...]' [...] it can render something more vulnerable, because if you say, 'Well we valued its natural capital and it looks like this,' and something else more valuable comes along, then how do you defend your site or your place?*

For many participants, an important factor in the ethical concerns they had about the use of natural capital approaches in conservation was how they might be used by others, especially powerful groups

such as developers, landowners, and large corporations. A few participants spoke approvingly of a 'true' or 'pure' form of natural capital approach (e.g. 98, quoted below, and 19, not quoted here). However, not all were optimistic about this version being realised, and some participants felt environmental protections were at risk due to the type of natural capital approach implemented:

98 *The natural capital approach at the moment is, if you take the purest approach the Natural Capital Committee was describing and certainly Dieter Helm was describing in his book— The 25-year plan came out of this idea that we needed the plan that was about looking after our natural capital that would have identified limits and thresholds on the use that capital [...] The 25-year plan does none of that. [...] It's embedding the natural capital approach, but actually it's not describing quite a lot of the system the government committee proposing it has asked for. There's still a risk that we take away quite a lot of the environmental legislation that actually is providing some of the safeguards in describing the space under which that could operate.*

43 *I suppose again I'm quite cynical in that I see the natural capital approach being subverted by those who wish to use it to argue their own cases. We've seen the natural capital approach underlying a move by corporates away from biodiversity conservation and towards carbon markets and water markets because they are measurable [...] I suppose philosophically, I worry that the free market economy has not necessarily served us well in our management of the planet's resources [...]*

Several participants expressed some level of distrust about the use of natural capital approaches by others, such as participant 43 above and participant 47 in the following comment. These comments suggest that experience underlies ethical discomfort for some participants, similar to the way experience was a reason why some participants discussed earlier felt less uncomfortable.

47 *'Why would you put nature in the charge of capitalists?' would be my personal view from 30 years of experience in conservation. [...] a lot of what we do as a charity is appeal to people's hearts and minds, and that's what people want to do. Don't get me wrong, I can see there's a logic to it in terms of carbon markets and all that kind of stuff.*

Many participants expressed the view that they and/or many other people working in conservation held personal moral beliefs about nature, and several participants spoke about moral foundations of conservation organisations or the conservation movement itself. These principles were frequently at odds with some of the strategic options outlined above, which drives many of the ethical challenges that surround these options. This section examines the idea of morally motivated conservationists and conservation before exploring some of the ethical challenges experienced by them.

As noted, participants frequently expressed the idea that conservation and conservationists were driven by strong or deeply held ethical views.

98 *The thing that's kept me doing what I'm doing is my sense of moral purpose, and looking after species and nature that otherwise doesn't have a voice.*

66 *I've tried to think about this – is it a sense of responsibility that I have? Certainly, something that was instilled in me from a young age by my grandmother and my mother was a responsibility to look after, to care for, to cherish. […] It's to do with the rights of all those other organisms on this planet that we share this planet with. This planet isn't ours. For me personally, that's a real thing that drives me in my work.*

A sense of moral responsibility towards nature was often cited by participants as a personal principle that motivated them in their working life, such as in the above examples. Participants 98 and 66 both expressed a sense of kinship or empathy with nature – by 'giving it a voice' and 'sharing the planet with it' – and principles of caring and stewardship. Both participants in these examples indicated that this was a long-term or lifelong source of motivation, suggesting that it is an important part of their identity. Another way that moral or ethical stances were implied to be part of many conservationists' identities was by participants describing a belief about nature being important in itself (often referred to as its 'intrinsic value'[6]) as a reason why conservationists as a group worked in conservation.

90 *We work in this sector because we feel that there is a value. We all consciously choose to work for a charity and work to try and protect the environment.*

28 *It's very much in their heart as much as it is in their mind. The belief is that not everything comes with a price tag on it, that nature is valuable because it's valuable, and for a lot of people who work in conservation organisations that is why they do that job because that's what they believe. That's how a lot of people would express it. It can be very passionately expressed at times.*

Additionally, some participants described conservation as a movement founded this principle, further emphasising the long-term and potentially identity-forming position of moral views about nature in conservation.

85 *The conservation movement was grounded in an ethical drive. You know, 'It is unethical, it is not moral…' There is something intrinsic about the need to look after our environment, and that is associated with the environmentalists of the '60s and '70s.*

[6] The various intricacies of this term are considered in Chapter 3, and so it is not examined in depth in this chapter.

Some participants felt that some conservationists held these views more strongly than others, as suggested by participant 28's comments in the above quote referring to a substantial but not universal set of conservationists, but overall participants generally considered these views to be a significant feature of conservation practitioners.

Various ethical challenges for conservation practitioners were presented by the strategic options outlined above (working with developers, securing additional funding, engaging with others via natural capital and ecosystem service approaches, and combinations thereof) that might give conservation practitioners more power or ability to achieve their nature conservation objectives. Several ways in which the strategic options available to conservation practitioners excluded some of their moral principles or objectives appeared across participant accounts, which presented (or potentially presented) participants or their colleagues with morally-charged decisions and ethical questions.

Participants spoke about a variety of qualities, principles, and types of worth associated with nature that they were concerned were unlikely to be encompassed fully, easily, or at all by the methods used in natural capital and ecosystem service valuation, which was often discussed as source of ethical concern. The detailed content of these concerns is covered in Chapter 3. For the purposes of this chapter, the main concerning functions of these valuation approaches being used prominently in decision-making were that they could exclude some ethical arguments for conservation or fail to achieve conservation objectives due to their incompleteness. The following excerpts show some examples of the concerns participants had or were aware of among conservation practitioners regarding these valuation methods and approaches:

10 *Nature conservation by its very dealing with the natural environment which is so complicated and the interactions between species and communities and stuff is so complex, trying to distil stuff down into a pithy phrase or distil stuff down into a metric and therefore a simple calculation, you throw out so much. And I think that is an ethical concern.*

17 *There's a huge ethical argument about natural capital in the first place, because if you place a value on something, if somebody has the money, then it doesn't protect it any further, does it? [...] we think it has a different kind of value, although the pressure is to put a monetary value on it, because everybody understands that.*

90 *If one hectare of woodland is plantation or one hectare of woodland is ancient woodland, the value of it is going to be different in terms of timber value, in terms of biodiversity value, in terms of recreational value. It becomes difficult to create clarity in that sense. So, the ethical challenge is: are we happy at just saying, 'Well roughly, the average is about this and therefore we'll use*

*that figure because that makes the point without it being absolutely calculable all the way back to 0.0'?*

Many participants felt that ethical motivations for conservation were pushed out of conversations by the use of natural capital approaches, for example:

85 *It has made it even harder to have conversations that aren't instrumental. [...] There comes a point where we lose the lexicon—and we have done already, I think—we lose a lexicon associated with making the case. [...]*

46 *[…] I sometimes see that we've lost the battle a wee bit in terms of getting across the intrinsic value of biodiversity, which is not easy to put a monetary value on.*

The values they were concerned about were those that are especially difficulty to articulate, exacerbating this problem:

53 *They never include all of the benefits simply because we really struggle to quantify some, we even struggle to describe them [...]*

84 *I think the main thing has been whether or not we can hold intrinsic and extrinsic values in our heads at the same time. I now hear articulate people in decision making positions inside and outside government quite comfortable with the ability to do that whereas I feel that there's been a lot of discomfort with it.*

Participant 84 indicates that they are aware of fellow conservationists who feel more able to navigate the different perspectives, but feels less confident about doing this themselves.

For some participants in charities, their moral duty towards the beneficiary or beneficiaries identified in their foundational principles was incompatible with some of the strategic options discussed above. For example, participant 73 discussed how their organisation's strong stance could not be accommodated by biodiversity-offsetting approaches.

73 *There is a specific issue about us acting on behalf of our beneficiary, in other words [—] [...] I think that charities have a particular role and a particular responsibility to act on behalf of their beneficiaries, whoever is cited in their charitable objectives, in our case, it's [—]. In a sense, we adopt a position which is not reasonable, if you know what I mean? It's not one in which we, as government would do, weigh the pros and cons and come to a balance based on some sort of utilitarian principle. We take quite a strong rights approach to looking at protection of [—].*

This suggests that some conservation practitioners may be faced with a choice over whether to adhere to their moral principles or to be excluded entirely from some of the strategic options available to

them, rather than to engage with them but with some discomfort around their principles being minimised.

**2.323 Articulation of ethical issues among conservation practitioners**

Many of the concerns participants had about the strategic options involving closer alignment with organisations or forces they were not morally aligned with were about not articulating or being able to articulate the ethical aspects of their points of view. There are several signs that this is not something they routinely do in their work, which may lead to these principles being crowded out more easily.

Participants tended to express any ethical aspects of underlying motivations or reasons for protecting nature much more clearly and noticeably when discussing real and hypothetical situations where other powerful parties were involved or the organisation's power was in some way impaired. These were the parts of most interviews where participants most often spoke about intrinsic value in nature and personal, emotional, ethical principles and beliefs regarding nature. By contrast, when participants spoke about nature in the context of decisions when the organisation held most of the power in a situation, such as decisions about reserve management, they were more likely to explain their nature-focused goals in more formal or neutral ways, such as by citing a reserve's protective legal designations.

26 *We manage [—] Nature Reserve […], [it's an] absolutely amazing place. [...] It's a very, very, incredibly important site – it's a National Nature Reserve, Site of Special Scientific Interest, Special Area for Conservation, a Special Protection Area, a geological conservation site, a Ramsar site. It's got every designation going; really, really important.*

66 *We've got a designated site for [a specific species of] birds. It's a Ramsar site because it's a wetlands site. [...] We've got this international agreement that we've signed through a UN convention to protect these birds. They're really important.*

In these examples, participants gave formal, written, legally-binding sources when explaining why they aimed to protect features of nature. This is similar to a way that the general interests of people were framed above, but there are some differences. These participants used emphatic, enthusiastic phrasing (e.g. "absolutely amazing", "very, very, incredibly") and noted that these sites were 'really important', not just technically protected, when discussing formal foundations of nature-focused aims. This hints at a broader importance represented by these designations – though the nature of any broader importance from protective designations was generally not specified when discussing these situations.

As found in other studies of groups of conservationists, an educational background in natural sciences was prevalent among participants. The majority of participants had a natural science degree or degrees (23 of 26 who stated their educational background in the interview), usually in biological sciences or a biology-related field such as ecology or zoology (seventeen of 23), and several had continued to work directly in scientific research for much of their career (the nine participants with a background primarily in environmental or biological science research noted in Table 2.1).

The prevalence of conservationists with a scientific background, or an associated preference for scientific evidence and reasoning, was frequently raised by participants as a reason why consideration of ethical issues might be limited, for example:

26 *[...] many people in nature conservation come from a scientific background so we take a very evidence-based, scientific approach to things and probably don't think too much about ethics and all that kind of stuff.*

28 *This is only a perception. Conservation is largely, or has been the past, has largely been dominated by what I would call scientifically trained people, for whom ethics is an issue but it's something to get over rather than the first thing that they might think of. I wonder sometimes whether that impacts the behaviour of those in the sector. [...] It's like health and safety. It's like fundraising. It's like someone else's problem.*

Participants 26 and 28 speculated that conservationists' scientific background led to them taking a scientific approach to decision-making (as discussed above, with an example from participant 26), which in turn meant that ethics was outwith their areas of concern and awareness.

Being a conservation scientist was described by some participants as a reason why they do not see ethics as something for them to personally engage with. Engagement with ethics was described as not being part of their knowledge model, concern, awareness, or identity:

90 *[...] most people in this sector, in my opinion, their approach is to try and be as honest and as factual as possible. Because a lot of the area of our work is based around science and ecology and evolution and everything else, most of our thinking is scientific in the way that we approach stuff.*

Around two thirds of participants stated they had no training in ethics (seventeen of the 27 participants who were asked directly) and around a third (ten of 27) were able to recollect undertaking some ethics training during their higher education or over the course of their career. In six of these cases, this was a form of professional ethics training (assessments to obtain chartered ecologist and environmentalist status, legal ethics for the participant with a background in law) or a limited amount

of training in animal and/or research ethics (modules as part of a degree course, training required for an animal handling license); in most cases this training took place a long time ago.

28 *Certainly when I was at university, I can't remember doing anything on ethics at all. Is it even in the training for people at that stage, even mentioned? I'm not sure.*

Participants tended to list lethal control of vertebrates or animal welfare and funding or corporate partnerships as the main or only sources of ethical considerations when initially asked.

17 *In my mind, my first thoughts were two key areas, so you're going to have to prompt me if there's something I'm not thinking about, because most of our moral and ethical ones come up in terms of whose the funding is. […] The other area of ethics is always going to be around – and this was new to me – managing species for the benefit of conservation.*

47 *That's the only two contexts I've heard it in.*

As the interviews went on, participants revealed more specific situations and activities in which they came up and often other sources of ethical issues occurred to them, but the implication about their pre-interview ideas suggests that ethics related to other areas of their work, including those associated with disciplines of applied ethics such as environmental ethics, have a low profile in conservation. This was further supported by some participant comments about ethics being something that is mainly discussed in casual conversation or informal settings.

84 *Most of my conversations are the after work, down the pub type conversations to be honest, they're not formally in the role. […] It's down to the individual interests of those people and so there is almost a small cabal of us who talked about ethics quite a lot. But it's never quite got to the point where it's really informed the way that we do our work.*

Participant 84 felt that ethical discussion was generally seen as strange or unusual in conservation organisations, which may help to explain why conservation practitioners do not seem to be in the habit of talking about ethical aspects of their work.

84 *It is a bit esoteric. It's the sort thing that's so esoteric that I wouldn't dare talk to any of my colleagues about it because they'd just say, 'Come back to reality.' […] I think people will just tell me to get my head out of the books if I started talking about that […]*

Participant 85 suggested that economic or instrumentally orientated approaches in decision-making had contributed to this lack of discussion over a long period of time, suggesting that there are multiple reasons for this culture.

85 *Ethics, morality, all sorts of areas of discussion have been pushed out of the conversation for so*

*long that it's difficult to bring back in. It isn't a subject area that's easy to gain traction in policy terms, and that's why it's difficult— I think we're out of the habit of it.*

Participant 84 also felt that this had left some conservation organisations unprepared for dealing with the ethical questions and moral discomfort raised by the types of strategic options outlined above, including natural capital approaches.

*84 I think this has surfaced some of those tensions. So while [this organisation] as an organisation was spending some time try to figure out where it's sat on natural capital approach, so we were seeing lots of organisations completely changing the way their business models and their branding towards natural capital facing, and we were definitely not doing that, but were trying to wrestle with how we did it we often said what we need is conservation philosopher. And we had a few closet conservation philosophers but not proper conservation philosophers.*

Some participants speculated that natural capital approaches and associated ethical challenges were an upcoming topic for discussion in conservation strategy development that had not yet happened in full at the time the interviews took place, due to the relatively recent arrival of these approaches in conservation:

*10 I think in itself it's posing a new ethical issue for the sector to deal with . . . I think the issue isn't well enough known.*

## 2.33 Establishing a fair nature-society relationship

### 2.331 Facilitating a positive nature-society relationship

Participants often framed the protection of people's interests as a duty, responsibility, or obligation of conservation. One common way this was expressed was by citing their organisation's formal guiding principles as the basis for taking people's interests into account in decisions, such as the statutory duties of government organisations and the charitable objectives of charities.

*65 We recognise, and we have in our founding legislation, a requirement to balance the needs of the public and people against nature conservation.*

The language used by participants from government organisations, such as talking about a 'requirement' (participant 65 above) and something they were 'charged with' (participant 66, not quoted here), suggests that accounting for the interests of people was seen as a non-negotiable, formal obligation (perhaps even an externally-imposed one). Participants from several conservation charities framed their responsibility towards people's interests in a way that suggested they similarly

saw it as non-optional and an inherent part of the organisation's existence, such as explaining how it is part of being a charity in general or is an explicit part of the organisation's charitable objectives:

*26 Any charity works for the public good, can't do anything else. So we have to understand that the public good is for the whole of the community. [……] We have a responsibility for the public benefit that is this site because we're a charity, that's what we're here for.*

*43 [I]t's something that we are all made very mindful of as part of our indoctrination to working at [—]. It's an essential ethos. It's in our mission statement, so it's from the top down. We have a clear position statement of making sure that we respect human rights and create benefits for people whenever we can, that permeates the decision-making process.*

*84 It's actually written in our statute as an organisation that we should be doing stuff that provides benefits for people, so explicitly anthropocentric, but we also talk about a moral or an ethical imperative to conserve species.*

The inclusion of ethics-related words and concepts such as 'the public good' and 'rights' when presenting the broad aim of meeting people's interests as a formal and core responsibility of an organisation, as in the above quotes and similar descriptions from other participants, are early indications that this was seen as a somewhat moral or ethical aim of conservation by many participants.

Participants typically raised the interests of people as a formal aim of a conservation organisation when talking about commenting on the activities of others as an organisation (such as developers – e.g. participant 65 above – or farmers and land managers) or planning and managing conservation projects (such as managing access to nature reserves – e.g. participant 26 above – or planning overseas conservation projects – e.g. participant 43 above). These situations centred around decisions within conservation organisations where people-focused goals were considered alongside nature-focused goals of conservation.

Many participant descriptions of ethically-charged situations where conservation organisations held significant power were, on the surface, decisions about environmental management that involved a balance between two quasi-ethical conservation aims, one focused on nature and the other on people. Participants' examples of decisions about managing access to nature reserves demonstrated these questions of balance especially clearly.

*74 I think one of the big ones that we come across, particularly with our National Nature Reserves, [is that] we're conserving the National Nature Reserve but also we're trying to encourage people to use it. There can often be a tension between the disturbance that you'll get from [...] people*

*visiting and also trying to conserve them.*

The idea of protecting nature *for* people appeared frequently across interviews as a people-focused goal of conservation. A specific version of this aim was for people to learn about, be inspired by, and enjoy nature. In situations where the organisation held significant power in a decision, this objective was often mentioned was when participants described 'ethical considerations and questions' about controlling access to nature reserves their organisation managed. The surface level conflict in these situations was usually a practical decision about reserve management, a question of balancing the practical requirements of protecting habitats with the practical costs of people accessing reserves to enjoy experiences in nature that these protected areas provided, both of which were themselves uncontested as aims of the organisation in most examples of this scenario.

23 *[O]n some sites the habitat can be extremely sensitive. If you get large numbers of people gathering together to see a species, something like the [— species], which has been relatively recently reintroduced in the UK, that can cause quite a lot of trampling of the habitat. [...] At the same time, we want the general public to have the enjoyment of actually seeing that wildlife. That applies to children as well. We want everybody to enjoy those [—]. But that does present us with a bit of a problem on some sites where we get an awful lot of visitors.*

In this quote and the above quote from participant 74, the nature-centric part of this conflict was expressed in a fairly specific, technical, amoral way, with mentions of individual species, designations, and specific or technical harms that could befall the protected ecosystems (e.g. 'trampling', 'disturbance'). Meanwhile, with this particular people-focused aim we start to see another way that people-focused aims were expressed: people's access to nature for inspiration and enjoyment was usually discussed in a warmer, more personal way (such as referring to emotional experiences that visitors could have, as in the above example from participant 23), compared to the formal, official way that the inclusion of people's interests in general was discussed.

These decisions often arose in the form of an operational conflict, such as between different reserve management styles, with any potential ethical conflict or ethical side to the aims remaining relatively unarticulated in comparison. This raises an uncertainty about whether there is an ethical question to answer, which was expressed by several participants.

23 *There is a visitor management issue, if you like. It's maybe not an ethical one. We might want to think about how much we publicise particular events.*

Participant 23's query about whether this was really an ethical issue followed by an operational solution suggests that the conflict in these 'hybrid' ethical-operational decisions might reside solely

on the operational side, with little or no underlying ethical conflict between nature-focused and people-focused goals, rather simply being experienced or articulated at the operational level.

**2.332 Facilitating a fair nature-society relationship**

While 'classic' people versus nature conflicts of interest were common in activities featuring ethics issues, with almost all participants describing these at some point**,** many participants also described ethical challenges in situations where they were trying to balance the interests of two groups of people at different scales. Two thirds of all participants described this in various area of their work. In some cases, conservation organisations were the more powerful of two groups whose interests were in conflict. A responsibility to act on behalf of multiple beneficiaries was a common feature in these activities. In several cases, providing for the interests of both people and nature was identified as a core part of the organisation's purpose in several cases.

*46 [...] our responsibility to be thinking about the wider public interest and the need to protect the environment for health reasons and wellbeing reasons [...]*

*66 Ultimately, we're charged with protecting nature for the people of [country].*

In many cases where they were involved in a development planning process, conservation organisation staff were actively engaged in the process of balancing both sides of a conflict, rather than opposing or advocating from one side:

*65 If we're commenting on a planning application, we have what we've basically called our 'balancing duty'. We have to say, 'Well, the impact of this would be on these seabirds or this area of bog,' or whatever. However, we will also recognise that if this development went ahead, it would bring these jobs or it would introduce this housing or whatever, be wider public benefit. At some point in our judgement, if those outweigh the conservation and the environmental benefits, then we would revise our opinion on that basis. That's relatively new, but it's something that is part and parcel of us trying to take account of either public needs [or nature conservation].*

However, the people-nature balancing aspect of these questions seldom appeared to be an ethical question in themselves under these circumstances. Nature-focused and people-focused strategic goals both appeared to be accepted and important among conservation practitioners in most situations where a conservation organisation held significant power in a multi-party decision, and more often a source of practical conflict than ethical conflict.

Ethical conflicts were more often apparent regarding the difference in scale between the parties involved. One situation where this was seen was in participant descriptions about situations where

directly enforcing types of land management was found to bring ethical challenges in the practical manifestation of existing conservation strategy. This was mainly described by participants from governmental organisations and occasionally larger land-owning charities. These participants described ethical challenges associated with the direct practice, rather than the strategy itself, of enforcing the reduction of an economic behaviour. This was most often agricultural activities by individual landowners without financial security. Participants described generalised examples of direct interactions with individual small landowners using language indicating compassion, and some level of emotional distress in some cases, such as emotive framing (highlighting vulnerabilities, misfortune, unfairness).

19 *We might deal with a landowner where we need to enforce measures around their land management regime but they may be sick or elderly or have experienced a bereavement or will be in financial difficulty [...]*

66 *Just like the landowner saying, 'Actually, I'm trying to run a business. I'm trying to feed my children, I'm trying to make sure this farm is going to stay viable for the future.'*

46 *Over here, the large majority of our designated sites are privately owned, probably by a small farmer, and [as soon as] we designate something that immediately places a restriction on what he can do there and what he can sell it on to do. So there's possibly an impact on the value as he sees it, and it means that we won't allow him to do certain things on his land that somebody who was a few miles away would be allowed to do. And they do feel quite sore about it. As do we, because again, these folk are just trying to make a living, and it's just how you address or redress the individual burden versus the greater collective public good. Which we struggle with every day.*

## 2.4 Discussion

The analysis found that conservation practitioners often find themselves faced with very challenging circumstances that make it difficult to achieve their nature conservation objectives using the legislation and persuasive tools they had previously relied on. Their power in decision-making was often reduced by these tools being dismissed or ignored, which was compounded by often having fewer financial resources than other parties involved in decisions about environmental planning. The strategic options available to them as potential solutions were new funding sources, decision-making tools, and environmental policies that move them closer to some of the forces involved in the power-imbalanced situations that prevent them from achieving their nature conservation objectives, such corporate partnerships and engagement in natural capital approaches. These options appeared to be

morally unpalatable to many participants, and so this combination of challenging circumstances and strategic options presented them with morally-charged decisions or ethical questions around whether or how to engage with these options.

There was considerable unease around the use of natural capital approaches, though most participants saw them as potentially useful options to consider. The majority of these concerns were fears that some features will be forgotten, undermined, or excluded from discussions when natural capital or natural capital-type approaches are used in environmental decision-making. These concerns are similar to concerns about 'crowding out' that have been frequently raised across the recent history of economic approaches in environmental decision-making (Neuteleers & Engelen, 2015; Rode et al., 2015; Kusmanoff et al., 2017). Participants perceived themselves and colleagues, or conservation in general, as motivated by ethical principles. Other studies of conservationists have found many of them share this view – the surveys conducted by Holmes et al. (2016) and Sandbrook et al. (2019) included the statement 'Conservation should be based on ethical values' and found general agreement with this statement from respondents overall (though this was stronger for some types of conservationist than others). These ethical motivations and beliefs were the basis for much of this moral discomfort.

Some participants found that they were able to navigate the differences between their own or the organisation's ethical principles and the viewpoints taken when using strategic options such as natural capital tools with relative ease, while many found themselves concerned about these differences. Despite the idea that conservation and conservationists are ethically motivated with strong moral beliefs, were several internal factors within conservation practice that inhibited the presence of ethical principles in conservation decision-making, which could mean they are ill-prepared to counteract the crowding out of these principles when engaging with or deciding about engaging with these tools.

One of the main sources of difficulty regarding discussing ethical issues in their work expressed by participants was that conservation practitioners often have a scientific background and identity, which they indicated might impair ability and willingness to engage with philosophical aspects of conservation in general, or they believed that other conservation practitioners felt this way. A similar study by Stuart & Rizzolo (2019) of conservation biologists in North America investigated their relationship with moral advocacy about endangered species and found they often felt it was not their role as scientists to engage in moral advocacy or felt it was necessary to hide their moral principles. Several of the interview responses reported by Stuart & Rizzolo indicated that some conservation biologists think moral advocacy regarding endangered species belongs in some areas of conservation work but not others, and a majority of respondents stated that the conservationists best suited to

engaging in advocacy for at-risk species are those who understand both the science/facts and politics/principles, and many saw advocacy organisations (such as non-governmental organisations) and scientific groups as complementary (Stuart & Rizzolo, 2019). It is concerning, therefore, that the conservation practitioners in this study felt similarly reluctant and unprepared to raise ethical concerns in their work. While participants were not from advocacy organisations as such, several of them or their colleagues engaged in lobbying and in policy development, and many also had scientific backgrounds, placing them among the set of conservationists that at least some other sets of conservationists hope will bring an ethical angle to environmental decision-making. Participants accounts also suggested that believe their colleagues have a low opinion of ethical discussion, and they have found ethical discussion to be informal and casual if anything, and not explicitly present in discussions. Ultimately, ethical discussion does not appear to have structural support or a strong cultural presence in conservation practice.

The interviews and interview dataset presented several challenges for the study in this chapter. The original research objectives, and therefore the topic guide based on them, were too broad in scope. This chapter's study originally aimed to find out about the detail of ethical conflicts in conservation practice, the difficulties they caused, how ethical conflicts were resolved, and how natural capital approaches might have added to or changed any of these ethical conflicts. However, ethical issues were generally very integrated with more tangible issues and so difficult to usefully distinguish from them, and the main ethical challenges experienced by participants were around the place and perception of ethics in their work, the topic guide was not as well-focused as it could have been. A more extensive piloting stage may have identified these issues sooner (Gillham, 2005), but overall the interview contents were generally suitable for the revised objectives, and this kind of evolution in research objectives is part of qualitative research using thematic analysis (Braun & Clarke, 2006).

In hindsight, the study may also have been improved by conducting fewer interviews. Determining the appropriate sample size for qualitative studies is challenging, even for experienced researchers, as it varies widely based on research questions, research approach, and variation among participants. It usually cannot usually be decided before beginning the study and there is little agreement or guidance about standard minimum numbers (Baker & Edwards, 2012). It was difficult as a relatively inexperienced interviewer to identify when the 'saturation point' was approached and so I erred on the side of having more participants. However, this was a higher number than some qualitative methods scholars consider ideal for an interview study (Brinkmann, 2013) and it resulted in having a very high volume of data that was challenging to analyse. The depth provided by interviews was valuable and necessary for the purposes of the study, but fewer interviews may have allowed for a closer examination of some features of this depth. The choice to use individual participant interviews

appears to have been appropriate in hindsight, as several participants referred to holding back on discussing ethical issues among their colleagues and so group interviews would probably have placed unhelpful limits on the discussion.

# 3 – Examining an ethical challenge through a philosophical lens

## 3.1 Introduction

### 3.11 Context

The previous chapter found that ethics has a complicated and contradictory place in conservation. Interviews with conservation practitioners found mixed views about the role of ethical principles in conservation and about themselves as ethical agents in their work despite personally identifying as morally-driven people, especially with regard to nature. Participant accounts indicated that conservation practitioners experience difficulty or reluctance in discussing ethical topics in a professional context due to perceptions about the culture in conservation practice, their training and abilities, and the benefit of engaging with ethical topics.

Participants identified concerns that the use of natural capital approaches in conservation decision-making will result in losing or undermining features they consider to be of moral importance to conservation and described following or engaging in debates about their use. However, there are suggestions that these debates do not lead to resolution of these concerns. The features perceived to be at risk were most often stated or implied to be values of some kind, which conservation practitioners struggle to understand, describe, express, debate the merits of, and bring into the relevant conversations. This leaves these features of moral interest to conservation at potential risk from the increased use of natural capital approaches in conservation. The relationship between conservation and ethics suggests this problem will continue unless these values can be understood, expressed, and their protection argued for; this is the problem this chapter addresses.

The natural environment is important to different groups of people in many ways and for many reasons. In the course of attempting to address these multiple interests and needs, decisions about environmental protection and management feature many questions about value. The disciplines of economics[7], ecosystem services research, and environmental ethics are relevant to these decisions and each use different concepts of value, which are outlined below.

[7] Discussions of 'economics' in this chapter refer in general to fields of economics interested in the environment. This includes environmental economics and ecological economics, which have different perspectives on the relationship between economics and the environment. This distinction is not made in this chapter as it is more relevant to the topics in Chapter 4, so it is examined and considered there.

In economics, the main values of interest are the worth attached to benefits that people obtain from environmental features. These are commonly categorised in a way that distinguishes 'use values' (the worth of benefits obtained by use of a resource) from 'non-use values' (the worth of benefits obtained without using or even necessarily coming into direct contact with the environmental feature). Non-use values include the worth to people of knowing that the feature exists ('existence value') or the act of providing it for people in the future ('bequest value') (Tinch et al., 2019). A variety of methods exist to elicit quantitative amounts for the worth of these benefits to estimate the economic value of environmental features, including market and non-market approaches. There are well-known and well-studied challenges with their methodologies and applications (Edwards-Jones et al., 2000; Sagoff, 2011; Parks & Gowdy, 2013), especially regarding the use of monetary valuation (Spangenberg & Settele, 2016; Bordt, 2018).

Ecosystem services assessments aim to measure the benefits to people from environmental features. These often use economic or quantitative valuation methods to measure the worth of these benefits (Ling et al., 2018), which brings difficulty in appropriately incorporating the value of cultural services in ecosystem services frameworks (Scholte et al., 2015; Small et al., 2017; Tinch et al., 2019). 'Cultural ecosystem services' provide intangible or non-material benefits to people (Satz et al., 2013) and the types of worth assigned to these benefits are variously labelled 'cultural values', 'intangible values', or 'non-material values' (and subtypes such as 'spiritual value' and 'aesthetic value') (Gould et al., 2015; IPBES, 2016; Sanna & Eja, 2017). In addition to problems with eliciting values from people – such as receiving 'protest responses' of high or zero amounts (Luck et al., 2012) – assessing these environmental features in terms of benefits may not reflect what is important to people (Chan et al., 2012; Sanna & Eja, 2017). Ecosystem services research is an interdisciplinary research area (Costanza & Kubiszewski, 2012) and alongside or in collaboration with economics disciplines has engaged in a great deal of research into the valuation of ecosystem services, including the challenges of including cultural services (Torres et al., 2021). Social science and ideas of 'relational value' have brought new perspectives into this area of research (Chan et al., 2018).

Extensive study of values associated with nature is also a feature of environmental ethics research, where questions about intrinsic value and instrumental value have been central throughout the history of the field (Jamison, 2008; Minteer, 2012) and continue to be so (Marques da Silva, 2019). 'Intrinsic value' in nature is generally used to indicate that an aspect of nature has value in itself, while 'instrumental values' indicate that its value derives from bringing about an intrinsic value (the happiness of sentient beings, for example) (Jamison, 2008). Arguments for the existence of intrinsic value in nature include those founded in the ability of something to 'flourish' (O'Neill, 1992) or in claims that something being able to act in a way that benefits itself means it is able to value itself and

so has intrinsic value (Rolston III, 1994). There is little consensus on the definitions of intrinsic and instrumental values of nature, the distinctions between them, and the existence of intrinsic value among environmental ethicists, and a pragmatic need to move beyond the dichotomy has been suggested (Minteer, 2012).

## 3.12 Problem

The various meanings and applications of 'value' between disciplines and in everyday language is a source of confusion in the interdisciplinary spaces of environmental decision-making (Gunton et al., 2017; Tadaki et al., 2017). Studies of the personal views of conservationists finds areas of both consensus and disagreement (Sandbrook et al., 2019; Dempsey, 2021; Vucetich et al., 2021a). Intrinsic value is a particular point of debate; intrinsic value in nature and/or its place as the basis of a core principle of conservation has been established (e.g. Skolimowski, 1984; Soulé, 1985), disputed (e.g. Schaubroeck, 2018), debated (e.g. Butler & Acott, 2007; Justus et al., 2009; Vucetich et al., 2015), downplayed (e.g. Kareiva & Marvier, 2012), reiterated (e.g. Skandrani, 2016; Piccolo, 2017; Taylor et al., 2020), reinterpreted (e.g. O'Connor & Kenter, 2019), and misinterpreted (Batavia & Nelson, 2017).

These questions are central to debate about the use of economic tools in conservation, but conservationists are reluctant to bring ethical values and principles into these areas of conservation decision-making, as found in Chapter 2 and in other recent studies (Baard & Ahteensuu, 2019; Stuart & Rizzolo, 2019). The findings of Chapter 2 also suggest that conservation practitioners find it difficult to understand and express ethical values of nature and the ethical principles associated with them due to the culture and structure of conservation practice and their disciplinary backgrounds. Given the extent of academic discussion and disciplinary variation, this is not surprising. An understanding of the features of values of nature held to be important in conservation practice – in greater detail than identifying their personal stances towards nature and nature conservation, but likewise grounded in the world of conservation practice – would help conservation practitioners navigate debates and concerns about economic tools in the course of their work.

Identifying types of value that people believe or argue exist does not necessarily provide a compelling argument that society ought to act to protect them itself (O'Neill, 1992; Tenen, 2020). Philosophical ethical theories have well-examined lines of moral reasoning for how various precisely defined values should be taken into account in moral decisions, which could potentially be drawn upon by conservationists advocating for nature. The interdisciplinary fields that link conservation and ethics give some idea about which and how ethical theories might be drawn on as a normative basis for conservation, but the possibility of building on these in practice may be impeded by debates within these fields.

For example, environmental ethics – a mostly philosophical field – has historically focused heavily on questions about intrinsic value in nature and alternatives to anthropocentric ethical theories (Minteer, 2012; C. Palmer, 2013; Stålhammar & Thorén, 2019; Brennan & Lo, 2022), which has distanced the field from traditional ethical theories (Wolff, 2009). Some environmental ethics concepts of intrinsic value in nature are associated with Kantian deontological ethics (Callicott, 2002) (in which moral agents have obligations towards members of the 'moral community'), but making the step from value in nature to moral obligation towards nature has been challenging (Muraca, 2011). Grounding environmental ethics in virtue ethics theory (in which character traits are central to morality) has been advocated for by some authors (Cafaro, 2001, 2010; Sandler, 2003, 2004, 2010; Dzwonkowska, 2017; Knights, 2019). The influential environmentalists Aldo Leopold and Rachel Carson have been argued to be environmental virtue ethicists (Cafaro, 2001) while Leopold's famous 'land ethic' has been argued to be a consequentialist theory (Holbrook, 1997). Although arguments for a utilitarian form of environmental ethics (in which the morally right action is that which results in the most of a particular good, such as human happiness) have been made (e.g. Birnbacher, 1998), they are relatively rare, and environmental ethics as a field has traditionally been hostile to utilitarianism (Wolff, 2009).

Ecological ethics – an applied ethics field linking conservation biology and philosophy – aims to be pluralistic with regard to the underlying ethical theories it accommodates (McCoy & Berry, 2008; Minteer & Collins, 2008; Perry et al., 2012) as part of its pragmatic applied ethics approach, where the context in which it is applied is prioritised over conceptual processes (Minteer & Collins, 2005b). However, ecological ethics does not have a method by which to resolve key differences in underpinning ethical stances (Perry et al., 2012) and the field has seen less development in recent years (though a tentative field called 'conservation ethics' is beginning to emerge as a possible successor that carries forward several of its approaches to interdisciplinarity (e.g. Biasetti & de Mori, 2020; Ferraro et al., 2021)).

Compassionate conservation – an actively developing interdisciplinary field in the intersections between animal ethics, environmental ethics, and conservation – engages with multiple ethical theories (Beausoleil, 2020). There has been considerable debate about which provide the most appropriate foundations for the field (Hampton et al., 2019; Coghlan & Cardilini, 2021), which does not appear to be close to a resolution (Beausoleil, 2020). The merits of virtue ethics as the foundation of compassionate conservations have been most prominently explored (Ramp & Bekoff, 2015; Wallach et al., 2018; Bobier & Allen, 2021), but this focus is challenged by arguments for the importance of consequentialist ethical reasoning (Johnson et al., 2019). The field does not yet have a functional applied ethics approach (Ferraro et al., 2021). While compassionate conservation's challenges to mainstream conservation provide some insights into the latter's current normative

foundations by contrast, its proposals for useful normative arguments to turn to are limited by its primary concern being mainstream conservation's emphasis on species rather than individual animals.

These is a relative lack of consensus about the most appropriate normative foundations for conservation across the relevant interdisciplinary fields that link conservation and ethics, which means any insights are unlikely to be accessible to most conservation practitioners. In addition to understanding the values of nature that conservationists are concerned about under the prospect of increasing use of economic approaches, a targeted investigation into the support they have from normative ethics theories may provide insights that conservationists could use to advocate for them.

## 3.13 Response

With a view to improving the understanding of the values of nature that conservation practitioners believe to be important but at risk when using natural capital approaches in conservation, and the normative support these values may have, so that conservationists may better engage with ethical concerns about natural capital approaches, this chapter addresses the following research question: What insights into ethical concerns about natural capital approaches in conservation can be generated by a philosophical value theory assessment? This will be approached using the following objectives, of which the first is a descriptive objective and the second a normative objective:

- To identify and characterise the values of nature that participants feel are threatened by the increasing role of natural capital approaches within conservation.
- To establish the normative support for these values of importance to conservation using insights from environmental ethics work.

The descriptive objective will use philosophical value theory to investigate the different components of the values that participants expressed concerns about regarding the use of natural capital approaches. Philosophical value theory is the study of the nature of values (Hirose & Olson, 2015), and as such provides several concepts and principles that can act as a lens through which to search for insights about the values discussed in this context by participants. This will provide a set of empirically-derived 'descriptive values'. To consider why they ought to be protected, the normative objective will investigate how far they are supported by two key ethical theories of Western philosophy – utilitarianism and deontology – as they are used in environmental ethics.

# 3.2 Methods

## 3.21 Dataset formation

### 3.211 Recap of source dataset collection and characteristics

The dataset analysed in this chapter – the 'reduced dataset' – was extracted from the interview data collected and used in Chapter 2 – the 'source dataset'. The source dataset consisted of 242,000 words of indexed transcript data from individual interviews conducted in 2018 with 33 participants from 23 different conservation organisations. The collection and characteristics of the source dataset are outlined below, and full details can be found in the Methods section of Chapter 2 (section 2.2 and tables therein).

Interview participants were conservation practitioners working in strategic level positions in UK-based conservation organisations. Suitable potential participants were identified through information publicly available online (e.g. LinkedIn, conservation organisation websites) and on the basis of recommendations from other participants, potential participants who had been approached to take part but declined, or supervisors. Potential participants were approached by email inviting them to voluntarily take part in the study (full details in section 2.23).

The characteristics of the full set of participants and organisations present in the source dataset are described in Chapter 2 (2.241, Tables 2.1 and 2.2). These characteristics are relatively similar for the reduced dataset, so they are described in this chapter's text for the reduced dataset only (in section 3.213). Summaries of the source dataset characteristics are shown in parentheses in Tables 3.1 and 3.2 below, for ease of comparison with the equivalent characteristics of the reduced dataset.

In the interviews, participants were asked about their experiences of ethical considerations in conservation and the effects of natural capital approaches on ethical questions (full details in 2.22 and topic guide in the Appendix). Interviews were audio recorded then transcribed by the researcher or the professional transcription service UK Transcription Ltd. (full details in 2.242). The full interview transcripts in the source dataset were coded in NVivo according to the coding index developed in Chapter 2 (full details in 2.25).

The coding index included, among other codes relevant to that chapter's objectives, a descriptive code that marked any text in a transcript where a participant discussed 'ethical concerns linked to natural capital approach use'. Data were coded to this code when the topic of natural capital approach use (identified from explicit references made by the participant or by the context in the interview, which included a section with questions about natural capital approaches) co-occurred with the topic of concerns of 'ethical' relevance (based on the participant identifying it as such, either explicitly or

implicitly in the context of the interview questions). This content of this descriptive code (that marked the topic only) was sub-coded with a set of inductively developed analytic codes that marked the meaning of the participant's comments on the topic of 'ethical concerns linked to natural capital approach use' (i.e. what they said about this topic). If no distinct meaning could be discerned, the text received no analytic code within this descriptive code.

**3.212 Extraction and indexing of reduced dataset**

The dataset used in this chapter was extracted from the source dataset as follows.

The analytically coded data within the descriptive code 'ethical concerns linked to natural capital approach use' were merged to make a single code that contained the transcript data where participants described some kind of ethical concern related to the use of natural capital approaches with sufficient detail to identify the meaning, but no longer separated into different codes marking specific types of concern.

This code contained approximately 10,500 words of transcript data from 29 of the original 33 participants. This was reviewed to confirm and collect with a new code all instances where a participant discussed a value of nature that they observed, believed, or feared was not or would not be sufficiently accounted for or protected if natural capital approaches were used in conservation decision-making. These concerns could be speculative and included participant views of fellow conservationists' concerns as well as their own. Any reason expressed by a participant for the potential exclusion or inadequate protection of a value of nature was considered sufficient. The necessary points were *the value* and that the participant or conservationists *held it to be important* and *at risk when using natural capital approaches*. Full transcripts were checked if required to confirm the latter two points if they were not clear from the extracted data. If these points could not be confirmed, that piece of text was not considered further in this analysis.

Values in or of nature were the type of value of interest in this study, in the sense of 'value' meaning something's worth or importance, rather than in the sense of a person or community's principles. These are closely connected concepts and so the latter is present in some of the extracted data. However, the analysis focuses on the former in order to stay as precise as possible.

The resulting data were labelled so that each label represented a participant discussing a single value of nature that they felt was important to conservationists. These are called 'data fragments' when reporting and discussing the analysis. Sometimes these were combined from two to four pieces of text if a participant's description of a value had been split during the coding process (e.g. by the interviewer's dialogue not being coded to the original codes in the source dataset) or the non-linear nature of the interview conversation. When this seemed possible, the full transcripts were checked to

establish whether the participant was knowingly and intentionally referring to their own point from elsewhere in the interview (by explicit reference made by the participant, e.g. “Going back to what I said about…”, or implied by the interview context, e.g. a prompt to elaborate from the interviewer) and separate pieces of text were added to the same data fragment if this was the case. Separate pieces of text were not combined into the same data fragment when it only appeared based on coder judgement that the participant was discussing the same type of value as they had at another time in order to minimise the risk of categorising values prematurely before the main analysis stages.

The abbreviation ‘VNRN’ is used to refer to ‘values of nature they (participants) are concerned may be at risk from the use of natural capital approaches’ throughout the rest of this chapter.

**3.213 Summary and characteristics of reduced dataset**

The reduced dataset analysed in this chapter consisted of approximately 6,050 words of interview transcript data organised as 49 data fragments showing participants’ discussions and descriptions of VNRN. These data fragments were from 26 participants working in strategic level positions in 19 different conservation organisations.

The number of data fragments and the word count of the text within them varied between participants. Fifteen participants provided one data fragment each, seven participants provided two data fragments each, three participants provided three to five data fragments each, and one participant provided eight data fragments (mean 1.9 data fragments per participant). The total word count per participant ranged from 63 to 556 and the mean word count per participant was 234. The mean number of words in a data fragment was 123. As participants were not all asked an identical set of questions (especially regarding additional prompts and follow-up questions), did not all have the same amount of time available for the interview, and varied in their style of speaking, this variation is expected.

Most participants present in the reduced dataset (24 of 26) were employed in executive or senior management positions (eleven directors, five heads of department, five chief executives or chief officers, and three other senior advisor or senior management roles). One participant was employed as natural capital specialist and one as an economist (Table 3.1a). The majority of participants (24 of 26) had a background in conservation practice and/or research. One participant’s background was principally in economics and another’s was principally in non-conservation charitable sector work (Table 3.1b). The participants had worked in conservation since dates ranging from the 1970s to the 2010s, with half (13 of 26) starting in the 1990s (Table 3.1c).

**Table 3.1. Details about the set of study participants whose interviews were part of the dataset used in the Chapter 3.** The numbers of participants in this reduced dataset are reported, with the numbers present in the full source dataset used in Chapter 2 shown in brackets for reference. Part (a) reports the positions participants held in the organisations they were employed at, part (b) reports their general career background, and part (c) reports the year they started working in conservation (aggregated to decade level).

| Participant characteristics | No. of participants |
|---|---|
| *(a) Position held within organisation* | |
| Director | 11 (14) |
| Head of department | 5 (7) |
| Chief executive or Chief officer | 5 (5) |
| Senior manager or Senior advisor | 3 (4) |
| Natural capital specialist | 1 (2) |
| Economist | 1 (1) |
| *(b) Background* | |
| Conservation practice or general conservation | 17 (22) |
| Conservation science and research | 7 (9) |
| Economics | 1 (1) |
| Another charitable sector | 1 (1) |
| *(c) Year started working in conservation* | |
| 1960-1969 | 0 (1) |
| 1970-1979 | 1 (1) |
| 1980-1989 | 6 (9) |
| 1990-1999 | 13 (13) |
| 2000-2009 | 4 (6) |
| 2010-2018* | 2 (3) |

*Study was conducted in 2018.

The set of organisations that participants present in this dataset worked at included three governmental organisations and sixteen NGOs, with seven and nineteen participants from each type respectively. Four of the NGOs, with six participants between them, had a broad conservation remit and twelve NGOs, with thirteen participants between them, specialised in a particular taxonomic group, habitat type, conservation theme, or local area (Table 3.2a). Three of the organisations operated up to an international scale, twelve operated on a national scale, and four operated on a regional scale, at which five, seventeen, and four participants were employed respectively (Table 3.2b). To obtain a fuller view of the working of larger organisations where staff may have a relatively

limited view compared to those in a smaller organisation, multiple participants were recruited from larger organisations where possible (see 2.23). More than half of the participants in the reduced dataset (14 of 26) were the sole participant from the organisation they worked at and the rest (12 of 26) were among two to four participants who worked at each of five organisations (Table 3.2c).

**Table 3.2. Details of the organisations at which study participants were employed and the number of participants from each type of organisation for the dataset used in the Chapter 3.** The numbers of participants and organisations in this reduced dataset are reported, with the numbers present in the full dataset used in Chapter 2 shown in brackets for reference. Part (a) shows the types of organisations, including governmental or non-governmental status and whether they have a specialist remit (focusing on a particular taxa, habitat, theme, or region) or a broad remit, and the number of participants from each. Part (b) shows the geographic ranges of the organisations and the number of participants from each. Part (c) shows the distribution of participant numbers across the different organisations from which they were drawn. Abbreviation used: NGO = non-governmental organisation. List items indented and below totals are subtypes contributing to the total above them.

| Organisation characteristics | No. of organisations | No. of participants |
|---|---|---|
| *(a) Type* | | |
| Government (total) | 3 (3) | 7 (7) |
| Non-government (total) | 16 (20) | 20 (26) |
| Broad remit NGO | 4 (5) | 6 (10) |
| Specialist NGO (including regional) | 12 (15) | 13 (16) |
| *(b) Geographic range* | | |
| International or UK and international | 3 (3) | 5 (6) |
| National | 12 (14) | 17 (21) |
| Regional | 4 (6) | 4 (6) |
| *(c) Participant distribution* | | |
| One participant per organisation | 14 (16) | 14 (16) |
| Multiple participants per organisation | 5 (7) | 12 (17) |

Compared to the full dataset used in Chapter 2, interviews with fewer participants from a smaller number of conservation organisations formed the dataset used in this chapter. This is because this chapter's dataset only includes statements about the topic of interest with sufficient depth to analyse as required for this chapter's objectives, which not all participants made. However, overall the differences are minor between the sets of participants and organisations in each dataset. The differences between the participants in each dataset can be seen by comparing the reduced dataset numbers (out of parentheses) with the source dataset numbers (in parentheses) in Tables 3.1 and 3.2.

Participants are referred to using randomly generated, randomly assigned number codes (Table 3.3), which are the same as those used in Chapter 2.

**Table 3.3. The number codes used to refer to individual participants in this study and the type of organisation they worked at when interviews were conducted in 2018.** The participant's area of expertise is shown for those with a role related to economics. Organisation details are reduced for two participants whose anonymity could otherwise be unacceptably compromised by the combination of details about them included in this thesis. Number codes were randomly generated and randomly assigned to individual participants; they do not indicate any other features about the participant, the organisation they work at, or their relationship to other participants or organisations. Abbreviation used: NGO = non-governmental organisation.

| Organisation type | Participant codes |
|---|---|
| Governmental | 19, 46, 53, 65, 66, 70 (economist), 74 (natural capital specialist) |
| NGO, broad remit | 33, 43, 63, 68, 89, 98 |
| NGO, specialist remit | 10, 12, 26, 28, 47, 56, 67, 78, 83, 85, 93 |
| NGO (not otherwise specified) | 17, 73 |

## 3.22 Descriptive values analysis: Using value theory-informed index

The data were subject to thematic analysis with a hybrid deductive-inductive coding approach (Fereday & Muir-Cochrane, 2006) by using a concept-based coding structure, concept-guided but data-responsive coding within the structure, and concept-referencing data-driven pattern analysis (Gibbs, 2018). This involved using a coding index structure developed from basic principles of philosophical value theory (introducing a deductive, concept-driven element) to find how certain components of value appeared in participant accounts of VNRN (with some interpretive flexibility within the structure to allow data-driven, inductive features to emerge), then patterns in these were analysed to develop thematic categories of the ways participants presented these values (a mostly data-driven, inductive process).

The index structure was primarily guided by reference texts on value theory, especially the introductory overview by Hirose & Olson and the chapter on incomparability and incommensurability by Chang in *The Oxford Handbook of Value Theory* (2015). It was additionally informed by the main points of debate about value in environmental ethics, based on researcher knowledge from key textbook and anthology sources (e.g. Light & Rolston III, 2003; Jamison, 2008; Minteer, 2012; Rolston III, 2012) and wider reading. The index structure had a dimension for each of the following basic components of value: the value *bearer* (the aspect of nature that has the value being described); the relevance and role of a *subjective valuer* (whether an entity with a subjective viewpoint, such as a person, is required in order for the value to exist and, if so, what their role in the value's existence is);

the value's *commensurability* (what scale of value units, such as monetary units, can it be placed on); the value's *comparability* (what other values can it be compared to and with respect to what consideration); and how the value can be *measured* (included as a practical rather than a philosophical query).

Codes within each index dimension were developed during the coding process. This was an iterative process of reading the dataset text and creating codes as required when relevant features arose in the text, labelling text with the relevant code, and regularly reviewing the set of codes to split, combine, or revise them as necessary. Data fragments were considered in their entirety during the coding process. The process continued until all data fragments were coded as far as possible to each of the dimensions in the index structure.

This information was charted in a spreadsheet showing the identified value component codes for each data fragment to facilitate comparison of value components within and between data fragments. Patterns in value components across the dataset were explored within this chart and analysed (with regular reference to the full data fragment text) to develop a number of analytic categories of value that describe and interpret participant understandings of VNRN, which were used as the basis to examine them further.

NVivo 12 and NVivo stable release 2020 (QSR International) were used to carry out the coding stages. MS Excel was used for the charting and pattern exploration stage.

## 3.23 Normative analysis: Investigating support for descriptive values from ethical theories

In order to explore the reasons why these empirically-derived descriptive values should be protected, the support for each type of value from two major ethical theories in Western philosophy was investigated: utilitarianism, in which the morally right action is that which results in the most of a particular good, such as human happiness; and deontology, in which the morally right action is determined by rights of and duties towards a moral community (Jamison, 2008; Singer, 2011). Only two ethical theories were examined for reasons of space, and utilitarianism and deontology were chosen because utilitarian and deontological arguments are influential in public discourse and policy (Wolff, 2009; Singer, 2011) so they are promising sources of normative support that is useful in a practical context.

Examples of utilitarian and deontological approaches to environmental ethics were sought using databases of academic literature (including Web of Science, the University of York library, and Google Scholar). This was a goal-orientated search rather than a systematic one, with the objective of finding

texts that examine and ultimately advocate for using the ethical theory in the field of environmental ethics. Potential texts were gathered – a relatively small number – and the most suitable one to represent each theory was chosen. The selected texts were: 'Environmental ethics and utilitarianism – are they incompatible?' by Dieter Birnbacher, published in 1998 in the *Revue philosophique de Louvain*[8]; and 'The map of moral significance: A new axiological matrix for environmental ethics' by Barbara Muraca, published in 2011 in *Environmental Values*. The arguments in these texts were studied, noting especially the points relevant to the characteristics of the descriptive value categories identified as the first objective in this chapter, to establish the extent to which each ethical theory provides a normative argument in support of the descriptive values.

# 3.3 Results

## 3.31 Categories of value

This section reports the descriptive analysis of participant accounts of values of nature that they consider to be important to protect and potentially at risk when natural capital approaches are used (VNRN).

After coding the data using the value theory-informed coding index structure and exploring patterns in the value components across the dataset, the analysis found that the relevant values of nature can be defined according to either the role of a subjective valuer or the valuer bearer. Many data fragments referred to both a subjective valuer and a value bearer, but in most cases only one was the key defining feature of the value. This formed the basis for a set of mutually exclusive categories of value that account for the majority of data fragments. Eight data fragments did not fall into one of these categories: these were mainly brief mentions or did not contain enough information to understand the value being discussed as a value of nature (including after checking the wider interview context), and in all but one case the participants who provided these data fragments were the source of other data fragments that could be clearly categorised. These categories of value are described below.

[8] The paper by Birnbacher was published in French, and no suitable English-language paper about utilitarian environmental ethics was found during the search. To use Birnbacher's paper in the study, two machine-translated versions of the text were generated using MS Word and Google Translate, the texts compared, and any anomalies resolved by manually checking the translation against the original French (with sufficient French language knowledge to confirm the meaning of short phrases) to make an English-language version of the text. Machine translation of an academic text from French to English is likely to have high accuracy (Groves & Mundt, 2015) and to be sufficient for this study. Extra attention and effort were given to translation of technical terms. For transparency, footnotes in the Results section show the original text for terms and quotes where language precision was especially essential and the translation process had the potential to alter the meaning.

**3.311 Values defined by the role of a subjective valuer**

Four categories of value that are defined by the role of a subjective valuer were identified among participant descriptions of VNRN. These are labelled here as: Missed Instrumental Value; Assigned and Attributed Value; Inherent Value; and Objective Intrinsic Value. In total, these categories accounted for half of the data fragments (24 of the original 49) and included data fragments from half of the participants (thirteen of the original 26). The respective roles of a subjective valuer are that they benefit from the valued item, assign value to the item, attribute value to the item for religious reasons, recognise the value of the item, or have no role in the value's existence. A subjective valuer had multiple roles in some cases, such as benefitting from and also assigning value to the item, but one role was usually more essential in the participant's description of the value.

*Missed Instrumental Value*

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*"It's about the public, as a whole – mankind – recognising that without trees, we will all die." – Participant 17*

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'Missed Instrumental Value' is a category of value identified from participants descriptions of a VNRN that was defined by a subjective valuer *benefitting* from an item. Eight data fragments from four participants were in this category – two participants from specialist conservation charities (12 and 17) and two from governmental organisations (53 and 70). Most of these participants gave multiple examples or described values that fitted into this category on multiple separate occasions.

The importance of nature for the fundamental benefit of survival was raised by several of these participants.

12 *We absolutely need [the ocean]. It produces at least 50% of the oxygen in the air that we breathe, if not more. It produces food, it affects the climate and weather. And in relation to climate change, we really need our seas to be resilient. So they need to be really biodiverse for us to be able to survive and thrive, if possible, but even just survive.*

In these accounts, the provision of this benefit by nature was often emphatically, starkly, and unambiguously described as essential, and the importance nature had as a result did not require beneficiaries to actively seek this benefit, assign value to the item, or even articulate or recognise that they are benefiting. The emphasis on the benefit to a subjective valuer, which could be passively received, rather than a subjective valuer's act of valuing was the key defining feature of this category of value.

This emphasis on benefitting over actively valuing was also present in participant descriptions of benefits that a subjective valuer was more aware and appreciative of, such as intangible benefits of access to nature.

53 *[...] these other aspects and benefits people get which are less easy to quantify [...] Woodlands is a good example, natural environments – because we did some work on [an upland area], interviewed a load of people about what they felt was important about it, and one that stuck at for me, which is great, was this bloke who said he really liked walking up into the hills [for solitude and a break from everyday life (expressed as a light-hearted personal example)]*[9].

The subjective valuer in participant 53's example recognised and articulated the valuable benefit, and the data fragment this quote is drawn from is conceptually close to the Assigned Value category, which is discussed next, but here and in the wider context of the quote the focus was on the benefit to the subjective valuer from their experiences in nature. Participants 53 and 70 frequently spoke about 'benefits' and both referred to the idea of a 'full set' of benefits that were received by subjective valuers but were not all adequately accounted for in natural capital approaches.

70 *[...] in practice the natural capital approach as applied is often pretty reductionist and ends up focusing on just the benefits that you can value, which is a subset of the benefits […]*

The values in this category were clearly understood by participants as instrumental values – in addition to being an inherent implication of the emphasis on benefitting, this was apparent from the way participants framed the importance of certain aspects of nature.

17 *It's got its use. It's recognising its use. Even if you don't get an emotional attachment, or forest bathing is not for you, it has an incredible use to us, as mankind, the planet, as a whole.*

Phrases making direct reference to subjective valuers 'using' nature for something, as in the quote above, or to subjective valuers 'needing it to be able to' benefit, as in the earlier quote from participant 12, identify these descriptions of VNRN as instrumental values by framing them as a means to an end. Another way these descriptions implied that participants were talking about an instrumental value was through examples where the importance was based on the provision of something subjective valuers received, such as oxygen (participant 12 above) or food (participants 12 and 70), rather than the importance being placed with nature directly.

Participants were concerned that this type of value would not be adequately protected in decision-making guided by natural capital approaches despite being an instrumental value (i.e. the type of value

[9] General description used instead of original phrasing to maintain anonymity and avoid other research ethics problems, as original phrasing paraphrased a distinctive comment from a participant in another study.

that anthropocentric approaches generally aim to protect) because it is challenging to meaningfully quantify it in monetary terms.

53 *The downside to it is that all monetary valuations that we do are partial. They never include all of the benefits simply because we really struggle to quantify some. We even struggle to describe them, and therefore we really struggle to put any kind of meaningful pounds or pence bit on that. […] [Regarding the previous example about an upland area] We could put a figure on the peat, how much is [it] worth in terms of carbon, we put a figure on some of the water stuff – do you know what I mean? But we didn't have a figure on '[solitude and a break from everyday life]'.*

All four participants whose comments were in this category expressed this idea. An inability to fully describe intangible benefits to the subjective valuers, as stated by participant 53 above, was thought to contribute to the difficulty of quantifying them. The scale at which the subjective valuers tangibly benefit from nature was also seen as a source of this difficulty, such as the following comments from participant 12 about humanity's reliance on the ocean for survival and from participant 17 about the 'incredible' usefulness of 'the whole planet' to mankind:

12 *Those things are really hard to cost.*

17 *Natural capital is going to have a hard time putting a figure on that.*

It was often unclear whether this was 'merely' a technical problem about quantitatively the measuring the benefits and/or their value, or a more fundamental problem with placing the value on a scale of monetary value units at all (i.e. the commensurability component of value from the coding index structure). Some descriptions tended towards the former; for example, participant 70 discussed how making adequate assessments of ecosystems in terms of the benefits they provided is difficult because of their complexity and the limits of scientific understanding, but was hopeful that this problem could be resolved in the future:

70 *The other thing then is what natural capital would like to be able to do, and if we could get better at this it would be brilliant, is to focus on whether the natural environment is actually healthy. […] the biodiversity that may matter for our survival might not be [identified as a concern] yet. […] Maybe we should be more worried about the soil bacteria [for example]. Do you see what I mean? […] The problem is that often we can't actually do it in scientific terms. […] we're used to the idea that we understand most things about the system. But we really don't […].*

On the other hand, participant 12 expressed concern that placing a monetary value on an aspect of nature could lead to it being inappropriately exchanged for something else:

12 *[…] the really big concern is that if you put an economic or financial value on anything, suddenly it becomes tradable. […] One of the worries is that you can pay things off that need to be protected and are irreplaceable really. And the ocean, we need it for our survival as human beings. […] If you take a purely status quo approach on what there is and you say, 'Oh well, this area with its current ecosystem is worth…' – you know, this whole resource equivalency approach – then we're really worried that could have a negative impact.*

In this statement, the risk was framed as a result of treating something which is 'irreplaceable' as 'tradable' and 'equivalent'. Although comparability and replaceability are not identical concepts, they are similar enough that this could imply, to some extent, that Participant 12 considers making the value of the ocean commensurable on a scale of monetary value units to be a problem because this could allow it to be treated as comparable with other things in decision-making about the environment, when nothing is comparable to a resilient ocean with regard to human survival.

In both cases, the concern was associated with a poor fit between the measurement methods or quantitative scale and the part of nature that provided these essential benefits. This could be explained in part by the value bearers in descriptions of VNRN that formed the Missed Instrumental Value category, which were often whole ecosystems or very large-scale aspects of nature, with an emphasis on their overall high quality and considering them holistically. This can be seen from the sources that participants identified for these benefits (e.g. "*the planet*" from participant 17, "*the ocean*", 'resilient seas', and "*pristine wetlands*" (quote not shown) from participant 12) and from their concerns that their value was not fully accounted for by focusing on specific ecosystem services or features (seen especially from participants 53 and 70). 'Nature' in general was sometimes given as the value bearer, but less frequently than in other value categories.

The subjective valuers were another distinguishing feature of the Missed Instrumental Value category. Participants often identified the beneficiaries as humanity as a collective whole, which can be seen in phrases like "*the public, mankind – as a whole*" from participant 17 (in the highlighted quote), "*it's provided globally to society*" from participant 53, and various references to the idea of 'us as human beings' or similar. In most cases, the stated beneficiaries were not any particular group of people.

Participant 53's discussions of VNRN (which have been included in the category of Missed Instrumental Value because of the emphasis placed on 'benefits' to people from nature) encompass some different value bearers and subjective valuers, with their illustrative example of a specific upland area and the associated local community. However, their account still suggests that they see a

holistically-understood natural environment as the bearer of these values and collectively-understood groups of people as the subjective valuers, similarly to the others discussed here. For participant 53, it appears that the range of benefits that subjective valuers can receive is an important feature of this value.

53 *I think there's a load of stuff about equity we need to be thinking. Equity of the availability of the benefits from the natural environment. So has everybody got the opportunity… For some ecosystem services it matters where they are. For other ecosystem services, like climate regulation in terms of greenhouse gas sequestration and carbon, it doesn't really matter where they are, it's provided globally to society. But some things it really is specific about where they are. I think location and equity are coming up the agenda.*

In this quote, participant 53 explained how some benefits, particularly intangible benefits (shown in other quotes and the wider interview context), must be provided by a nearby location in order to reach the beneficiaries. Participant 53 considered this to be important because they thought subjective valuers ought to have equitable access to these benefits, expressing the collective nature of the subjective valuer group through the idea of equity (illustrated using small-scale examples) rather than naming a group that is collective in nature (as seen from other participants).

Several participants implied that the recipients of benefits from nature with Missed Instrumental Value included not only present-day or near-future humanity, but also humanity in the future. This was implied by being inherent to the benefit of 'human survival', as discussed by participants 12 and 17, and was apparent in other ways in participant 70's discussions of VNRN. Participant 70, an economist, described potential problems from the use of standard discounting rates in natural capital approaches in "*intergenerational decisions*" and concerns about whether the current ways of assessing the environment would identify "*[for example,] what's happening to the soil bacteria, [and] will that allow us to keep growing food in future years*", which more explicitly identifies future generations of humanity as the subjective valuers of Missed Instrumental Value.

*Assigned and Attributed Value*

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*"I'm seeing increasingly somewhat a rejection of the natural capital approach and the recognition that it doesn't embed the full values that society places on the natural world [...]" – Participant 43*

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Another category of value defined by the role of a subjective valuer that emerged from participant accounts of VNRN was Assigned and Attributed Value. Assigned Value is a type of value that exists because a subjective valuer *actively assigns* or *actively attributes* value to an item. Data fragments with descriptions of VNRN from seven participants fell into this category: four from government organisations and three from various types of charity.

Two distinctive features that were referred to in participant descriptions of VNRN formed the basis for the category of Assigned and Attributed Value: a value in nature that is not based on a benefit to the subjective valuer; and an active role for subjective valuers.

*98 The natural capital approach requires that there's a beneficiary of the products in nature in order to give it value. There will be cases where nature is highly valued [in the public mind], but it may not have an obvious beneficiary or consumer, therefore it will not be valued.*

Participants often explained a VNRN through references to actions such as people 'valuing' and 'placing values on' nature in descriptions that formed this category, such as in the above quote where participant 98 speaks about nature that has value because it is 'valued'. This kind of framing links the value directly to the subjective valuer's thoughts and actions, emphasising the conscious act of a valuer assigning or attributing value to nature as a defining feature of the value.

The subjective valuers of Assigned and Attributed Value (i.e. those who assign or attribute the value) were usually society, people in general, local and indigenous communities, or conservationists (sometimes including the participant themselves). They were often spoken about in a collective, holistic sense, as for Missed Instrumental Value, though more focused on social connections, such as more frequent references to 'society' and shared experiences rather than 'humanity' and shared fates.

*74 [...] there's a whole range of species that would be on a red list that I would've never even knew existed but [...] I want them to exist and I want them to exist for future generations even if I never see them. And I think there's a whole proportion of society that feels like that.*

Participants who identified themselves or other conservationists as the subjective valuer of Assigned and Attributed Value often extended the subjective valuer group to include other groups or society more widely, by expressing their opinion that other people shared their views – such as participant 74 above and participant 17 below – or suggesting different but analogous views to their own that others might hold – such as participant 70 below.

People's thoughts, opinions, feelings, and beliefs about nature were central to participant descriptions of VNRN that formed the Assigned and Attributed Value category, rather than their wellbeing, health,

and survival as in the Missed Instrumental Value category. These views were the basis for the various ways that subjective valuers assigned or attributed value to nature.

43 *And for us, we work in local communities, and when you talk to local communities about why they want to protect the forest, it's going to be a very different answer than we would give. It's shaped by their history, by their culture, by what they actually capture within that forest.*

In the above account, participant 43 lists several factors that might influence the views the subjective valuers hold about an item in order to consider it worth of protection. Other participants expressed several bases for subjective valuer beliefs that an item had value by listing various values with the format '[adjective] value':

17 *[…] it might have a historical value or a cultural value or a social value. [… …] I think as humans in the environment sector, and lots of humans who aren't, who just care about it, we think that all environments have an emotional value. They tie, hopefully, people together in terms of our entire evolution.*

'Existence value' was used similarly by participant 74. The adjectives in these accounts seem to refer to reasons why people hold views that mean they think a part of nature has value, similar to the reasons expressed by participant 43. In some accounts of VNRN, participants described subjective valuers attributing value to an item based on a religious or spiritual belief.

70 *If you think, as I do, that God made it, so it's Creation therefore it has a value of itself, independent of its value to human people, you can't fit that into the natural capital approach. Or if you're a Native American and your land is sacred, sacred doesn't fit. And that's quite important.*

Participant 70 described this value as "*independent of its value to human people*", but this has not been taken to mean that the value is entirely independent of subjective valuers in this analysis (as in the Objective Intrinsic Value category below) because the subjective valuers in this account are given a significant role in the form of articulating or attributing the value, suggesting that it is seen an important feature of this VNRN.

Participants listed several different reasons for assigning a value to nature were listed by participants, or named several types of value based on these reasons, but these were often in the form of a list and no reasons stood out as the most prominently expressed. This suggests that the specific *reasons* for assigning value were less important to participants describing VNRN than the fact that the subjective valuer *assigns or attributes* the value at all, which informed the choice to group these accounts in an Assigned and Attributed Value category in the analysis. 'Religiously (or Spiritually) Attributed Value'

was considered as a category or subcategory at one stage during the analysis process, because there appeared to be a greater emphasis on the reason in these accounts and the action was closer to *attributing* than *assigning*, but ultimately these differences from the precursor to the Assigned and Attributed Value category were relatively slight compared to their similarities to each other and differences from descriptions of VNRN in other categories.

The value bearers of Assigned and Attributed Value included nature and the environment in general, as well as more specific value bearers such as species and places or natural entities that are local to the valuers, sometimes framed as 'theirs'. Value attributed to nature for spiritual reasons was additionally borne by specific types of 'land' in some participant accounts. However, specific value bearers were less heavily featured in participants' descriptions of these VNRN than other value components and usually served as illustrative examples.

Although the possibility of the subjective valuer benefitting from the item was generally not ruled out in these descriptions (e.g. participant 98 only stating that people *might not* benefit, rather than that they *do not*), participants clearly expressed the view that subjective valuers benefitting was not a necessary condition for this value to exist. They often highlighted the difference between this value and benefit-based values when explaining how Assigned and Attributed Value was not well captured by valuation approaches that focus on benefits to people, such as in the following quote:

43 *When you actually then ask people about their values and what it is that they care about, you see an almost inverse relationship with our ability to economically quantify them. […] For example, there was the UK ecosystem assessment, which tried to do evaluations, and that was definitely showing that when you looked at what people said they valued about the natural environment, there wasn't a way of then actually putting economic values on those things because they were the intangibles; they were the ability to be out in nature. And I know much has been made about, 'Well, you could use the surrogate of health and wellbeing.' But actually, there was a clear discrepancy in what was measurable and what was valued.*

As with Missed Instrumental Value, participants spoke of what could be interpreted as a technical difficulty in assessing Assigned and Attributed Value in nature with quantitative and/or economic methods that may be used in natural capital approaches. Another interpretation is that this is a conceptual incompatibility or difficulty based on different understandings of what it means to 'value' something among conservationists, people in general, and other parties in decisions where natural capital approaches are or could be used. Multiple meanings of 'value' as a verb, and sometimes synonyms or phrases for the different concepts behind those meanings (e.g. 'measure', 'put a monetary value on'), appeared in these accounts and across those in other value categories when

participants tried to express points about the shortcomings of quantitative and/or economic valuation. This suggests that these multiple meanings are all present in the discussions and decision-making environments participants drew from. Participants sometimes used multiple meanings of 'value' as a verb close together to describe concepts they were aware were different, which points to the differences and similarities between ideas of what it means to 'value' something as a source of difficulty for capturing Assigned and Attributed Value. For example, participant 98's used 'valued' first to mean 'considered to have value' and next to mean 'given a [monetary] value'. In participant accounts of Assigned and Attributed Value, a subjective valuer 'valuing' something tended to be the first meaning, while 'valuing' something with valuation processes of natural capital approaches only allowed the second meaning.

Incompatibility between Assigned and Attributed Value and quantitative and/or economic valuation methods was more explicitly expressed as a problem than it was for Missed Instrumental Value. One way this was expressed was through comments that expressed a negative view about using this kind of valuation for these methods, such as that it was an unwelcome or risky option:

*17* *We think it has a different kind of value, although the pressure is to put a monetary value on it because everybody understands that.*

*74* *Those sorts of things are very difficult to put any kind of monetary value on and if you go down that route then that's quite a risk.*

For some participants, as implied by participant 74's comment about risk, these methods were inappropriate for Assigned and Attributed Value because of the potential for them to alter the decision-making process in a way that led to unwanted outcomes:

*98* *It's very easy to do this in a way that could end up making nature far more tradable. Where highly valued places that are valued in the public mind because the process doesn't value them lead to perverse decision being made. That's a real problem.*

Participant 98 raised the spectre of economic valuation making nature 'tradeable' regarding Assigned and Attributed Value, as participant 53 did for Missed Instrumental Value.

Some participants explained an idea that consumer-based and benefit-focused economic valuation methods (more so than quantitative measurement in general) close down rather than open up decisions to some types of values, especially Assigned and Attributed Value, which could also affect how decisions were made.

*43* *[...] what people care about and what people value about their natural environment is not well*

*reflected in the economically based cost-benefit analysis of what is measurable. [... ...] We assume that economics is a neutral tool and will cut through all that; whereas actually, it's innately biased towards, if you like, a western philosophy of cost-benefit analysis.*

70 *What's morally wrong with that is: in natural capital or economics systems the only valid value is the consumer value. So you're trying to collapse all other worldviews and ethics and values into a consumer framework, because that's the only way you can fit it into your framework. Doing so might be better than nothing, but it's ethically very dubious that the only kind of value that people are allowed to have is a consumer one.*

The restrictive function of these valuation methods was seen by these participants as a moral problem with the decision-making process itself, not only with the likely reality of the outcomes. This is shown by participant 43 (from a charity that often worked overseas in developing countries) framing it as an outlook imposed on others by historically powerful groups, and participant 70 identifying the 'moral' problem of excluding a wide range of viewpoints.

While most participants expressed the incompatibility between Assigned and Attributed Value and economic valuation by discussing implications and complications of the valuation process (i.e. mostly related to the measurement dimension of the coding index structure), some participants' descriptions of VNRN that fell into this category included more straightforward comments that Assigned and Attributed Value does not have a financial value:

47 *[...] there is this sort of spiritual, wild land thing that we do talk about that there's a moral responsibility to protect something even if it hasn't got an economic value. Which again comes contradictory to the natural capital idea [...]*

17 *A moral natural capital value – for instance, an ancient tree that's 3,000 years old – has no financial value, but it might have [various other values – quoted previously].*

These comments come closer to suggesting that Assigned and Attributed Value simply cannot be placed on a scale of monetary value units – that is not commensurable on this kind of scale.

*Inherent Value*

Participants accounts of VNRN included descriptions where nature or a part of nature has value as a result of having an inherent quality that is recognisable to a subjective valuer. This was the basis for a category labelled here as Inherent Value. Descriptions of VNRN from four participants formed this category – one from a governmental organisation and three from regional or specialist charities.

The bearer of Inherent Value in these descriptions was either nature in general, discussed by two participants, or woodland, discussed by three participants. These were described with qualities such as being 'other', special, unique, and ancient.

*10 [When making decisions using natural capital accounting] we lose the specialty, we lose the otherness [...]*

*17 But you have lost a unique habitat, because somebody can afford to pay for it to be lost.*

In these accounts of VNRN, participants highlight specific qualities of nature or woodland as the main feature in their explanations. Despite the distance from subjective valuers that is suggested by some qualities such as 'otherness', they are still relevant and necessary for this value to exist – the participants or other subjective valuers are able to recognise and articulate the inherent quality to some extent, which is the main defining feature of the Inherent Value category. Recognition by a subjective valuer is essential to some of the inherent qualities identified by participants, such as being special or unique, and others are both relative to and recognisable to subjective valuers, such as being ancient or other; without subjective valuers, these value-conferring qualities would lose their relevance.

The subjective valuer in participant descriptions categorised as Inherent Value was often given as 'we' or 'you' (in the sense of 'one'), which could be interpreted to mean to mean conservationists or humanity and society in general. When a more specific subjective valuer was given, this was usually members of the conservation organisation or otherwise conservationists themselves.

*10 [For] old school naturalists, for want of a better word, and I don't mean that in a negative sense, this is kind of worrying stuff because their whole approach is almost to appreciate the otherness of nature […]*

*73 We [as an organisation] have a position which is no further loss of ancient woodland. That's an absolute position.*

Some of these accounts, such as those above from participants 10 and 73, give the impression that some conservationists hold a resolute defensive line to protect nature with this value in the face of changing and challenging circumstances, which suggests it is particularly important to conservationists.

Some participants cited concerns about the risks of using a market-based approach to account for the value of nature when discussing VNRN in data fragments categorised as Inherent Value, indicating that they believe it is not adequately assessed by these approaches:

*17 There's a huge ethical argument about natural capital in the first place, because if you place a value on something, if somebody has the money then it doesn't protect it any further, does it? It makes it a currency. Suddenly the natural environment has a currency and everything can be bought and sold.*

As with Missed Instrumental Value, the risk of allowing the irreplaceable to be treated as tradable, or implying that this is appropriate, was raised as a concern regarding Inherent Value. Nature that is 'irreplaceable' was a prominent feature in descriptions categorised as Inherent Value, and could be considered to be an inherent quality in itself or perhaps an umbrella quality that underpins several of the other qualities.

In addition to the idea that Inherent Value in nature would not be adequately assessed or accounted for by market-based methods, several participants suggested that it is impossible to assign a meaningful numerical value to items with Inherent Value. They are "*things which, fundamentally, you can't put a figure on*" (participant 10) – that is, they are both unmeasurable and incommensurable on a scale of numeric value units.

*73 [...] the value of ancient woodland is not replaceable therefore putting a value on it is almost meaningless.*

*26 [...] you can't actually replace that woodland, there is no metric that you can use. There is no habitat creation approach, there's nothing, there's no way around it here. Ancient woodland is ancient for a reason, you just can't, in human timescales, you just can't recreate it. [... ...] that ancient woodland is literally valueless because it's just too precious to even consider putting a value on it.*

The irreplaceability of nature was often given as the reason for this incommensurability (especially when discussing ancient woodland), which this category has in common with Missed Instrumental Value.

*Objective Intrinsic Value*

The final value type defined by the role of a subjective valuer is Objective Intrinsic Value, which is defined by the lack of a necessary subjective valuer. Three participants described VNRN that were categorised as Objective Intrinsic Value.

These participants described a value of nature that exists outwith human opinion or requirements, and specifically does not require a human valuer in order to exist.

*93 [...] wildlife has a value for its own sake and it existed here. That nature has a value as nature, we're part of it.*

*10 There's loads of stuff here that have got no benefit to us at all, absolutely none. These plane trees aren't of any benefit to us at all really, they just evolved in the same way that we just evolved [...] We're in danger of loading too much on this because we can't let nature be of its own intrinsic worth, which is outside human existence, outside the human narrative.*

The bearer of the value was generally described in a relatively non-specific way, such as 'nature' or 'wildlife'. At the participant's suggestion, the interview with participant 10 took place outdoors (a rare exception), in a small urban park near the organisation's offices; participant 10 explained the bearer of this value by indicating the general surroundings where there was "*loads of stuff*" that could have this value, with an example readily found in "*these plane trees*".

In terms of practical measurement, Objective Intrinsic Value is not among "*things that we are able to value*" (participant 93), and perhaps cannot even fully understand, perceive, or recognise, as implied by the ambiguity of 'something greater':

*89 We shouldn't have to resort to anthropocentric arguments for the conservation of nature, in some way. That in fact there's something greater than that.*

Participant 89's account was similar to some of those in the Inherent Value category, such as participant 98's, but distinguished from these by the quality seeming to be less recognisable and the participant explicitly identifying it as a non-anthropocentric value. Although participant 93 connected people to this value by stating that "*we are part of it*", participants saw Objective Intrinsic Value as a value of nature that is not assessed in terms of "*anthropocentric arguments*", with one participant stating:

*10 The worry of natural capital accounting is trying to make everything of value to us.*

Although Objective Intrinsic Value was relatively lightly described by participants, these accounts were distinct from other descriptions of VNRN. This brevity contributes to an overall picture of an Objective Intrinsic Value that is beyond the human ability to assess and defined by the irrelevance of humans for the value's existence: these features were expressed decisively by participants, and it seems fitting for this value category that nothing more needed to be said.

### 3.312 Values defined by the value bearer

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*"[…] there's a difficulty around the natural capital approach, because it does take biodiversity into account to a certain extent, but it doesn't really."*

*– Participant 83*

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Of the original set of 49 data fragments where participants described VNRN, 24 data fragments from thirteen participants were categorised into one of the subjective valuer-defined categories described above, and eight had too little detail to categorise. The remaining seventeen data fragments formed a single category of value that was *defined by the value bearer*, rather than the role of a subjective valuer or any other feature. These data fragments came from sixteen participants' descriptions of VNRN, making this the value category that was discussed by the highest number of participants. In these descriptions, participants emphasised the bearer of the value more heavily than other value components in some way. This category is labelled here as the Value of X.

*The Value of X*

Across the entire dataset, many participant descriptions of VNRN included 'negative' descriptive elements, about what a particular value *was not* rather than what it *was* – not measurable in a certain way, not based on benefits, not based on a human valuer and so on. Most of the previous categories included at least some 'positive' descriptive elements – the value is based on benefits to humanity, social and cultural attribution by society, specific qualities – or, in the case of Objective Intrinsic Value, a very precise negative definition. Meanwhile, a characteristic of the Value of X category is that it is consists in large part of negative descriptions or the absence of certain features in descriptions, without any in particular standing out as a sole defining factor or a reason to divide the category into multiple categories.

For example, in descriptions categorised as Value of X, some participants stated that economic valuation methods do not capture this value fully or easily or that the process is unsuitable for other reasons – a negative descriptive element that was also seen in other value categories. These included similar points to those made in descriptions of VNRN in the previous categories, such as the inability of the quantitative decision-making process to account for the value and the unsuitability of an economic approach due to the poor outcomes for nature it could lead to (not included as quotes here due to their similarity to previous points). However, not only was this one of several negative descriptive elements seen in the Value of X category, but it was also pointed out less frequently than for any other group, appearing in around a third of the data fragments categorised as Value of X

compared to almost every data fragment in other value categories. There are few indications that participants or fellow conservationists thought the value they spoke of in these descriptions *could* be well accounted for by the economic valuation methods that might be used in natural capital approaches (which would have meant these data fragments should not have been included in the dataset at all), but statements like this were not made direct as regularly as for the other value types. This seems to be a sign that this set of participant descriptions of VNRN might not be focused on the same value components as those in the other categories.

A very common negative descriptive element in participant descriptions categorised within the Value of X category were references to a value that was not derived from any use or benefit to people. This distinguishes it from Missed Instrumental Value but gives it a negative characteristic in common with the other subjective valuer-defined categories.

73 *[...] even the language that underpins natural capital shifts you to a different place, I think. Particularly needing to find utility in nature in order to put a value on it. For a lot of people, that's a fairly significant shift […]. Because once you start saying, 'Nature has value because it delivers human benefits' it has all sorts of implications for what you choose to support and what you choose not to support, and what you choose to value and what you choose to ignore, and I think that's problematic.*

56 *I suppose [economic tools] raise the question of: what value is a species? […] Why is that ignored, in a sense? Just because a bee can pollinate strawberries and it's worth however many millions of pounds to the economy; does that make it better than a tadpole shrimp? Or something that has no material benefit to us? How do we value a species for being a species?*

In these accounts, however, the main concern appears to be 'ignoring' an item's real value, which would be "*problematic*" (participant 73) and to be avoided – as implied by participant 56's questioning about how to determine the value. There seems to be less concern about the absence of any particular variety of non-instrumental value or another, which might have placed these data fragments in one of the other categories. This is implied in these examples by the lack of information about this other value in participant 73's description and by participant 56's unanswered questions. Similar discussions about an aspect of nature having a value that was not based on utility, benefits, ecosystem services or was otherwise explained as non-instrumental but with few other features to indicate how the value might come to exist or be assessed were common across this category.

However, the participant accounts of VNRN that form the Value of X category were not merely a set of miscellaneous descriptions with insufficient detail to place them one of the other value categories. Eight data fragments were not categorised during the analysis for this reason – some of these were

simply very brief, and too distant from the participant's other comments about VNRN to confidently link the data fragments, while several had more depth but contained mainly 'negative' information, without enough 'positive' information to make further sense of the comments. Compared to these data fragments, those which were categorised within Value of X had several 'positive' descriptive elements that contributed to the category's formation in the analysis.

Positive elements were often found among the negative elements of descriptions. When participants explained that the full value of an item was not the same as the value determined by ecosystem services assessments, it was sometimes less clear whether they meant that the value was unrelated to human benefits or that it provided benefits beyond those from the most obvious and tangible ecosystem services; the latter would bring their meaning closer to that of Missed Instrumental Value. However, there were cases where the relevance of such a benefit was ambiguous (unlike descriptions in the Missed Instrumental Value category) while the value bearer was vividly articulated. Consider the following excerpts, which are examined below:

67 *Natural capital considerations are based back on ecosystem services and what you're valuing from those, very often, I find. […] If, over here, you can't yet value the Atlantic woodlands full of a diversity of lichens and mosses that are just hanging around on the west coast of Britain, if they haven't got as yet a tangible or obvious value as much as pollinators, they will get less investment. Even though if you took that level of research away and just looked at them as components of the natural environment, Atlantic woodland is no more or less valuable than a pollinating insect. They're just wildlife that exist in Britain.*

56 *[...] before the natural capital approach was a thing, it was all about ecosystem services, the ecosystem service approach. [...] One of our very early strategies for Scotland looked at the value of [species of the organisation's focus taxonomic group] to the economy and various other aspects of life. By doing that, you also identify species that, on paper, have no value yet. We don't actually know if they'll suddenly become a cure for some disease or something […] The natural capital approach takes that to the next level, I suppose. [...] I think what we need to be careful is that we continue to have a holistic approach to biodiversity and not just cherry-pick the useful things. [... ...] If we take an example of woodland creation to prevent flooding. You could plant a lovely deciduous woodland of native species and it would do that. Equally, you could plant a non-native species like rhododendron and it would stop water flowing as quickly. Now, both of those provide a natural capital benefit by stopping flooding, but one is clearly better than the other. [...] [Asked to elaborate] Because it's got biodiversity benefits. It's got other benefits.*

Both of these participants allude to the possibility of a benefit that could give an item instrumental value, but the benefit is not currently known about and so the item's instrumental value is non-existent or unmeasurable for the time being ("*can't yet value*", "*haven't got as yet a tangible or obvious value*", "*have no value yet*"). Both favour a broader approach, presumably to ensure these features are protected on the basis of potential future benefits.

However, the evocative descriptions of example ecosystems – participant 67's "*Atlantic woodlands full of a diversity of lichens and mosses*" and participant 56's "*lovely deciduous woodland of native species*" – give the impression that these ecosystems are what really matters to the participant, rather than any hidden or potential benefit (even if they feel that is also important). Neither is any particular quality identified by the participants as the reason why they might personally appreciate these ecosystems, as in the Inherent Value category. In addition, both participants eventually introduce ambiguity about the necessity of a human benefit to their accounts – participant 67 implies that the woodlands are valuable simply for existing towards the end of the quoted excerpt, and participant 56's phrase "*biodiversity benefits*" could be interpreted to mean that biodiversity is either a beneficiary or an end goal in itself. Participant 56's next comment about "*other benefits*" could point towards human benefits, but overall the two statements above are more certain about what *has* a value than what that value *is*. A focus on the value bearer appeared in similar ways in many data fragments that were otherwise mostly described in negative terms, making it a positive feature that suggested they might be usefully grouped together under this theme.

The set of value bearers identified by participants across the data fragments that were eventually categorised as being about the Value of X was another distinguishing characteristic. 'Biodiversity' and 'species' were the value bearers given most often in participant accounts of VNRN in this category – each individually was the value bearer stated by about half of these participants (each stated by seven of sixteen participants), and together they were the value bearers given by about two thirds of these participants (one or both stated by ten of sixteen participants). This value bearer profile was a distinctive feature of this value category because its most prevalent items, 'biodiversity' and 'species', were rarely given as the value bearer in any of the other value categories. Only three data fragments in the other value categories included either of these as a value bearer: two accounts of Assigned and Attributed Value and one of Missed Instrumental Value. This suggests the possibility that participants, or their fellow conservationists, think biodiversity and species have a different type of value to those in any of the previously described value categories. This may also apply to nature in general, which was the other main value bearer in Value of X descriptions, with a similar frequency to the other categories. There were relatively few differences between descriptions referring to different value bearers, and several participants mentioned multiple value bearers within the same context, so these

descriptions were interpreted as a single category – hence the label of 'the Value of X', to refer collectively to 'the value of biodiversity', 'the value of species' and so on.

Although it was frequently mentioned, descriptions and meanings of 'biodiversity' as a valuer bearer varied in this category. A small number of participants implied that it encompassed ecological features such as connectivity, such as participant 56 (above) and the following example:

83 *[…] the natural capital approach is good at valuing ecosystem services – […] whether that's carbon capture or flood protection, that kind of thing – but it doesn't take in biodiversity very well. […] It's back to that whole thing of connectivity within the landscape […]. That it's more than just the value of a site in isolation, that there are so many connections that make a difference for how wildlife travels, and all that kind of thing.*

However, it was relatively rare for participants to articulate such traits, including in the majority of mentions of 'biodiversity'. This contributes to the overall impression of an emphasis on *what* entity has value as a whole, rather than the specific details that might suggest *why*.

The term 'intrinsic value' appeared most numerously in descriptions of VNRN in the Value of X category – another distinctive feature of this category; nine participants' descriptions in the Value of X category included this term, which accounts for around two thirds of the participants who used this term across this chapter's dataset. (The other uses of the term 'intrinsic value' were in five data fragments from five other participants: two categorised as Objective Intrinsic Value; and three that were not categorised.)

28 *[...] [just] because something doesn't necessarily give a direct economic benefit it's no less 'valuable' to those who are interested in intrinsic value. A good wildfowl example would be eider ducks up in Iceland still produce eiderdown. That's collected, it has a benefit. You can imagine people in Iceland thinking that eider is a very valuable part of the ecosystem. Whether they would believe the same of pink-footed geese, where as far as I know they don't collect the down. But they nest in the same places. For me, in this organisation, we would see both of those species as being of equal value.*

Consistent with the overall prominence of non-instrumentality in this category, these references to 'intrinsic value' tended to refer to a non-instrumental value of some kind when a meaning could be inferred – such as in the above example from participant 28, who implied that the 'intrinsic value' they referred to was something different to an instrumental, benefit-based value. However, in many cases only the term 'intrinsic value' was present in these accounts, and participants generally did not identify

inherent qualities that confer a value or a lack of a subjective valuer, which would have moved these descriptions towards the Inherent Value and Objective Intrinsic Value categories.

Compared with other value types, descriptions of the Value of X were the least likely make a clear reference to a subjective valuer. If the definition of a 'subjective valuer' was relaxed by removing the requirement that participants presented them as having a relevant role in the value's existence and accepting those implied to have a connection to the value, the subjective valuers were usually conservationists as a group (and occasionally people in general).

46 *I think it's one of the main reservations others have too: would it be used for the benefit of nature or not if the people using it don't understand nature. [Asked what might be misunderstood about nature.] I think it is about the intrinsic value. [... ...] I suppose to ourselves in the conservation field, at times it would be the only value that we were basing our decisions on […] [Values based on ecosystem services] are easier concepts for others who aren't really as into nature as we are.*

Conservationists as a group were framed as having or implied to have a connection or relationship to the value in question in these accounts. This included participants referring to conservationists acknowledging or believing in the value of an item, such as participant 28 speaking about how they and their colleagues were 'interested in' the value – similar to Assigned and Attributed Value. Participants sometimes framed themselves or their colleagues as people with a (perhaps rare or unusual) insight into or appreciation of this value – similar to Inherent Value, especially if 'having intrinsic value' is considered to be an 'inherent quality' in the sense used in that value category. But unlike in the previous categories, participants typically did not present this belief, acknowledgement, or even appreciation by conservationists or others as something that brings the value into existence. Instead, the value often appeared to have the more significant function in these accounts, where it served as a motivating factor – such as participant 46 (above) explaining that it is a basis for their decisions or participant 66 (below).

66 *Within [the organisation] now there's a real pull between presenting nature as a value commodity in society that brings benefit to people and the intrinsic value of nature. […] Everyone who's here works here because we like nature, we believe it should be there and we don't think it should have to have a function.*

Participant 66 also spoke here about another connection with the value that conservationists (as the closest thing to a subjective valuer) might have: seeing it as their responsibility to articulate it to others. A few other participants made comments with a similar implication by expressing concern that they might be unable to advocate for this value.

46 *[...] the times I've seen when we have to start talking about ecosystem services to make our case, I sometimes see that we've lost the battle a wee bit in terms of getting across the intrinsic value of biodiversity [...]*

85 *It has made it even harder to have conversations that aren't instrumental. […] And there comes a point – and we have done already, I think – where we lose a lexicon associated with making the case. […] the more we go down this route, […] the more we have to express value in terms of instrumental issues.*

Any potential subjective 'valuer' in Value of X accounts was presented more as a witness, advocate, or defender than a valuer. They may appreciate and be motivated by the value, but in these participant accounts they are generally not framed as a reason the value exists.

I have attempted to show the 'positive' qualitative features that contributed to the decision to develop a thematic category from these data fragments during the analysis. However, it is worth mentioning some simple quantitative features from the dataset that provide supplementary support for the idea of subjective valuer-defined and value bearer-defined categories as two distinct ways participants described VNRN. First, there was little overlap for individual participants between the two types of category – only four out of eleven participants with multiple data fragments in the dataset appeared in both types of category, and two of these four participants only appeared in the Value of X category as a result of describing *other* environmentalists' views. These were participant 98, speaking about *The Guardian* environmental journalist George Monbiot, and participant 70, an economist in a government organisation (who noted that they "*have had lots of these conversations [re. concerns about natural capital approaches] in practice*"), speaking about conservationists in non-governmental organisations. Second, it does not appear that the Value of X category is merely an outcome of some participants being 'less descriptive' – although there were more data fragments per participant on average across the subjective valuer-defined categories in total than for the Value of X category (mean 1.85 compared to 1.06), the mean number of words per data fragment was very similar in both (136.5 compared to 138.3). Data fragments represent separate references to VNRN (as described in section 3.212), so this suggests the participants whose VNRN descriptions formed the Value of X category spoke about VNRN less often, or about fewer variations of VNRN, rather than that the Value of X required or represents simpler explanations.

## 3.32 Normative support for values from different ethical theories

This section investigates the support from major ethical theories for the categories of value discussed above – which represent participant accounts of VNRN as interpreted using ideas from philosophical

value theory – using examples of these ethical theories from the academic literature of environmental ethics.

### 3.321 Utilitarian ethics

The example chosen for utilitarian environmental ethics is a paper in which philosopher Dieter Birnbacher (1998) considers and describes how utilitarianism can be compatible with environmental ethics. This paper works within 'classic' utilitarianism's argument that human wellbeing (an intrinsic value) should be maximised, and items that contribute to this should be encouraged or protected on the basis of their instrumental value[10]. Birnbacher examines versions of the 'convergence hypothesis', according to which the majority of values of nature converge *in effect* or *in principle* with those supported by classic utilitarianism.

Instrumental values based on wellbeing benefits to humans are supported by classic utilitarianism, and Birnbacher argues that many values of interest to environmental ethics are supported by utilitarian principles in effect, either by accounting for a sufficient range of benefits (as in Bryan Norton's version of the convergence hypothesis) or by guidance based on its principles leading to their protection. This provides support from classic utilitarianism for many of the 'missed' values in the Missed Instrumental Value category.

Birnbacher argues that the range of benefits supported by classic utilitarian principles includes benefits to future generations of humanity from future use and potential future benefits from uses that are not yet known, in addition to those currently known and obtained by immediate use – these have obvious instrumental value in classic utilitarianism by contributing to human wellbeing. This lends support to the Missed Instrumental Value in nature that participants described, which includes value based on tangible benefits to humanity, including future humanity. Birnbacher argues that intangible benefits from experiences of nature, another type of value-conferring benefit in Missed Instrumental Value, also have instrumental value in utilitarianism because they make essential contributions to human wellbeing, pointing out:

> *Precisely, the experience of the non-functionality and sufficiency of nature is one of the most functional things on which modern man strongly depends.*[11] *(p. 436)*

[10] The following terms were translated as follows:

*valeur(s) instrumentale* – instrumental value(s)
*«valeurs propres»*, which are *les valeurs «en soi»* – 'own values', which are values 'in themselves'
*valeur(s) intrinsèques* – intrinsic value(s)
*valeur(s) inhérentes* – inherent value(s)

[11] Original: *'Justement, l'expérience de la non-fonctionnalité et de la suffisance de la nature est l'une des choses les plus fonctionnelles dont dépend fortement l'homme modern.'*

As humanity benefits from ecosystems as a result of complex ecological qualities that are not always fully understood or identifiable, but which may be irreversibly damaged with little forewarning, the utilitarian argument should also support practical principles that take a cautious approach to their protection, Birnbacher argues; this suggests that the high quality, holistically viewed ecosystems that bear Missed Instrumental Value should be supported in effect by classic utilitarian arguments. Overall, the category of Missed Instrumental Value in nature finds ready support from Birnbacher's account of the effective compatibility between environmental ethical and classic utilitarianism, by including the 'missed' value through giving enough consideration to the ways that nature is instrumental to human wellbeing.

Assigned and Attributed Value and Inherent Value find some indirect support from utilitarianism through this argument, though this support is on the basis of any benefits that arise from these relationships with nature, rather than the act of assigning or attributing the value. Birnbacher also considers how far 'own values' of nature (values of nature in itself) could converge with the values that are relevant in utilitarian ethics, and in doing so makes an argument that provides Assigned and Attributed Value and Inherent Value with support from utilitarian ethics.

Birnbacher brings in a concept of 'inherent value' from within utilitarian ethics for this purpose, in which 'inherent value' is a value something has because it is an object of 'states of intrinsic value'[12]. In utilitarian thought, 'states of intrinsic value' are those experienced by sentient beings, such as health or pleasure. This can also include more 'contemplative' states, such as religious contemplation. Items which *cause* these states have instrumental value, while items that are *objects* of these states have inherent value. 'Own values' of nature, Birnbacher argues, could be reconstructed as inherent values, which would link them to the intrinsically valuable states that utilitarianism is concerned with.

Birnbacher explains how parts of nature can, for example, "trigger our aesthetic reactions" (p. 438), "[give] us a feeling of familiarity and of belonging" (p. 438), or "[act] as a catalyst for what is natural in ourselves" (p. 439). These responses are "cognitive and affective states which constitute our wellbeing" (p. 438) and they arise because a particular part of nature is the object of a subjective valuer's opinions, beliefs, and perceptions. This allows a value of nature that exists because of what a subjective valuer thinks about it, as in Assigned and Attributed Value and Inherent Value, to be supported by a utilitarian ethical argument – not because an item *causes* an intrinsically valuable state, but because an intrinsically valuable state is *about* the item. Birnbacher makes this argument by highlighting a range of opinions, beliefs, and perceptions that might lead to an item having inherent value, which includes several that were identified by participants describing Assigned and Attributed

[12] Original: *'états d'une valeur intrinsèque'*

Value and Inherent Value, such a historic and cultural attachment to a particular place or 'homeland' (original German: *'Heimat'*, no direct translation to French or English), connection with and/or a sense of the otherness of nature, or aesthetic appreciation. Birnbacher's explanation of inherent value as part of a utilitarian environmental ethics is not identical to participants' descriptions of Assigned and Attributed Value and Inherent Value, but the functional relationship between the subjective valuer, the value bearer, and the value of nature is very similar.

Objective Intrinsic Value in nature, on the other hand, receives no support from utilitarianism in Birnbacher's study – some minimum involvement by a subjective valuer is necessary in the values considered important in utilitarian ethics, which is incompatible with the definitive absence of a subjective valuer in the Objective Intrinsic Value category.

The Value of X category does not receive direct conceptual support from Birnbacher's account of a utilitarian environmental ethics (except perhaps borderline cases with Missed Instrumental Value) – the morally relevant values in Birnbacher's arguments are all defined by a connection to a subjective valuer as the main criteria, not any other items that cannot be argued to be likewise intrinsically valuable. However, the value bearers in the Value of X category can receive support from this ethical theory in effect, since species, biological diversity, ecosystems, ecological connectivity, and so on are likely to have instrumental and/or inherent values. If participant accounts of the Value of X are interpreted as Assigned and Attributed Value, with participants or their fellow conservationists assigning the value, then they could be included more easily in a utilitarian argument as inherent values – but this was not how participants described this value, which makes this argument more difficult to apply.

**3.322 Deontological ethics**

A paper by philosopher Barbara Muraca (2011) was chosen as the example of an academic examination of a deontological approach to environmental ethics. Muraca attempts to move beyond the 'demarcation problem' that deontological, particularly Kantian, ethics encounters in environmental ethics – challenges with deciding where to draw the line indicating which entities are members of the moral community, and therefore worthy of direct moral consideration as ends-in-themselves. Muraca's approach is to separate the 'axiological step' (understanding the relevant values), the 'ontological step' (establishing which values different entities have), and the 'deontological step' (deciding which entities have moral significance).

The paper focuses on the axiological step because, Muraca argues, a poor axiology that is unable to accommodate different moral intuitions about the environment is a key reason for environmental ethics' demarcation struggle when using a deontological approach, which could otherwise provide a

strong moral basis for environmental ethics. Muraca works with a 'relationalist value theory' in which subjective valuers and valued objects are understood as functionally and fundamentally related, which is more appropriate than theories that separate them because:

> *we are not first out there [in the world] and THEN step into a relation with other entities and judge them according to our preferences, but our very originating as subjects of judgments is rooted in a pre-thematic, precognitive and preconscious relation of value. (p. 382)*

Muraca proposes a novel axiological framework with 'Intrinsic Value/inherent moral value' on one axis and 'Relational Values' on the other, presented visually as a graph (shown in upcoming figures). The Intrinsic Value axis includes various subcategories of value an entity or collective might have, going from values of collective entities in themselves as wholes or parts of a whole (lower moral significance) to values of subjective experiences for themselves (higher moral significance). The Relational Value axis includes 'Functional-relational Values' and 'Fundamental-relational Values' (abbreviated here as Functional-RV and Fundamental-RV). *Functional*-RV are based on relationships that involve reflection by a valuer, and are divided into two subtypes: 'Instrumental Values' (lower moral significance), when entities or collectives serve a 'merely instrumental' purpose to a valuer as a result of their preferences or are "valuable in a more solidarity-oriented instrumental sense when they surpass merely egoistic preferences and yield a utility for a larger number of persons" (p.384), including to future generations; and 'Intrinsic-eudaimonistic Values' (intermediate moral significance), when entities or collectives are valued as part of a good human life, rather than because they fulfil a particular need. *Fundamental*-RV (highest moral significance) are "valuable for being the fundamental and substantial conditions of possibility for life on earth" (p. 384).

Of the descriptive value categories identified in this chapter, most of the subjective valuer-defined categories have features that allow them to be placed on the Relational Values axis of Muraca's value framework[13] (Figure 3.1). The exception is Objective Intrinsic Value, which is generally excluded from this axis due to the framework's basis in a relational theory of value (it could be positioned on the lower part of the Intrinsic Value axis, but without a corresponding position on the Relational Values axis to give items with this value a placement in the plane of the framework graph). The position of the other subjective valuer-defined categories on the Relational Values axis comes from subjective valuer role described by participants.

[13] Their position on the Intrinsic Value axis is less clear – values of entities or collectives in themselves seems closest to participant descriptions, rather than individual conscious experiences for themselves, but this mostly inferred from the types of valuer bearer in these descriptive values, which are somewhat restricted as a result of this study's objectives and methods. Additionally, the most useful and interesting insights about the descriptive value categories are found on the Relational Value axis, so the reported analysis focuses on these insights more than those from Intrinsic Value axis.

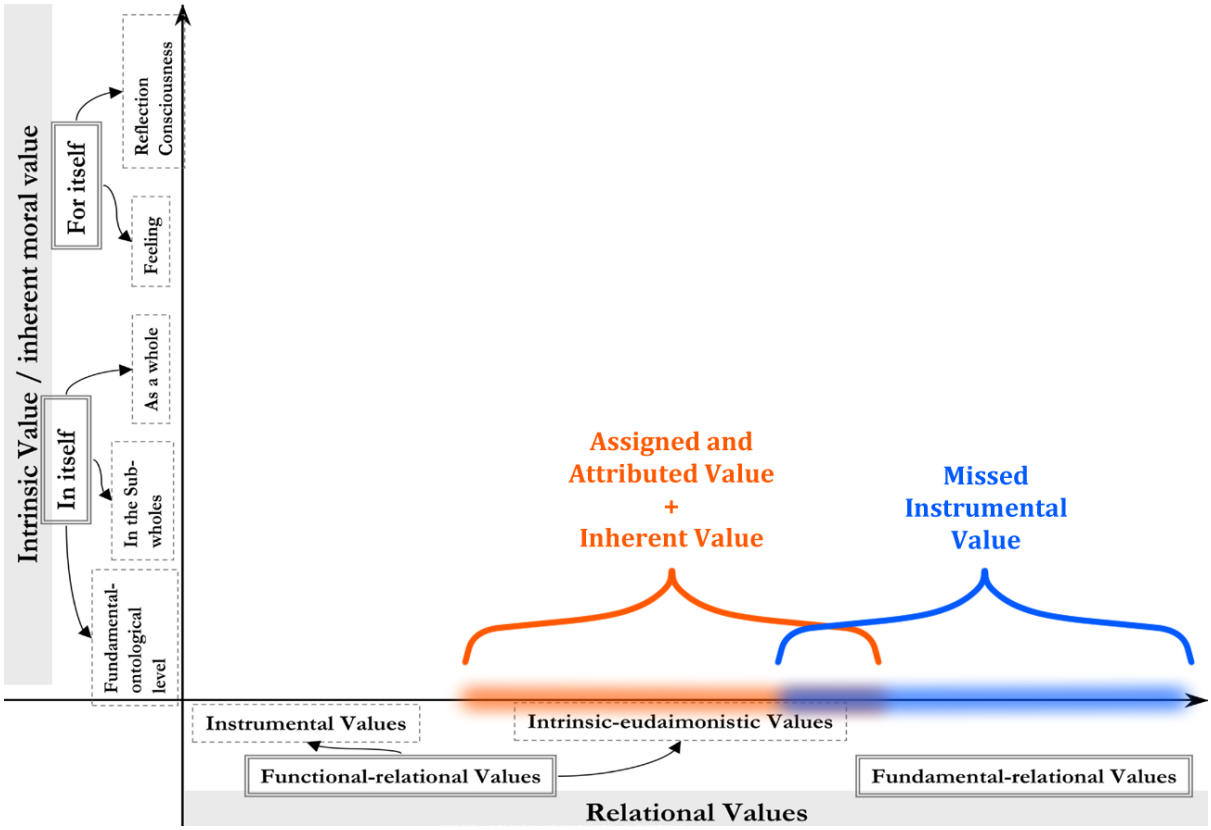


**Figure 3.1. Selected areas of correspondence between the subjective valuer-defined descriptive categories and the axiological framework developed by Muraca (2011).** The positions of Assigned and Attributed Value, Inherent Value, and Missed Instrumental Value categories (descriptive value categories developed in this chapter from analysis of participant accounts of VNRN) are shown as coloured additions on the Relational Axis of the axiological framework from Muraca (2011, fig. 2) (greyscale base image).

Assigned and Attributed Value and Inherent Value describe values in the Functional-RV region of the Relational Value axis (Fig. 3.1, orange additions) as they involve some kind of reflection by the subjective valuer, and fall closer to one subtype or another depending on the specific reason why they consciously value an item.

Interestingly, the descriptive category of Missed Instrumental Value mostly falls within the Fundamental-RV region of the Relational Value axis on Muraca's framework (Fig. 3.1, blue additions), since they are mostly based on nature's importance for human survival and do not require the beneficiary to reflect on this relationship – *not* Instrumental Values, which require a valuer to have goals and preferences that are known to them in Muraca's framework. The borderline examples about intangible benefits of experiences in nature are more like Intrinsic-eudaimonistic Values (one of the Functional-RV subtypes), which in Muraca's framework are closer to Fundamental-RV than Instrumental Values are (the other Functional-RV subtype). Some implications of this are considered in the Discussion section.

The Value of X category cannot be decisively placed on the axes of Muraca's value framework due to the lack of detail about the nature of the value in participant descriptions – though in cases when participants described the subjective valuer-value bearer relationship, this relationship is closest to the subjects-valued objects relationship associated with Intrinsic-eudaimonistic Values in Muraca's framework. The fact that participants often called this value 'intrinsic value' also fits anecdotally with Muraca's explanation of Intrinsic-eudaimonistic Values, where the author expresses the following view:

> *I suspect that many people who intuitively claim for the intrinsic value of non-human beings implicitly have in mind this meaning rather than the deontological category of inherent moral values linked to direct moral obligation. (p. 389)*

Instead of the *axes*, the Value of X category is about items (the 'X' of interest) that might be on the *plane* of the framework's graph. Muraca suggests where various entities and collectives might be placed on this plane during the 'ontological step'. Muraca's intention is to demonstrate the framework rather than to claim these placements as complete or to be accepted by all, and there is not enough space here to convey the reasoning given in the paper for the various placements, but her "distribution of entities and collectives aims at getting as close as possible to an immediate plausibility in order to offer a wide basis for consensus" (p. 386). Muraca suggests where several items similar to the value-bearing items identified by these participants (i.e. 'X' in 'the Value of X') might be placed on the framework, including landscapes, forests, populations/species of plants and animals, ecosystems, and processes. These are mostly placed in the framework graph's lower right quadrant: low-to-intermediate on the Intrinsic Value axis, with inherent moral value *in* itself but not *for* itself, and intermediate-to-high on the Relational Values axis, with either Fundamental-RV or the Functional-RV subtype Intrinsic-eudaimonistic Values (Figure 3.2).

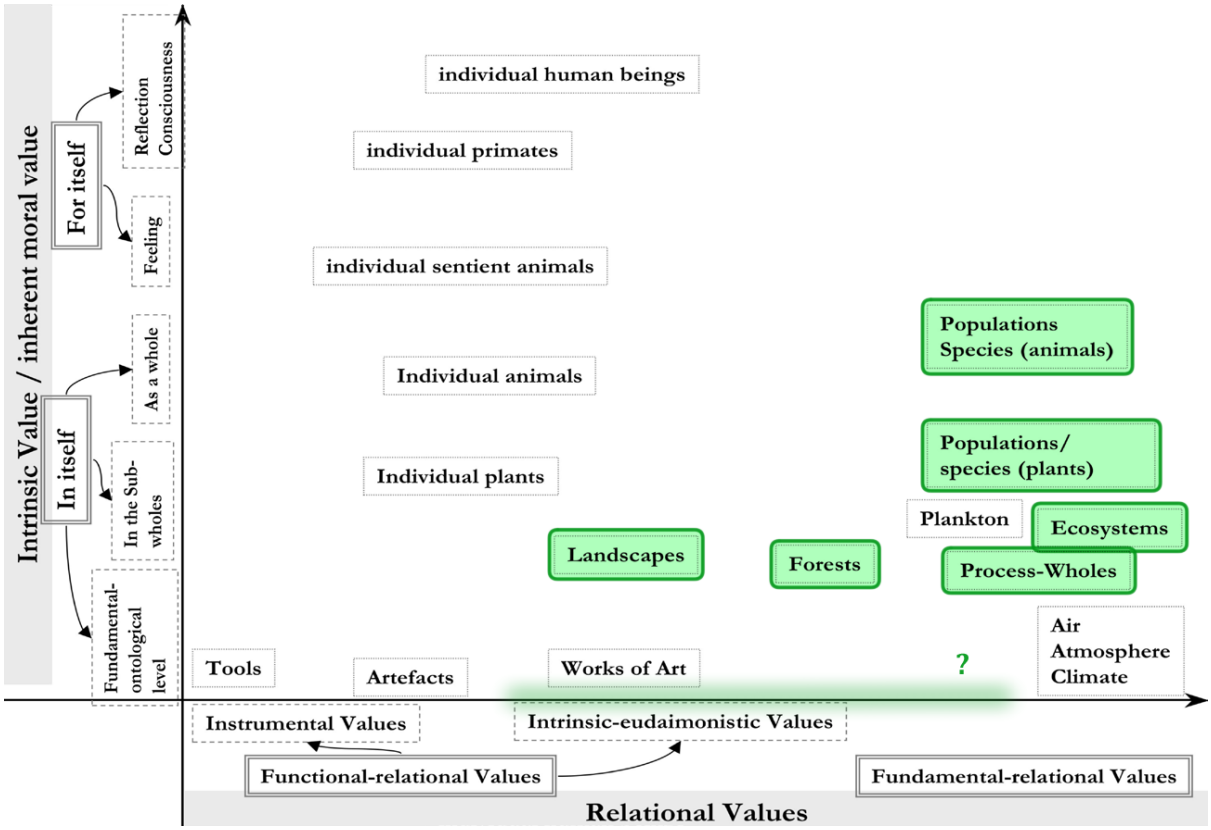


**Figure 3.2. Selected areas of correspondence between the Value of X descriptive category and the axiological framework developed by Muraca (2011).** Items that correspond to valuer bearers from the Value of X category (a descriptive value category developed in this chapter from analysis of participant accounts of VNRN) are highlighted with coloured rectangles among a range of items on the plane of the axiological framework from Muraca (2011, fig. 3) (greyscale base image). The possible position of the Value of X category on the framework's Relational Values axis is also shown, indicated by a coloured line (and question mark to indicate the lack of certainty).

The value framework developed by Muraca is intended to release discussions and interpretations of values from the 'demarcation problem' of deontological approaches to environmental ethics. The framework uses Relational Values as a second dimension to develop a 'map of moral significance' on which values and items can be located in preparation for the 'deontological step', which involves deciding where on the map to draw 'lines of moral significance'. Muraca distinguishes between members of a *moral community*, to which moral agents have a moral obligation, and items that have *ethical relevance*, which are not owed moral respect but do have moral significance that should be taken into account in a deontological position. Items above the line on the framework's Intrinsic Value axis are members of the moral community, while items to the right of the line on the Relational Values axis have "a crucial and nearly non-negotiable ethical relevance, which is not reducible to their instrumental service to the [moral community]-members" (p. 391). Muraca suggests where the lines of moral significance could be drawn for anthropocentric, pathocentric, or biocentric deontological

stances (Figure 3.3) – where there is moral obligation towards humans, sentient beings, or living beings respectively.

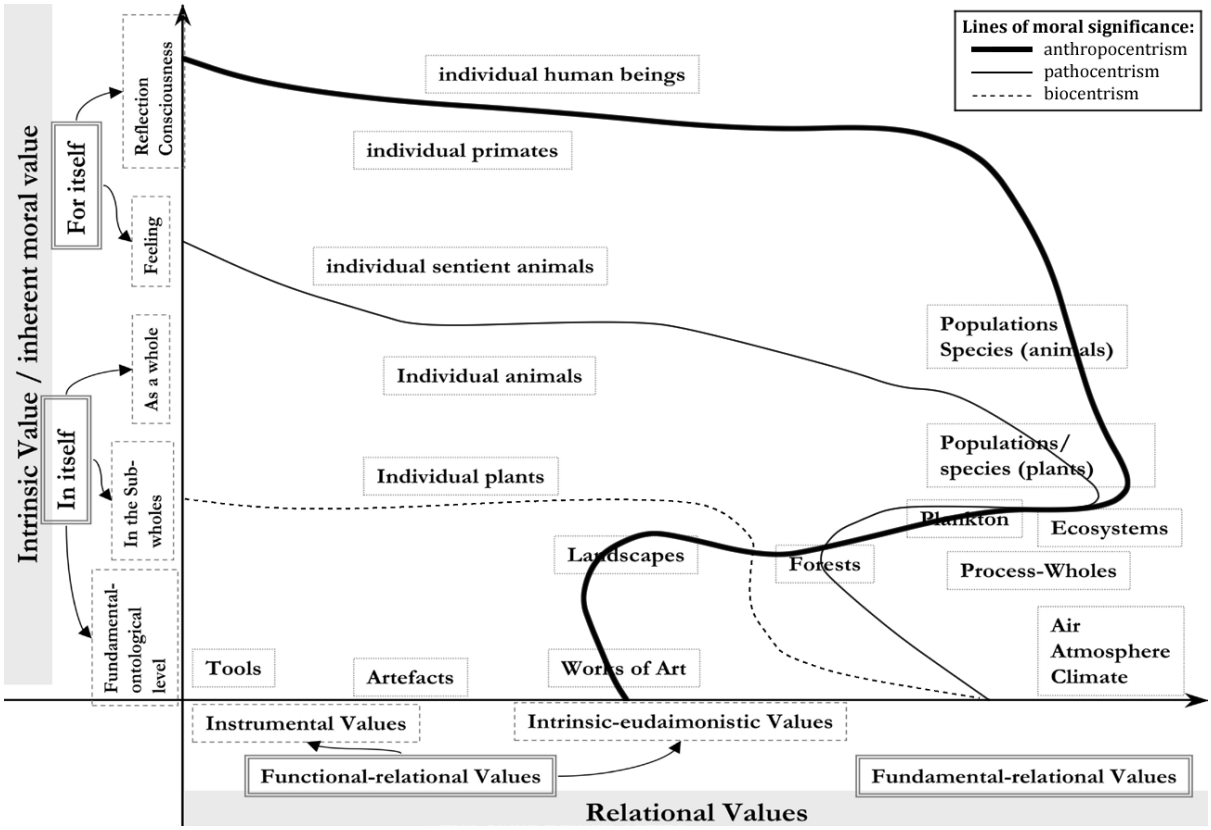


**Figure 3.3. Lines of moral significance on the axiological framework; reproduced from Muraca (2011, fig. 4).** Figure shows lines indicating which values and items might have 'moral significance' when taking an anthropocentric, pathocentric, or biocentric deontological stance. Items above/outside the line have moral significance according to the relevant stance. (Figure key added.)

Due to "the anthropological assumption of human beings as essentially social and reciprocity oriented animals" (p. 390), Muraca argues a 'deep anthropocentrism' that includes the rights of future generations "has to be the minimal condition for any ethical position – anything below would be individual egoism and thus be inconsistent with any moral point of view" (p. 390). In terms of how much support this lends this chapter's descriptive value categories, the majority are shown to be associated with moral significance in a deontological approach under a deep anthropocentric position by the relevant features (i.e. items on the framework's plane which correspond to the value bearers in the Value of X descriptive category and positions on framework's Relational Value axis which correspond to the various subjective valuer roles in most of the subjective valuer-defined descriptive categories) being positioned above/outside the anthropocentric line of moral significance (compare Figs 3.1-2 with Fig. 3.3). The range of subjective valuers in the descriptive categories can also be supported by a deep anthropocentric position as it includes all people, including those in the future.

Objective Intrinsic Value might have some moral significance under the biocentric position Muraca identifies (but does not defend). Other than this, the descriptive value categories have more support under an anthropocentric position than a pathocentric or biocentric position, since the latter two do not give moral relevance to items such as forests and landscapes based on human reflection.

# 3.4 Discussion

This chapter sought insights into the ethical concerns of strategic level conservationist practitioners about natural capital approaches to help address a lack of key knowledge and understanding that limits conservation practitioners' ability to fully engage with or resolve them, identified in the previous chapter after being suggested by wider literature. Analysis of participant accounts using a philosophical value theory lens found that they described values of nature that they or their colleagues feel are important and potentially at risk from the use of natural capital approaches (VNRN) in one of two distinct ways, explaining them primarily in terms of the role of a subjective valuer or the item that bears a value. Values defined by the absence of a subjective valuer were relatively rarely raised as VNRN. 'Biodiversity' and 'species' were often described as the bearer of VNRN with few additional details to establish what type of value they were thought to have. A comparison of these descriptive value categories with utilitarian and deontological versions of environmental ethics found normative support for most of the subjective valuer-defined categories in both of these ethical theories, but value categories without clear subjective valuer involvement were more difficult to find support for.

## 3.41 Anthropocentric values of nature

Participants described VNRN that existed because subjective human valuers could benefit from, assign or attribute value to, or recognise valuable qualities in nature; these value descriptions formed categories that have been labelled Missed Instrumental Value, Assigned and Attributed Value, and Inherent Value, respectively. By considering these categories together, the presence of human valuers was found to be a prominent defining factor across participant descriptions of VNRN. The involvement of human valuers in these descriptive value categories is key to the normative support they can acquire from utilitarian and deontological theories of environmental ethics.

*Benefit-based values*

Missed Instrumental Value finds relatively direct support in both utilitarian and deontological environmental ethics. The value of ecosystems and landscapes for the life-supporting and intangible quality of life benefits that improve the wellbeing of present and future humanity are clearly compatible with classic ethical utilitarianism's view that human wellbeing has intrinsic value and should be maximised. Using the axiology developed and used by Muraca (2011) within a deontological

approach, there are no direct moral *obligations* towards items with Missed Instrumental Value, but they have moral *relevance* as collective entities – that cannot be reduced to individual services they provide – because they are inseparable from the subjective human valuers embedded within them, who *are* owed direct moral obligation, and so moral agents have duties towards these items. Missed Instrumental Value is supported similarly by both ethical theories: this is a VNRN based on contributions to human wellbeing, and so items with this value are supported through whichever route the respective theories take to account for items that do not possess their highest priority value but contribute to or are necessary for its existence.

Additionally, Muraca's map of moral significance helps to identify a possible difference between Missed Instrumental Value and the implied 'unmissed instrumental value' that participants believe natural capital approaches are likely to account for, or that they did not often express as a VNRN for some other reason. This axiological framework separates 'Intrinsic Value/inherent moral value' and 'Relational Values' into the two axes of the map, the latter of which is the basis for moral relevance. Among the map's Relational Values, values of nature based on their tangible contribution to a valuer's specific goals and preferences have 'Instrumental Values', while the descriptive category I have named 'Missed Instrumental Value' mostly falls under values based on the fundamental relationship between humans and ecological wholes (Muraca's 'Fundamental-relational Values'), with no overlap with the map's 'Instrumental Value'. Similar values to those described by Missed Instrumental Value have been called 'inherent' rather than 'instrumental' by other researchers examining aspects this interdisciplinary space (Spangenberg & Settele, 2016). Regardless of whether the label is a perfect fit, this suggests that the VNRN described by participants categorised here as Missed Instrumental Value are not simply 'missed' by using valuation methods that only work for those within a narrow definition, but instead are a distinctly different and more essential type of anthropocentric value. Muraca's Instrumental Values (implied to be the 'unmissed' value) are very similar to the 'use values' of economics, which are among the more straightforward values to assess using stated preference methods such as contingent valuation (Hanley & Perrings, 2019; Tinch et al., 2019). Meanwhile, Missed Instrumental Value is *not* very like the corresponding 'non-use values' in economic valuation (these are more akin to the other subjective valuer categories, though not the same; see below), which require a valuer to be aware of and accurately articulate the benefit they receive from part of nature – a contested assumption for the kind of benefits in the Missed Instrumental Value category (Tinch et al., 2019) and contrary to participant descriptions of the subjective valuer's role.

Missed Instrumental Value finds support from both utility-based or duty-based ethical viewpoints and does not appear to be underpinned exclusively by one or the other – but is either ethical theory a better option on which to base a moral case for its defence? Under a deontological approach, Missed

Instrumental Value has a different kind of value with higher moral relevance to the moral community (to which moral agents must respond) than the more basic type of instrumental value, while under a utilitarian approach they have essentially the same type of value (they are both instrumental in contributing to human wellbeing, the difference is down to the scale and scope taken into account). The axiology required to explain the moral significance of Missed Instrumental Value within a deontological approach shows why attempts to count ever more individual benefits of nature as additional instrumental values may fail to account for its fundamental importance, which is reflected in the shortcomings of several common economic valuation methods. A deontological argument that we (as moral agents) have a duty to protect fundamentally important parts of nature due to their moral relevance to humanity, regardless of individuals' awareness of or ability to articulate the benefits they receive, may be a useful counterpoint to call upon for conservation practitioners engaged in decision-making situations that involve heavy use of these valuation methods. However, Missed Instrumental Value is still fully compatible with a utilitarian approach and the axiology required to explain its relevance to human valuers is simpler. Utilitarian ethics is also prominent and influential in public policy (Wolff, 2009). A utilitarian argument based more directly on benefits to humanity, taking an appropriately considered and long-term view into account as suggested by the 'convergence hypothesis' (Norton, 1984, 1986, 1997), may be useful in decision-making contexts where these valuation methods are less prominent.

*Reflection-based values*

The descriptive categories Assigned and Attributed Value and Inherent Value involve a subjective valuer, like Missed Instrumental Value, but in these categories the value is based on a valuer's views of or about nature rather than any benefit they receive. A variety of thoughts, beliefs, and opinions were given by participants as the basis for a value that a subjective valuer might assign, attribute, or recognise in nature. The variety of reasons and 'value-generating' actions made this a difficult set of descriptions of VNRN to categorise neatly. Assigned and Attributed Value encompasses value assigned to nature for any reason and value attributed to nature for religious or spiritual reasons, which were categorised separately in an earlier stage of the analysis, while Inherent Value encompasses recognition of value-conferring inherent qualities of nature. Inherent Value remained in a separate category as it was framed in a different way by participants, but these two categories could be considered expressions of essentially the same idea – values based on people's considerations and reflections about nature and their relationship with it, where a valuer's particular reasons are less important to participants than the fact they consider it to have value.

Consideration and reflection by subjective valuers (rather than the specific reasoning within these thoughts) is also shown to be the uniting and most important feature in Assigned and Attributed Value

and Inherent Value through the way they are supported by ethical theories. Both of these descriptive value categories find support from utilitarian and deontological environmental ethics, but require the use of more 'advanced' axiological concepts than Missed Instrumental Value. In Birnbacher's (1998) examination of utilitarian environmental ethics, they correspond to the 'inherent value' (rather than instrumental value) that an item has when it is the object (rather than the cause) of intrinsically valuable states, such as spiritual contemplation by a sapient valuer (rather than pleasure or wellbeing). In Muraca's map of moral significance in deontological environmental ethics, they correspond to 'Intrinsic-eudaimonistic Values', in which items have moral relevance based on a functional relationship where the item contributes to a moral community-member's idea of a good life. In both theories, protection of items with Assigned and Attributed Value and Inherent Value is supported as a result of people feeling or believing they are important.

The descriptive categories of Assigned and Attributed Value and Inherent Value are the manifestation in participant accounts of VNRN of the 'in between' values (neither purely intrinsic nor purely instrumental) that have been difficult for economics, ecosystem services, and environmental ethics research to formally define in a way that is acceptable or understandable in other situations. Participant understandings of these values have been compared to environmental ethics ideas in this chapter's analysis, and these findings can be compared with the nearest analogous ideas in economics and ecosystem services research.

On the surface, Assigned and Attributed Value and Inherent Value are similar to various 'non-use values' in economics, which can be separated according to the reason why a valuer might consider something to have worth, as in 'bequest value' and 'existence value' (Tinch et al., 2019). However, value derived from people's views about nature often cannot be expressed or represented by the quantitative, monetary, and/or economic terms used in economic methods (Bartkowski et al., 2015). The extent to which these terms are inappropriate or even offensive is especially apparent for value based on spiritual or religious beliefs (Cooper et al., 2016) and collective cultural preferences (Saarikoski et al., 2016). Participants shared these concerns, as shown by the frequent expressions that quantitative or economic terms are inadequate or inappropriate for Assigned and Attributed Value and Inherent Value. Ecosystem services research has explored ideas of 'relational value' – usually used in the sense of 'relational principles' – in response to these challenges (Chan et al., 2018). Several approaches to understanding and incorporating these principles into decision-making have been developed, such as deliberative valuation methods (Gould et al., 2015; Kenter et al., 2016a), which could be useful tools for making Assigned and Attributed Value and Inherent Value more visible in decision-making.

*Subjective valuer identities*

The subjective valuers identified by participants across Missed Instrumental Value, Assigned and Attributed Value, and Inherent Value categories showed a common theme of being holistic, equitable, or otherwise expansive in some way, going beyond themselves, current generations, or more privileged members of society. This suggests that the conservationist practitioner participants were concerned about values of nature being at risk from the use of natural capital approaches because some human valuers might be excluded from the set of beneficiaries or value-assigners taken into account – a realistic concern that is reflected in the shortcomings of environmental valuation approaches (Jacobs et al., 2016) – and that the interests of future generations and equity and inclusivity in providing for the interests of current generations are important to them in decision-making that might involve these approaches. These subjective valuers are comfortably encompassed by the ethical theories examined in this chapter and the wider discipline of applied ethics they draw on, should conservation practitioners wish to appeal to these – but political arguments may be a more direct source of rhetorical support for the equitable distribution of benefits and accommodation of less powerful voices in decision-making.

## 3.42 The value of biodiversity and species

Most other descriptions of VNRN focused on the items that have such a value, rather than the particular type of value, and formed a single category labelled the Value of X. This category potentially includes more hidden variation than the subjective valuer-focused categories, as it was less fully described and shared characteristics with several of them. Several participants spoke about VNRN in such a way that implied the value bearer was more important than the type of value it has, not merely the focus of their discussion, but the strength of this implication was variable and not very strong across the category as a whole. It is possible that the ideas demonstrated in other value categories were what participants had in mind when speaking about the Value of X and this category represents less fully articulated attempts to describe the same values, and the apparent focus on the value bearer is merely superficial. Even if this is the case, participants centring their discussion on a value bearer without elaborating on or emphasising any characteristics of the value was a very frequent occurrence, so these were significant set of descriptions to account for in the analysis.

One possible explanation for this kind of description could be that protecting these aspects of nature in particular is a high priority to participants, regardless of the specific types of value they might have or because they have multiple types. However, while it is possible that this is true for some accounts, the fact that the most common value bearers in these accounts, ‘biodiversity’ and ‘species’, were rarely listed as the bearer in the subjective valuer-defined categories and few participants had data

fragments in both category types suggests that the Value of X category represents a distinct understanding or at least a distinct mode of articulation of VNRN among participants. An alternative or additional explanation could be that the low level of ethics training and explicit workplace discussion of ethics among the participants in this study (as found in Chapter 2), and in conservation science and practice more broadly (Baard & Ahteensuu, 2019; Saltz et al., 2019; Stuart & Rizzolo, 2019), results in participants being unable to describe the value in detail.

Finding direct normative support for the Value of X category in either utilitarian or deontological environmental ethics was more difficult than for most other descriptive categories, most likely as a result of the ambiguities and relative lack of value component description in this category. It appears likely that protection of these value bearers would have support from these ethical theories in practice, but it is not clear if this would reflect the VNRN that participants actually meant. However, the normative analysis suggests two routes to finding more substantial support for the Value of X from these ethical theories.

The first route is by using the map of moral significance developed by Muraca (2011) to identify possible values that collective entities such as ecosystems, landscapes, and species populations might have that would give them moral relevance under a deontological ethics approach. The Value of X value bearers had a similar 'profile' within Muraca's axiology to those articulated by other participants as the Missed Instrumental Value, Assigned and Attributed Value, and Inherent Value categories.

The second route could be to reorientate the interpretation of the Value of X around the subjective valuer role. If conservationists and those they represent (e.g. supporters or 'other environmentally-minded' people with similar views and concerns) were considered as subjective valuers who assign, attribute, or recognise a value in nature because of their beliefs and opinions, just as any subjective valuer in the other categories might, then the Value of X could be 'converted' to Assigned and Attributed Value and Inherent Value. Given the strong connection between conservationists and their moral principles expressed by many participants (as shown in Chapter 2), this seems like plausible alternative interpretation of the Value of X, even if it was not how some participants or their colleagues articulated it themselves. As VNRN in those descriptive categories had normative support from utilitarian or deontological approaches, this could allow the Value of X to be supported in the same way. Interpreting 'the value of biodiversity' as an Assigned and Attributed Value, with conservationists doing the attributing, also reflects the way 'biodiversity' is the object of a prominent and long-held principle of conservation (the view that biodiversity has 'intrinsic value' and should be protected for this reason) (Soulé, 1985; Skandrani, 2016).

However, ‘biodiversity’ and ‘species’ are used with various definitions in conservation biology (Holt, 2006; Frankham et al., 2012) and ‘biodiversity’ is used as both a normative concept and a scientific concept (Santana, 2018). Both of these meanings appear or are implied to be present in the range of participant statements about the Value of X. Although more emphasis on the normative meaning is perhaps suggested by the association with frequent use of the term ‘intrinsic value’ in this category, overall it was often unclear which meaning was intended. Meanings based on scientific reasoning about ecological complexity, redundancy, connectivity and so on are closer to the reasoning behind Missed Instrumental Value and – as seen in Chapter 2 – a type of argument conservationists are already familiar with. A lack of articulation about the nature of these value bearers and the kind of values they have may limit conservation practitioners’ ability to use concepts of ‘biodiversity’ to appeal to others, as it is more likely to appeal to those who share a similar viewpoint to conservationists in attributing ‘intrinsic value’ to nature (Elliott, 2020). The findings of this study indicate that further work may be required to help articulate and identify meanings that might underlie the accounts in this value category, but also show that conservation practitioners are capable of articulating several of the potential types of value that they might represent. Other concepts such as ‘life support systems’ or ‘caring for nature’ may be useful in articulating the various facets of biodiversity depending on the intended meaning and decision-making context (Elliott, 2020).

## 3.43 Intrinsic values of nature

Ideas of ‘intrinsic value’ in nature appeared throughout participant accounts of VNRN. In a classic article, philosopher John O’Neill (1992) summarises three uses of the term within environmental ethics, all of which appear in the descriptive categories: as a synonym for non-instrumental value, with value as an end in itself and not solely a means to another end (seen in some accounts in the Value of X category); value resulting from properties which do not come from relations with other entities, only properties that are inherent to the thing in question (seen especially in the Inherent Value category); as a synonym for objective value, describing a value that exists in the absence of a subjective valuer (seen in the Objective Intrinsic Value category). The concepts and arguments of environmental ethics were an intentional and acknowledged influence in the analysis in this chapter, but it is possible that the long-term presence of these ‘intrinsic value’ concept in environmental ethics (Jamison, 2008) may have overly constrained my interpretations of participant descriptions of value – the Inherent Value and Objective Intrinsic Value categories resemble these pre-existing ideas especially closely, for example. However, environmental ethics’ ideas about intrinsic values have been influential among professional environmentalists (Callicott, 2002), and acceptance of ‘the intrinsic value’ of nature has been found in empirical studies of conservationists personal views (Butler & Acott, 2007; Dempsey,

2021) and have a long history in conservation biology (Soulé, 1985), so it is likely that these categories are also fair reflections of participant understandings of value.

Environmental philosopher Dale Jamison (2008) describes a fourth use of 'intrinsic value' in environmental ethics: 'intrinsic value' as the feature that is necessary and sufficient for something to be given consideration in moral decisions, which seems to be the opinion of participants (or fellow environmentalists) who spoke about 'intrinsic value' in the Value of X category. This kind of view does not itself constitute an argument that nature has intrinsic value in a sense accepted by most ethical theories (Justus et al., 2009; Baum, 2012), but again suggests that the Value of X category could be usefully interpreted as Assigned and Attributed Value or similar.

Despite ideas of intrinsic value and the term itself appearing regularly, 'intrinsic value' in the sense of value in nature that does not require a subjective valuer – arguably the most contentious and academically vexing iteration – was rarely described as a VNRN by participants, with Objective Intrinsic Value being the least commonly described category. Even Inherent Value, which was not as directly centred on a subjective valuer as Missed Instrumental Value and Assigned and Attributed Value in participant descriptions, could be interpreted in terms of the role of a subjective valuer. Objective Intrinsic Value was difficult to find normative support for within the interdisciplinary limitations of this study, which precluded delving further into environmental ethics' rich examination of the concept. Unless this was the unspoken meaning of 'intrinsic value' in the Value of X category, it appears that value in nature that has absolutely no association with people is not a major concern for participants, and so the difficulty in establishing normative support for Objective Intrinsic Value is not particularly worrisome in this context.

# 4 – Ethical fit of the natural capital concept with conservation

## 4.1 Introduction

Natural capital approaches are increasingly used in environmental policy and raise a number of ethical concerns for conservation practitioners. While human-orientated approaches to nature conservation are a core part of the movement, the relationship between conservation and the natural capital concept is more complex. The aim of this chapter is to establish what the current presentation(s) of the natural capital concept are and to assess its ethical compatibility with priorities of conservation practice. In this chapter, current presentations of the natural capital concept are identified using document analysis and compared against the values of nature established to be of importance to conservation practitioners in the previous chapters.

Various heuristic metaphors regarding nature and the environment have been developed, promoted, and applied during the course of modern environmental studies. The natural capital concept's contemporary emergence in economics and the differences between the conceptual development and rhetorical use of the concept in environmental economics and ecological economics during this time is covered in Chapter 1 (section 1.23). While economics researched the natural capital concept in response to the rise of sustainable development as a political force, many conservation ecologists responded to similar demands by expanding their studies of the ecosystem services concept (Peterson et al., 2010; Jax et al., 2013; Baveye et al., 2016).

The natural capital and ecosystem services concepts are related and have an interwoven history. The natural capital concept originated in economics (Åkerman, 2003; Missemer, 2018) and the ecosystem services concept originated in conservation ecology (Jax et al., 2013; Baveye et al., 2016). The basic forms of the two concepts reflect their disciplinary origins: ecosystem services are a type of ecosystem function while natural capital is a type of capital. The natural capital and ecosystem services concept were initially used for different purposes, with histories typically describing natural capital being used to improve the ability of neoclassical economics to deal with environmental issues (environmental economics) or to create a new field of economics to do so (ecological economics) and ecosystem services being used to persuade society or politicians of the vital importance of protecting nature (e.g. Åkerman, 2003; Maris, 2015; Missemer, 2018). The natural capital concept involves the application of the ecosystem services concept, and so both concepts were used in the development of ecological

economics as a field (Costanza et al., 2017), while conservation biology did not significantly adopt the natural capital concept during the equivalent period of its contemporary history (Maris, 2015).

Two publications in 1997 mark a milestone in the mainstreaming of natural capital and ecosystem services concepts: a landmark paper on natural capital titled 'The Value of the World's Ecosystem Services and Natural Capital' published in *Nature* by Costanza and colleagues (Costanza et al., 1997); and a highly influential book on ecosystem services edited by ecologist Gretchen C. Daily and titled *Nature's Services: Societal Dependence On Natural Ecosystems*. Daily's book and Costanza and colleagues' study resulted in the ecosystem service concept entering mainstream policy and ecological science discourse simultaneously (Heydinger, 2016).The Costanza et al. (1997) study used a monetary valuation approach and calculated (with caveats) a dollar amount for natural capital and ecosystem services. This was a notable deviation from the previous ecological economics approach of emphasising biophysical valuation (Åkerman, 2003) and marked a turning point in the relationship between economics and environmental protection. It was followed by increased efforts to integrate ecosystem services with the economy, with increasing study of monetary valuation methods by both economists and conservation biologists (Gómez-Baggethun et al., 2010; Missemer, 2018), including a strong interest in both market valuation (Peterson et al., 2010; Baveye et al., 2016) and non-market economic valuation (Tinch et al., 2019).

The first decade of the new millennium featured increasing integration of the ecosystem services concept into environmental policy, with a growing emphasis on monetary valuation. The ecosystem service concept became prominent in environmental policy around the world following the Millennium Ecosystem Assessment (Gómez-Baggethun et al., 2010; Luck et al., 2012; Hails & Ormerod, 2013; Rodríguez-Labajos & Martínez-Alier, 2013). A key contributor to the increased prominence of monetary valuation in environmental decision-making was 'The Economics of Ecosystems and Biodiversity' (TEEB), an environmental economist-led project carried out in 2008-2011 with backing from the UNEP and IUCN. Unlike the Millennium Ecosystem Assessment, TEEB attempted to assess the cost of biodiversity and ecosystem services loss in monetary terms. It provided another high profile example of monetary valuation (Rodríguez-Labajos & Martínez-Alier, 2013) and made recommendations about integrating ecosystem services and natural capital into policy frameworks (Claret et al., 2018).

Several private sector consultancies and lobbying groups formed in England in 2000-2008 with the aim of working with the natural capital concept to facilitate competitive advantages for businesses through development of policy solutions and tools to monitor opportunities related to natural capital, including the Aldersgate Group and Environment Bank (Faccioli & Blackstock, 2017). Several

international collaborations between universities, non-governmental organisations, and for-profit organisations have been established to research and promote natural capital approaches, such as the Natural Capital Project in 2006 and the Natural Capital Coalition in 2012 (Tinch et al., 2019). The Natural Capital Committee formed in 2012 with purpose of advising the UK government on natural capital approaches (Natural Capital Committee, n.d.). Some conservation organisations have engaged with the concept as major contributors to these and other collaborative projects to facilitate natural capital approaches, including The Nature Conservancy, World Wildlife Fund (Turner & Daily, 2008), the RSPB (Barker, 2019), and the Scottish Wildlife Trust (Coffey, 2016).

The use of economic metaphors and tools in conservation, including natural capital approaches, is less accepted among conservationists than socially-orientated conservation approaches in conservation (Kopnina et al., 2018a; Sandbrook et al., 2019; Dempsey, 2021; Vucetich et al., 2021a). Proponents argue that the concept and approaches are useful tools for environmentalists seeking to appeal to stakeholders who are unconvinced by traditional arguments for conservation (Scharks & Masuda, 2016), while opponents argue that their limitations in capturing certain values of nature mean they are likely to result in poor outcomes for people and nature (Maris, 2015). These risks have been raised regarding natural capital approaches (Brockington & Duffy, 2010; Mullin et al., 2018) and observed in their application (Fletcher et al., 2019; Atkinson & Ovando, 2021).

This suggests there are potentially fundamental incompatibilities between natural capital approaches and the both the nature-based and social objectives of nature conservation. The extent to which these are ethical incompatibilities is not yet understood, which was found in Chapter 2 to be a source of challenges and ethical questions for conservation practitioners. This chapter aims to conduct an evaluation of the ethical fit between the natural concept and conservation practice to provide new understanding that could help conservation practitioners make ethically informed choices. The philosophical insights into practitioner concerns developed in Chapter 3 are brought to bear on these issues by addressing the following research question in this chapter: What do the ethical insights into practitioner concerns about natural capital approaches reveal about the ethical compatibility of the natural capital concept with conservation? The way natural capital is conceptualised and used has changed over time (Åkerman, 2003; Sullivan, 2013; Coffey, 2016; Bateman & Mace, 2020; Farrell et al., 2021), making the extent of compatibility difficult to establish in an interdisciplinary area with many fast-moving discourses. It is necessary to understand what the concept currently is in order to evaluate it. The following objectives are pursued in answering this research question:

- To identify the current versions of the natural capital concept presented in relevant academic literature.

- To evaluate the conceptual compatibility of the current natural capital concept with conservation objectives seen as unmet or at risk when applying it.

# 4.2 Methods

## 4.21 Research strategy

In order to critically assess the ethical compatibility of the natural capital concept with conservation practice, an item representing the natural capital concept was compared with an item representing the ethical principles of conservation practitioners. The latter is represented by the values developed in Chapter 3, which are ethical interpretations of empirically-derived values in nature that are of importance to conservationist participants or their peers and thought to be at risk during when using the natural capital concept in conservation decision-making (VNRN) (described in section 4.23). The natural capital concept was represented by its current interpretations and meanings in relevant academic explanations of the concept. The rationale for these decisions is explained below.

The place of natural capital approaches in conservation decision-making includes their use and development by a range of organisations, including governments, corporate investors and developers, and conservation organisations. These organisations can have different and often contrasting goals in using natural capital approaches (Faccioli & Blackstock, 2017), multiple tools and methods are available to facilitate their use, and the application of these tools can vary and result in a range of environmental outcomes (Bagstad et al., 2021). These opportunities for variation at each step mean that the natural capital concept can have a wide range of practical manifestations and effects. Many of the strategic level conservation practitioners interviewed in this study spoke about natural capital approaches hypothetically, particularly in the context of the, and expressed uncertainty about how to respond to this, while others were involved closely in natural capital policy development. This means they were often relatively distant from specific applications and concerned about the potential for an overall shift in the decision-making environment, or they were close to the evolving landscape of natural capital applications. Critically assessing the available tools, their application, or the outcomes of their application is important. However, in the context of this research, it is most appropriate to make the core concept itself the object of ethical critique. An ethical critique of the applied stages would be further removed from the core ethical conflicts and more suited to situations where the use of the concept has been accepted and optimising its application is the goal. If a tool or its application is found to be lacking, ethical questions about the core concept's suitability have not been answered, and so a critique of the concept is likely to have more lasting relevance for conservation practitioners. This research aims to assess the natural capital concept's place in conservation at a more fundamental

level and so the concept was selected as the object of study. From there initial recommendations about its application can be drawn.

The dataset used to establish the current conceptual meaning of the natural capital concept to represent it in the ethical evaluation was drawn from academic literature, specifically research journals. In addition to academic literature, descriptions and definitions of the natural capital concept can be found in documents produced by government departments and working groups, charities, international governance organisations, business and industry groups, and academia- or research-based groups. As many of these documents focus on the application of a natural capital approach, the descriptions of the natural capital concept itself are minimal or relatively shallow. More importantly, they are likely to have an implicit agenda that may affect the account given of the natural capital concept. Work published in research journals ought to have any such agenda made explicit and the peer-review process implements quality and reliability standards, in theory at least, which are not universally present across other sources of information about the natural capital concept. Although grey literature also contributes to these meanings in practice, peer-reviewed work published in academic journals is the closest to a 'gold standard' source of the conceptual meaning and so was chosen as the best available option for this study.

The following steps were carried out. First, the current presentations of the natural capital concept were established through document analysis of academic publications: a search strategy to find suitable documents was developed and conducted; content of the selected documents was analysed to establish the relevant features of the concept as it is currently understood and the wider context of these documents was reviewed to consider any potential implications. Second, these presentations of the natural capital concept were compared to the ethically interpreted empirical value categories identified in Chapter 3 to determine how fully and accurately it encompasses these values.

## 4.22 Establishing current presentations of the natural capital concept

### 4.221 Data collection

The dataset in this study is a collection of papers published in academic research journals, to be analysed to establish the current available understandings of the natural capital concept. The data collection process consisted of developing a search strategy suitable for acquiring a dataset to perform a developmental literature review (Templier & Paré, 2015), performing the chosen search and acquiring papers to form an initial article collection, identifying and acquiring suitable papers that are frequently cited by this collection, and adding them to the initial article collection to form the final dataset. The landscape of the research field has changed over time and the meaning of the concept has changed with it (Åkerman, 2003; Sullivan, 2013; Coffey, 2016; Bateman & Mace, 2020; Farrell et

al., 2021), and so the date range was restricted to capture current rather than historic meanings of the natural capital concept by minimising the inclusion of a time variable as far as reasonably possible. In order to account for influential papers that fall outwith the search and date range but which still form part of the current understanding of the natural capital concept, the papers most highly cited by the papers in the initial article collection were considered for inclusion in the full dataset. These steps are described in detail below.

*Search development*

All exploratory and final searches were carried out using the Web of Science database. The publication date range used for all searches was 1st July 2016 to 30th June 2021, covering the most recent five years at the time of data collection (August 2021). All searches used "natural capital" in the *Title* search field to increase the relevance of the results for a more efficient search process – the number of results for all searches was an order of magnitude higher without this term in the *Title* field.

The *Topic* search field searches article titles, abstracts, and keywords. Candidate search terms for the *Topic* field were gathered from among potential options from researcher familiarity with the field and from examining the terms present in the titles, abstracts, and keywords in the results of the above search with an empty *Topic* field for any that might be relevant (first manually then by checking a list of the most frequent terms in these search results generated by NVivo). The words 'accounting', 'approach', 'concept', 'framework', 'framing', 'indicators', and 'model' were identified as initial options for exploration as *Topic* field search terms. These were retained or dismissed based on their relevance to the research objectives. 'Accounting' and 'indicators' were dismissed as these are more associated with the application of the concept. 'Framing' was dismissed soon after beginning exploratory searches as it was found to be a redundant search term. The terms used in exploratory searches to develop the final search were therefore:

```
Title = "natural capital"
AND
Topic = approach OR concept OR framework OR model
AND
Publication date range = 1st July 2016 to 30th June 2021
```

using all possible combinations of the topic search words (i.e. 'approach', 'approach OR concept', 'approach OR concept OR framework', and so on).

The criteria to determine a paper's suitability for inclusion in the dataset were that it is primarily about explaining, examining, or developing the natural capital concept itself, or if the paper is about applying the concept then it is broad in scope and includes some theoretical development of the underlying concepts (i.e. it is not primarily about how to use it in a particular setting or an empirical study of its

practical application). All results were checked against these criteria, using the title and abstract, and marked as eligible for inclusion or not. The number of results for each search and the proportion of eligible results within each search were compared to evaluate each search term's relevance for seeking papers contributing to the current understanding of the concept. Set diagrams (Figure 4.1) were used as a visual aid in comparing search terms.

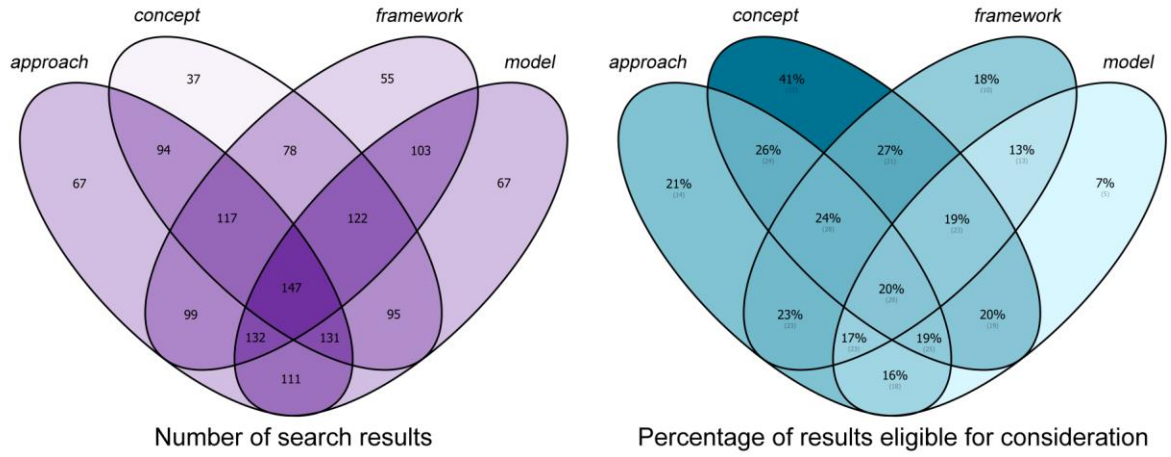


**Figure 4.1. Set diagrams of Web of Science search results during development of the final search terms.** The diagram on the left is shaded according to the number of search results. The diagram on the right is shaded according to the percentage of search results eligible for consideration for this chapter's dataset, with the number of eligible results also reported beneath the percentages on the right hand diagram. The searches were: Title = "natural capital" with Topic = combinations of 'approach', 'concept', 'framework', and 'model' separated by the OR search operator, Publication date range = 1st July 2016 to 30th June 2021.

The search with only 'concept' in the *Topic* field returned the fewest results but the highest proportion of eligible results. All searches with 'model' in the *Topic* field had a comparatively low proportion of eligible results. The proportion of eligible results from all other searches were fairly similar (Fig. 4.1). Based on this, 'model' was deemed to be an insufficiently relevant search term for the final search while 'approach', 'concept', and 'framework' were deemed to be sufficiently relevant. Therefore the final search from which to draw the initial dataset was:

```
Title = "natural capital"
AND
Topic = approach OR concept OR framework
AND
Publication date range = 1st July 2016 to 30th June 2021
```

*Final search, paper selection, and exclusions*

The chosen final search was run on the Web of Science database in August 2021. The search results included 117 papers, of which 28 were judged to be probably eligible for inclusion in the dataset

(according to the criteria outlined above) based on their abstracts. These papers were assessed more closely for inclusion in the dataset by taking the overall content of the papers into account.

Ten papers were excluded from the dataset upon further examination of the paper contents. Eight of these simply did not meet the eligibility criteria when looking beyond the abstract (e.g. empirical research about applying the concept with less contribution to the theoretical aspects of the concept than thought from the abstract alone). Two further papers were removed for the reasons outlined below.

Although the content is the primary feature of interest in this study, academic research and publishing is not an infallible process and so the effects and implications of the document creation context must be borne in mind during content analysis (Gross, 2018). Attempts to minimise the effects of faults in the publication process were made during data collection by removing papers from the dataset if they were deemed to be of unreliable quality. The standard for inclusion was not set extremely high as 'purity' of data sources must be traded off against the need to obtain an available understanding of the natural capital concept, and so only papers thought to have serious flaws in the publication process were excluded for this reason. This was based on my own judgement as a researcher who is familiar with the disciplines in question. The reasoning for specific removals and other dataset criteria are detailed during the description of the data collection and dataset refinement processes below.

One paper could not be obtained due to a lack of institutional access to the journal. One paper was excluded due to low quality. This paper was written in a way that made it extremely challenging to understand, despite my sustained effort, familiarity with the topics of the paper, and otherwise sufficient abilities. This was thought to be due to a poor translation being overlooked a lack of editorial oversight or a fault in the peer review process[14]. Regardless of the cause, the difficulty in understanding the paper's content mean it cannot reasonably be included as a source of the current understandings of the natural capital concept.

Eighteen papers from this final search met the eligibility criteria and were obtained to form the initial article collection.

*Addition of frequently cited papers*

To identify frequently cited papers, the lists of cited papers reported on Web of Science for the eighteen papers in the initial dataset were downloaded in MS Excel format and compiled according to

[14] English was not the first language of the authors and the translation was credited to undergraduate students rather than a professional translator. In 2021 the Norwegian Scientific Index reported that the journal and several others from the same publisher (MDPI) had variable quality in their peer review and editorial processes. These processes would normally be expected to identify and correct the low standard of the translated transcript before publication, which suggests that this issue of the journal may have been affected by these problems.

the unique Web of Science identification number to find the total times each paper had been cited within the initial article collection. As a simple way to account for recent papers with a relatively high number of citations in the initial article collection relative to the time they had been available for, each paper was given a 'citation score' calculated as follows. Papers published in 2016 or later were given an adjusted citation count, calculated as the number of citations per year since publication multiplied by five years. The mean of the adjusted count and the base citation count (the true number of citations by the initial article collection) was calculated to give a citation score. The base citation count was used as the citation score for papers published before 2016.

The papers in the initial dataset cited a total of 470 papers indexed on Web of Science, which had citation scores ranging from one to seven. Papers with a citation score of three or higher, which included 33 papers, were considered to be frequently cited. These papers were compared against the eligibility criteria outlined above. Based on this, four of them were selected and obtained to be part of the final dataset.

### 4.222 Final dataset

The dataset obtained to establish an account of the current presentations of the natural capital concept consisted of 22 papers published in academic research journals (Table 4.1). Eighteen papers were from the initial search and were published in 2016-2021. Four papers were chosen from among those highly cited by the initial eighteen papers; of these four, three were older papers that were highly cited overall, published in 1992-2003, and one was a recent paper with a relatively high number of citations despite being available for only a short time, published in 2019.

The format 'Smith & Jones-2020' is used throughout the rest of this chapter to indicate that a paper is being referred to as a document in the dataset, to help distinguish this from references to the authors themselves (who are referred to by name only) and normal in-text citations. This reference format is shown for each paper in Table 4.1.

**Table 4.1. Details of papers included in this chapter's dataset.**

| Document | Article Title | Authors | Journal | Year | Basis for inclusion |
|---|---|---|---|---|---|
| Hein et al.-2016 | Defining Ecosystem Assets for Natural Capital Accounting | L Hein; KJ Bagstad; B Edens; C Obst; R de Jong; JP Lesschen | *PLOS One* | 2016 | Initial selection |
| Maseyk et al.-2017 | Managing Natural Capital Stocks for the Provision of Ecosystem Services | FJF Maseyk; AD Mackay; HP Possingham; EJ Dominati; YM Buckley | *Conservation Letters* | 2017 | Initial selection |
| Mancini et al.-2017 | Stocks and flows of natural capital: Implications for Ecological Footprint | MS Mancini; A Galli; V Niccolucci; D Lin; H Hanscom; M Wackernagel; S Bastianoni; N Marchettini | *Ecological Indicators* | 2017 | Initial selection |
| Sullivan-2018 | Making Nature Investable: from Legibility to Leverageability in Fabricating 'Nature' as 'Natural Capital' | S Sullivan | *Science and Technology Studies* | 2018 | Initial selection |

| | | | | | |
|---|---|---|---|---|---|
| Gray-2018 | The confused position of the geosciences within the natural capital and ecosystem services approaches | M Gray | *Ecosystem Services* | 2018 | Initial selection |
| DesRoches-2018 | What Is Natural about Natural Capital during the Anthropocene? | CT DesRoches | *Sustainability* | 2018 | Initial selection |
| Leach et al.-2019 | A common framework of natural capital assets for use in public and private sector decision making | K Leach; A Grigg; B O'Connor; C Brown; J Vause; J Gheyssens; L Weatherdon; M Halle; ND Burgess; R Fletcher; S Bekker; S King; M Jones | *Ecosystem Services* | 2019 | Initial selection |
| Özdemiroğlu-2019 | Natural capital - a practitioner's overview of concepts and applications | E Özdemiroğlu | *Journal of Environmental Economics and Policy* | 2019 | Initial selection |
| Helm-2019 | Natural capital: assets, systems, and policies | D Helm | *Oxford Review of Economic Policy* | 2019 | Initial selection |
| Barbier-2019 | The concept of natural capital | EB Barbier | *Oxford Review of Economic Policy* | 2019 | Initial selection |
| Mace-2019 | The ecology of natural capital accounting | GM Mace | *Oxford Review of Economic Policy* | 2019 | Initial selection |
| Daly-2020 | A note in defense of the concept of natural capital | HE Daly | *Ecosystem Services* | 2020 | Initial selection |
| Furtado & Panhoca-2020 | How are the variables for the measurement of natural capital being elaborated? | LL Furtado; L Panhoca | *Journal of Environmental Management* | 2020 | Initial selection |
| DesRoches-2020 | On the Concept and Conservation of Critical Natural Capital | CT DesRoches | *International Studies in the Philosophy of Science* | 2020 | Initial selection |
| Bateman & Mace-2020 | The natural capital framework for sustainably efficient and equitable decision making | IJ Bateman; GM Mace | *Nature Sustainability* | 2020 | Initial selection |
| Costanza-2020 | Valuing natural capital and ecosystem services toward the goals of efficiency, fairness, and sustainability | R Costanza | *Ecosystem Services* | 2020 | Initial selection |
| Polasky & Daily-2021 | An Introduction to the Economics of Natural Capital | S Polasky; GC Daily | *Review of Environmental Economics and Policy* | 2021 | Initial selection |
| Fisher et al.-2021 | Integrating Economics into Research on Natural Capital and Human Health | B Fisher; LA de Wit; TH Ricketts | *Review of Environmental Economics and Policy* | 2021 | Initial selection |
| Costanza & Daly-1992 | Natural Capital and Sustainable Development | R Costanza; HE Daly | *Conservation Biology* | 1992 | Frequently cited (citation score 6) |
| Costanza et al.-1997 | The value of the world's ecosystem services and natural capital | R Costanza; R d'Arge; R de Groot; S Farber; M Grasso; B Hannon; K Limburg; S Naeem; RV O'Neill; J Paruelo; RG Raskin; P Sutton; M van den Belt | *Nature* (reprinted in *Ecological Economics* in 1998) | 1997 | Frequently cited (citation score 7) |
| De Groot et al.-2003 | Importance and threat as determining factors for criticality of natural capital | R de Groot; J Van der Perk; A Chiesura; A van Vliet | *Ecological Economics* | 2003 | Frequently cited (citation score 3) |
| Mayer-2019 | Valuing the invaluable: how much is the planet worth? | C Mayer | *Oxford Review of Economic Policy* | 2019 | Frequently cited (citation score 3.5) |

The papers include research articles, literature analyses, academic opinion and letter articles, and an editorial-style introduction article. The dataset includes papers by 65 authors, most of whom appear once. Authors with more than one paper in the dataset are Costanza with three and Daly, de Groot,

DesRoches, and Mace with two. DesRoches and Mace are present in the initial article collection only, de Groot is present in the frequently cited article collection only, and Costanza and Daly are present in both. The dataset documents were published in fifteen different journals – five in journals associated with either ecological or environmental economics, four in the *Oxford Review of Economic Policy* (in a special issue), four in *Ecosystem Services*, two in conservation-specific journals, two in sustainability-specific journals, and the remainder in other science- or environment-related journals.

*Dataset context check*

There are distinct co-authorship patterns, highly variable article citation, and uneven representation of geographic regions across the research fields the dataset was drawn from (Costanza & Kubiszewski, 2012; Buonocore et al., 2018; Pan & Vira, 2019; Apostolopoulou et al., 2021; Torres et al., 2021). The dataset is intended to represent current understandings of the natural capital concept, which this unevenness contributes to. For this reason, no attempt has been made to remove it. However, it is important to acknowledge and account for it as part of the document analysis process (Gross, 2018). An overview of the natural capital research field was developed to make these dynamics more visible to check if and how the dataset reflects this context, a co-authorship network diagram was generated as a reference to compare it against. The process of generating the diagram is described below, then the positions of dataset documents relative to co-authorship networks and other context points are outlined. The diagram is also used in the Results to check how this chapter's findings relate to these patterns (section 4.315).

The method of Buonocore et al. (2018) was followed (with additional data-cleaning steps) to perform an updated co-author cluster analysis. First, a search of the Scopus database for academic publications on the topic of natural capital from 1970 to 19th October 2021 (date of search) was conducted. (The Scopus database was used for compatibility with VOSviewer and because it indexes books and book chapters in addition to journal articles, which is helpful for visualising authorship structure across the research field overall even though these were not considered for inclusion in the content analysis dataset.) The search found 3,090 records (1,060 more results than the same search by Buonocore et al. (2018) three years earlier). The details of these records were exported using the function provided by the Scopus website. Next, the Scopus export file was edited in two ways to mitigate some issues that arise from the way VOSviewer reads bibliographic data: author identification numbers were added to author names (to prevent multiple authors with the same family name and initial being treated as a single author by the software); and author names for authors whose initials were listed inconsistently across records were edited to match each other (to prevent individual authors being treated by VOSviewer as two or more separate authors). Finally, a bibliographic network analysis of co-authorship was performed using VOSviewer (version 1.6.17), following Buonocore et al. (2018) in

using the program's default settings to exclude authors with fewer than five publications and publications with over 25 authors. 136 authors met these criteria and 101 were part of an interconnected set, with publications from 1988-2021. The co-authorship analysis showed a natural capital research field of thirteen distinct but relatively interconnected co-authorship clusters. An image of the co-authorship analysis was generated using VOSviewer and used as the basis for the reference co-authorship network diagram (Figure 4.2).

Out of this chapter's dataset, fourteen papers (of 22) are from 24 authors (of 65) across six of these clusters. The places of these papers on the co-authorship network diagram are shown in Figure 4.2 and outlined below, with reference to the co-author cluster labels from the figure (labelled in alphabetical order according to their position on the diagram).

Six papers in the dataset are from six authors in cluster B (Costanza & Daly-1992, Costanza et al.-1997, de Groot et al.-2003, Costanza-2020, Daly-2020, Fisher et al.-2021) – a central cluster in the co-authorship analysis containing nine authors – including all of the most highly cited authors in the interconnected network. The three older papers included in the dataset because they were frequently cited by papers in the initial collection, which are some of the highest cited papers about natural capital in general (Buonocore et al., 2018; Pan & Vira, 2019), are from authors in this cluster. Three papers are from four authors in cluster C (Mace-2019, Bateman & Mace-2020, Polasky & Daily-2021) – the largest cluster in the network with seventeen authors, which includes the majority of authors with an intermediate number of citations (relative to the network in the diagram). Two papers are from two authors in cluster D (Barbier-2019, Helm-2019) – the second largest cluster in the network, with sixteen authors. One paper is from five (of seven) authors in cluster A (Mancini et al.-2017), one is from four (of eleven) authors in cluster E (Hein et al.-2016), and one is from three (of seven) authors in cluster F (Maseyk et al.-2017). The dataset has papers by authors from all but two of the largest co-author clusters in the interconnected network (it has no papers from authors in the fifth largest cluster, which has eight authors, or a joint-sixth largest cluster with seven authors), which between them cover 67 of the 101 authors in the interconnected network (Fig. 4.2).

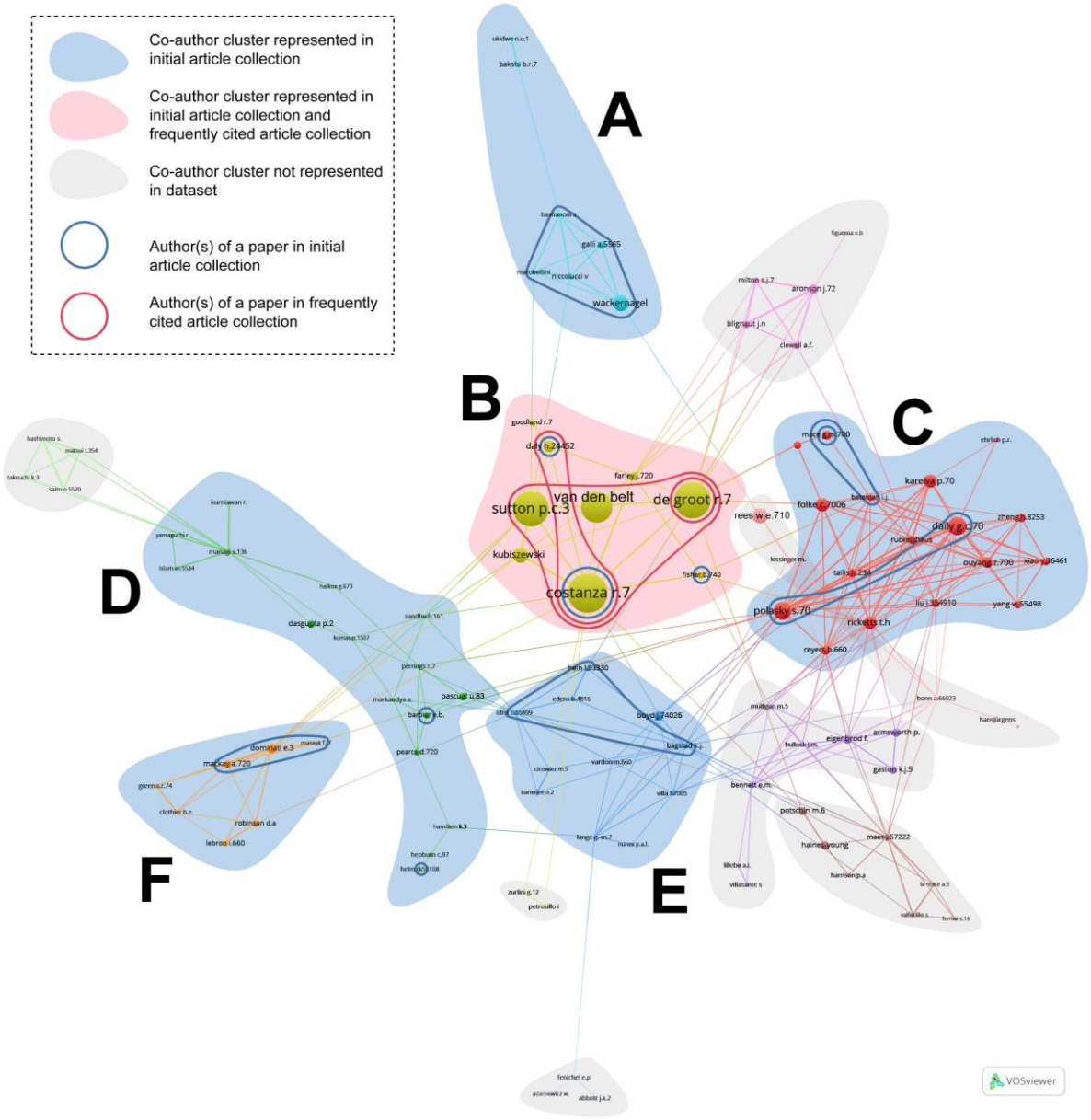


**Figure 4.2. Co-authorship network diagram and the place of documents from this chapter's dataset**. A co-author cluster analysis was performed using VOSviewer on an index of documents in the results of a Scopus search on the topic of natural capital from 1988-2021. Documents with over 25 authors and authors with less than five documents in the index were excluded from the analysis. The base cluster diagram was produced and orientated for visual optimisation by VOSviewer. Cluster shapes, cluster labels, and lines indicating papers in the dataset have been added. Circle sizes of the base diagram correspond to the number of citations of each author. Only co-author clusters with papers in the dataset are labelled. Clusters are labelled alphabetically from left to right, top to bottom.

Of the papers in the dataset with no authors in the largest interconnected group of the co-authorship network, two are by an author with more than five documents in the Scopus search but not in the largest interconnected group (DesRoches-2018, DesRoches-2020) and one reviewed papers by authors in an otherwise unrepresented co-author cluster (Furtado & Panhoca-2020). Five other papers

in the dataset are by authors not present in the co-authorship diagram (Mayer-2019, Özdemiroğlu-2019, Sullivan-2018, Leach et al.-2019, Gray-2018).

Special issues of journals also appear to have influenced which papers are in the dataset and are a source of connections between authors. Citations by Barbier-2019 and Mace-2019 are the basis for including Mayer-2019 (which does not have 'natural capital' in the title) in the dataset; these papers are all from a special issue of the *Oxford Review of Economic Policy*, where Helm-2019 and an article reviewed in Furtado & Panhoca-2020 (by Eli Fenichel and Yukiko Hashida) were also published (Oxford Academic, 2019). Polasky & Daily-2021 and Fisher et al.-2021 were both published in a symposium in an issue of the *Review of Environmental Economics and Policy*, along with an article by Edward Barbier (University of Chicago Press, 2021).

The vast majority of papers (21 of 22) were mainly or entirely authored by researchers based in Western, Global North countries. Most of these were based in the USA or UK at the time of publication (eight each, between them accounting for sixteen of the 22 papers). The remainder were authored by researchers based in Australia, Aotearoa New Zealand, and several northern and western European countries (sometimes also with UK- or US-based researchers). The older frequently cited papers were mainly by authors based in the USA or Netherlands. Only two papers in the dataset were authored by researchers based anywhere else, both with researchers based in South America – one of the twelve authors of Costanza et al.-1997 was based in Argentina and the authors of Furtado & Panhoca-2020 were based in Brazil. It is worth noting that the paper excluded based on apparent low quality (which seemed likely to be a result of translation difficulties) was authored by researchers based in Central Asia, and the paper excluded because of a lack of institutional access was published in an East Asian journal. (Neither of these papers were by authors on the co-authorship diagram as they had authored fewer than five documents in the Scopus search results).

The collection of documents has high coverage of the active research clusters across the natural capital concept's contemporary history, either directly (via authors) or indirectly (via co-author clusters). There is an uneven geographic distribution across the document authors, overrepresentation of highly cited papers and authors, and signs that collaborative links have influenced the documents included – all of which reflect the state of the research field shown by the co-authorship network diagram and other studies of research related to natural capital (e.g. Costanza & Kubiszewski, 2012; Buonocore et al., 2018; Pan & Vira, 2019; Apostolopoulou et al., 2021; Torres et al., 2021). Overall, the dataset can be considered reasonably representative of the overall research field where the documents originated and an appropriate source of presentations of the natural capital concept for this study.

### 4.223 Content analysis

The 22 papers in the final dataset were subjected to substantive content analysis, in which the messages in the texts were treated as a source of information on the current meanings (White & Marsh, 2006; Gross, 2018) of the natural capital concept in academic research on the topic, to establish a set of current presentations of natural capital concept. This began with coding the data, followed by displaying and condensing the coded data, and finished with identifying categories then themes across the data. These steps are explained below.

The concept of utilitarianism was used to construct an initial coding index. The justification for this methodological decision is as follows. Utilitarianism is both a moral and political theory according to which a particular value ought to be maximized (Riley, 2018). Economics, especially neoclassical economics, generally operates within a utilitarian framework (Baum, 2012; Tinch et al., 2019). Utilitarianism, as a normative ethical theory, is also relevant to conservation principles because it is one of the ethical foundations for many of the values of nature that are important to conservationists, as shown in Chapter 3. The eventual intention – the second objective of this chapter – is to test the content analysis results (i.e. the current understandings of the natural capital concept) against these conservation principles. As the general framework of utilitarianism as a 'value maximising' endeavour is relevant to both the economic concept of natural capital and ethical principles of conservation, utilitarianism is the most useful playing field to assess the concept on. So first, the concept must be interpreted through the lens of utilitarianism.

An initial coding index was constructed based on the value-maximising principles of utilitarianism, with parent topic codes to mark text that indicated what should be maximised, the ways it could be maximised, and for whom or what it was maximised in the natural capital concept. An additional topic code was created to mark text indicating the material items or processes 'natural capital' consists of. The content of these topic codes was specified by sets of descriptive codes within then, which were created and applied as the documents were read during the coding process. At this stage, the data were coded based on the way natural capital is explicitly discussed and explained or inferred (for example, from the way it is measured), and without considering the context of the paper as a whole. The authors, their affiliations, publication details etc. of the papers were not a focus at this stage but they were visible in the document during the coding process. The coding process was mostly deductive, since it began with a theory-derived set of codes that form the basis for subsequent analysis (Gross, 2018), but a necessary degree of openness regarding what was considered to be a statement about, for example, 'a way that the target feature could be maximised' allowed for a useful amount inductive influence from the data (Gibbs, 2018).

Next, the text of each document was reviewed in its entirety. Each paper was reviewed with the analytically coded text highlighted in its original context to ensure the meaning of coded data fragments had been accurately interpreted and to dismiss irrelevant content from further analysis. For example, if a paper discussed natural capital in various, contradictory ways in an introductory literature review then discussed it consistently in the paper's own contribution to the field, the latter was considered to be the relevant one for the purposes of this analysis. For another example, if a paper contrasted two different approaches to applying the concept but ultimately argued on behalf of one, the argued-for version way considered to be the relevant one. For empirical reviews or critical analyses where the paper described the natural capital concept without necessarily advocating for the version described, the findings of these studies are considered to be the relevant portion, whether the paper ultimately approves of it or not. The qualitative data analysis software NVivo (2020 release) was used in the coding and full text reviewing stages.

The content of the coding index topics (what is maximised, ways it is maximised, etc.) for each paper was charted in a spreadsheet using MS Excel. The document details (authors, publication year, title, etc.) were then hidden from view in the spreadsheet in order to reduce the level of researcher bias in the subsequent steps. It was not possible to eliminate this completely as paper content was potentially recognisable due to becoming familiar with it during the coding process and pre-existing familiarity with some papers from prior reading. The information in each spreadsheet cell was then summarised into its core elements.

Patterns in these core elements across the whole dataset were examined to identify the main presentations of the natural capital concept. The basic characteristics of the presentations were outlined before the document details were unhidden and the presentations were described in full, with reference to the condensed charted data and the original documents (to mitigate any loss or distortion of meaning that may have occurred during the data condensing stage). Some papers were moved into a different category in the course of revisiting the original documents and writing up the full descriptions, but this occurred relatively infrequently and mainly involved re-categorising papers as a partial or intermediate presentations.

*Findings context check*

The natural capital concept presentations established from content analysis of the dataset were compared with the co-authorship network diagram (generated as described above, section 4.222) and some additional context information to note their positions relative to these features of the research field.

## 4.23 Evaluating the ethical compatibility between the natural capital concept and conservationist principles

The ethical compatibility of the natural capital concept presentations with conservationist principles was evaluated by comparing them with the ethical interpretation of descriptive value categories from Chapter 3.

The descriptive value categories ('empirical values') are VNRN as described by study participants, who were 26 conservation practitioners working in strategic level positions in 19 UK-based conservation organisations. An investigation into normative support for the empirical values found that interpreting them in terms of the relevant philosophical values in a utilitarian form of environmental ethics ('ethical values'), based on an account by Birnbacher (1998), allowed most of them to have a reasonable normative foundation from this theory. Full details of the dataset and the analyses used to develop and investigate normative support for the empirical values can be found in Chapter 3. The empirical values developed in Chapter 3 were labelled Missed Instrumental Value, Assigned and Attributed Value, Inherent Value, Objective Intrinsic Value, and the Value of X. Assigned and Attributed Value and Inherent Value were relatively similar from a utilitarian ethics perspective so they are collectively referred to as 'Attributed Value' in this chapter. Objective Intrinsic Value refers to participants descriptions of value in nature that does not require a subjective valuer; this type of value was mentioned by relatively few participants, was difficult to find normative support for, and it is already well established that it is incompatible with or separate from anthropocentric approaches to nature (Beau, 2019), so it is not examined further in this chapter.

The investigation into support for the empirical values from utilitarian ethics means they can be formulated in terms of the value-maximising principles of utilitarianism. These 'empirical-ethical values' are outlined below and summarised in Table 4.2. (NB: The same labels are used as in Chapter 3 for the sake of continuity, other than Attributed Value as noted above. In Chapter 3 these generally referred to the empirical values only, but in this chapter they refer to the ethically-interpreted version.) This puts them into a similar conceptual format to the natural capital presentations identified in this chapter, which were interpreted in terms of their utilitarian functions and features in the above analysis.

Missed Instrumental Value describes value in nature that is instrumental in bringing about wellbeing benefits for humans and humanity, meaning it has instrumental value as the cause of an intrinsically valuable state (e.g. wellbeing, happiness). (Desirable states experienced by sentient beings have intrinsic value in the utilitarian environmental ethics described by Birnbacher (1998).) Participants spoke in particular about life-sustaining benefits as well as intangible benefits, which the beneficiaries

did not need to be able to articulate or even be fully aware of, and emphasised that all people should receive these benefits, taking equitable access and future generations into account. Attributed Value describes value in nature that is 'placed on' or 'seen in' nature as a result of reflection by a sapient being, often based on principles or beliefs held by an individual or community, and attributed to specific places that are 'their own'. In a utilitarian environmental ethics, this gives nature inherent value because it is the object of an intrinsically valuable state (e.g. spiritual contemplation). Participants referred to society and communities as the subjective valuers in these cases, including communities beyond one's own. For these participants this included indigenous communities and future people, for example. The subjective valuers are individuals under a utilitarian ethics perspective, but as members of society and community. The Value of X category accounts for participants expressing VNRN according to the entity that has a value, more so than the kind of value it might have. This was a common type of description that was difficult to find normative support for in the way it expressed by participants, but there were signs that it could be included variously as one of the other types and therefore find support from utilitarian ethics in the same way (other than if the intended meaning was closest to Objective Intrinsic Value). Participants mostly described 'biodiversity' and 'species' as having this value, which were rarely given as the value bearing entities in other value categories (Table 4.2).

**Table 4.2. Summary of empirical-ethical values used in this chapter's analysis.** The empirical-ethical values are interpretations of empirical values from Chapter 3 (descriptive categories of values in nature that study participants or their fellow conservationists feel are important and potentially at risk from the use of natural capital approaches in conservation) according to the utilitarian environmental ethics principles outlined by Birnbacher (1998). 'Attributed Value' refers to 'Assigned and Attributed Value' and 'Inherent Value' collectively in this chapter.

| **Empirical-ethical value** | **Item with intrinsic value (to be maximised)** | **Ways of maximising intrinsic value** | **Subject of intrinsic value** |
|---|---|---|---|
| *Missed Instrumental Value* | Conscious states, e.g. wellbeing or pleasure. | Protection of and access to entities with *instrumental value*, which *cause* intrinsically valuable states. | Members of humanity, all people equitably, future generations. |
| *Attributed Value* | Reflective conscious states, e.g. spiritual contemplation. | Protection and perception of entities with *inherent value*, which are the *object* of intrinsically valuable states. | Members of society and communities, communities beyond one's own. |
| *The Value of X* | Unclear. Value usually held by 'biodiversity' or 'species'. Could sometimes be treated as one of the other descriptive value categories. | | |

To assess the ethical compatibility of the natural capital concept with conservation principles, the empirical-ethical values (representing a set of conservation practitioner principles) were used as requirements against which to evaluate the natural capital presentations (representing the natural capital concept). They were compared according to their utilitarian features and functions: the maximised item in the goal outcome; how this outcome can be reached; who or what is or is not a beneficiary of this outcome. The entities that would or should be encompassed are also compared, since these were often distinct (e.g. 'own land') or the main feature of concern (i.e. for the Value of X) in participant descriptions. This comparison shows the extent to which the natural capital presentations are conceptually or functionally compatible with ethical features of concern to conservation practitioners (e.g. accommodating a wide range of benefits, reflection rather than benefits as a route to the maximised item, an inclusive range of beneficiaries including future generations of humanity and indigenous people).

# 4.3 Results

Three presentations of the natural capital concept were identified from the papers selected to represent how the core concept is understood. Each presentation has a different level of compatibility with the values of nature identified in Chapter 3 as important to conservationists but potentially at risk when applying the natural capital concept (VNRN). The presentations of the concept and the ethical fit with these conservation principles are demonstrated below.

## 4.31 Current presentations of the natural capital concept

The three presentations of the natural capital concept are labelled here as the 'profit presentation', the 'service flows presentation', and the 'community presentation'. They differ from each other in terms of what is maximised, the range of benefit types that are possible routes to that outcome, and whom or what the emphasised beneficiaries are. Seventeen of the 22 papers in the dataset articulated one of these presentations, two were compatible with one of them but did not fully articulate it, two articulated a mixed or intermediate presentation, and one did not fit any of the groups but articulated additional features of the concept. The natural capital concept presentations are described in full below and their components are summarised in Table 4.3.

As previously noted, the format 'Smith & Jones-2020' is used when referring to a document and its content within the context of this analysis (Table 4.1). Details of sources cited in quoted text are shown in footnotes.

**Table 4.3. Summary of presentations of the natural capital concept identified from analysis of papers in this chapter's dataset.** The dataset consists of 22 papers examining or explaining the concept, selected according to defined criteria from results of a targeted Web of Science search (published July 2016-June 2021, "natural capital" in *Title* field, "approach OR concept OR framework" in *Topic* field).

| Concept presentation | Maximised item(s) | Routes to maximising item | Emphasised subject |
|---|---|---|---|
| *Profit presentation* | Income, profit. | Obtaining known benefits that are visible in quantitative terms (including monetised and market-based). | Businesses, financial institutions. |
| *Service flows presentation* | Ecosystem service flows according to preferences, leading to wellbeing. | Preferences and needs for service flows are observable and inferred from choices made. Wellbeing delivered via the economy. | Current members of society. |
| *Community presentation* | Met preferences and/or wellbeing. | Preferences and needs for openly-defined benefits are both articulated and considered. Wellbeing delivered in various ways. | Public society, with intra- and inter-generational equity. |

### 4.311 Profit presentation

The profit presentation of the natural capital concept is broadly characterised by prominently featuring or prioritising private financial interests. Two papers in the dataset displayed this version, each from a different perspective. Özdemiroğlu-2019, titled 'Natural capital – a practitioner's overview of concepts and applications', describes the natural capital concept and its applications by policymakers and businesses from the perspective of an environmental economics consultant. Sullivan-2018, titled 'Making Nature Investable: from Legibility to Leverageability in Fabricating "Nature" as "Natural Capital"', describes how the natural capital is articulated in recent grey literature related to environmental policy and at 'green economy' policy-orientated events from the perspective of an academic participant.

Monetary income and profits feature prominently as the maximised item in this presentation of the natural capital concept, with these items being identified as the goals sought when in engaging with the natural capital concept more frequently compared to other papers in the dataset, either explicitly in Sullivan-2018 or implicitly in Özdemiroğlu-2019 (implied via a focus on for-profit beneficiaries).

The range of potential ways to benefit from ecosystems are primarily ones that can be identified and understood in quantitative, financial terms. This focus is inferred from quantitative or monetary

valuation-based tools being the types most regularly mentioned in Özdemiroğlu-2019, including assessment and decision-support tools (such as the Natural Capital Project's InVEST, the LEEP Institute's Outdoor Recreation Valuation Tool, and eftec's corporate natural capital accounting framework) and investment and market-based tools (such as 'green bonds' and reverse auctions). Özdemiroğlu-2019 notes in the concluding remarks that people's qualitatively understood needs and principles should be incorporated into analyses but that additional work towards this aim is needed. An emphasis on quantitative, financial terms in defining the benefits obtained from natural capital is shown in the analysis of natural capital tools reported in Sullivan-2018, such as in the following statement:

> *Natural capital accounting practices propose numbering and calculative applications to generate mathematical objects as a new set of numerical entities fabricated through practices of numerical abstraction and the creation of commensurability between these thus numbered entities. Through these numbering acts, mathematical objects are vested with the power to act as surrogate or proxy measures that represent the productive nature aspect under consideration. These surrogate numbers are then economized, i.e. are connected with some notion of market performance as denoted by priced values— (p. 56)*

The emphasised primary beneficiaries (i.e. those which are most frequently framed as beneficiaries in comparison to other potential beneficiaries) are businesses and corporations, landowners, financial institutions, and other private sector investors. These profit-orientated entities are framed as having some degree of control in applications of the natural capital concept, either through ownership of natural capital assets and identifying those that supply benefits to wider society in corporate accounts (in Özdemiroğlu-2019; the quote below is an example of this idea being visible), or by influencing how values are articulated through corporate presence in policy development environments, private sector consultancy engagement by policymakers, and directly by developing natural capital investment tools and contributing to the development of other natural capital-related decision-support tools (in Sullivan-2018). Wider society is a lower priority than owners and investors of natural capital assets in this presentation of the natural capital concept. This is suggested by how its application is framed or critically evaluated, with statements such as:

> *Natural capital accounting answers the following questions (eftec et al. 2015)[15]:*
>
> - *What natural capital assets does the business own, or manage, or depend on?*

[15] eftec, RSPB & PricewaterhouseCoopers (2015) *Developing Corporate Natural Capital Accounts* (Report for the Natural Capital Committee).

- *What flows of benefits do the assets produce, both for the business and for wider society?*
- *[list continues]*

*Özdemiroğlu-2019 (p. 348)*

> *[...] natural capital thinking promotes financial reward structures to incentivize a shift in practices by existing producers and land-owners into 'green economy' renderings (of which [biodiversity offsetting] is one [...]). Little attention is paid to the ecological debt experienced by broader society that often has been generated through historical productive and appropriation practices associated with these same actors [...]*

*Sullivan-2018 (p. 60)*

These accounts differ in their optimism about whether wider society receives benefits as a result of owners and investors applying the natural capital concept, but in either case wider society is secondary to private interests.

Regarding which aspects of nature are encompassed within the concept, 'natural capital' is presented as practically or conceptually equivalent to 'nature' in the profit presentation. Özdemiroğlu-2019 and Sullivan-2018 both state this idea explicitly (though the authors differ on whether they are favourable towards this idea):

> *My short-hand for 'natural capital' is 'everything above, on, in and under land, water and the sea'. When I first mentioned this in a presentation, someone asked 'Isn't that just nature?' It is indeed and we must not forget that.*

*Özdemiroğlu-2019 (p. 344)*

> *This 'stock of natural capital' is increasingly conceived as all of 'external nature' [...]*
>
> *'Nature' as 'natural capital' is thus framed in environmental and ecological economics and associated policy (con)texts as physical stocks of 'nature' [...] that produce 'natural resources' as definable 'goods', 'services' and 'values'.*
>
> *[...] a normalising conception of 'nature' as a dividend-generating capital asset is coming further into focus through initiatives that seek to account for this asset and financially materialise its 'dividends'.*
>
> *[...] thinking of nature as capital engenders confusion rather than clarity.*

*Sullivan-2018 (pp. 53, 53, 54, 55)*

**4.312 Service flows presentation**

The service flows presentation of the natural capital concept is broadly characterised by a focus on the valuation and provision of ecosystem service flows according to observed needs and preferences, and an implicit acceptance of the links from economic prosperity or service flows to social wellbeing. Six papers in the dataset provide examples of this presentation: Barbier-2019; Furtado & Panhoca-2020; Hein et al.-2016; Leach et al.-2019; Maseyk et al.-2017; and Polasky & Daily-2021. Most of these papers define or classify natural capital assets, suggest strategies for their management, measurement, or valuation, and/or clarify the underpinning economic principles. Furtado & Panhoca-2020 is a review of how natural capital variables are measures. This presentation of the natural capital approach is identified from the way it is described and discussed in these contexts.

It is difficult to single out a typical 'maximised item' in the service flows presentation of the natural capital concept as it is more accurately characterised by how the relationships between components are explained. Two relationships in particular are important in describing it: between the economy, services, and beneficial outcomes for subjects; and between subjects and valuation of flows of ecosystem goods and services.

A variety of subjects are identified as beneficiaries in the service flows presentation, including people, society, countries, businesses, and financial institutions, with no strong emphasis on any more than the others. 'The economy' is also more regularly framed as a beneficiary in this presentation compared to others, for example with phrases such as:

> *Natural capital assets support the ecosystem services that underpin our economy and thus deliver inputs or indirect benefits to business (Guerry et al., 2015)[16].*
>
> *Leach et al.-2019 (p. 1)*

> *[...] meeting the demands of a growing economy and human population [...] (Guerry et al. 2015)[17].*
>
> *[...] services that provide vital infrastructure underpinning economic activity and human wellbeing (Daily 1997; Polasky et al. 2015)[18].*
>
> *Polasky & Daily-2021 (pp. 88, 89)*

[16] Guerry AD et al. (2015) *Proc. Natl. Acad. Sci. Unit. States Am.* **112**(24): 7348–55.

[17] As previous.

[18] Daily GC (ed.) (1997) *Nature's Services: Societal Dependence on Natural Ecosystems*, Island Press; Polasky S et al. (2015) *Annu. Rev. Resour. Econ.* **40**(1):445-66.

> *[...] natural capital also consists of those ecosystems that provide important goods and services to the economy.*
>
> *[...] which requires that the per capita welfare of an economy does not decline over time.*
>
> *Barbier-2019 (pp. 14, 31)*

The economy itself is not necessarily the final beneficiary according to this presentation of the concept; humanity or society, which benefits by way of supported wellbeing[19], is usually given as the ultimate beneficiary. This wellbeing is achieved as a result of receiving flows of ecosystem goods and services (directly or with the input of via economic production), or it is a result of economic prosperity itself.

However, a characteristic feature of the service flows presentation of the natural capital concept is implicit acceptance of the premise(s) that service flows and/or economic prosperity lead to human wellbeing without further examination. These premises are usually mentioned and are not necessarily treated as if no further information is relevant. Some papers cite a source when they are stated (e.g. Leach et al.-2019) or clearly note their place in expanded definitions of the natural capital concept (Maseyk et al.-2017). Barbier-2019 primarily refers to an economic understanding of 'welfare' in its discussion of a capitals approach to sustainability, in which economic prosperity and people's general wellbeing are framed as close to synonymous, such as in the following example:

> *[...] an increase in wellbeing today should not have as its consequences a reduction in wellbeing tomorrow. That is, future generations should be entitled to at least the same level of economic opportunities— and thus at least the same level of economic welfare—as currently available to present generations. (p. 18)*

Polasky & Daily-2021 is an exception within the papers showing this presentation by discussing empirical research on links between human health or livelihoods and ecosystem services from natural capital (including a discussion of Fisher et al.-2021, another paper in the dataset from the special issue of the Review of Environmental Economics and Policy that Polasky & Daily-2021 is an introduction to, and which had an intermediate presentation of the natural capital concept). However, demonstrating if or how wellbeing follows ecosystem services and/or economic prosperity is not a focus in this presentation of the natural capital concept overall.

[19] 'Wellbeing' and 'welfare' are treated as synonymous unless otherwise stated, as most papers used both terms without notably different meanings or used them infrequently. For consistency, the spelling 'wellbeing' is used instead of 'well being' or 'well-being' in quoted text.

Another distinguishing feature of the service flows presentation regarding subject identity is an emphasis in practice on current members of society, regardless of whether they are a business, a country, or people in general. This is implied by current generations' role as active valuers, not only passive beneficiaries, in natural capital measurement and management decision-making processes. Only the choices and expressed preferences of current members of society are taken into account, and it is their choices which determine what is used and what is preserved for future generations. In this way, the interests of current members of society – especially those whose needs and preferences are captured in the valuation process – are given greater weight than future generations. When the interests of future generations are mentioned, they are to be given sources of services, not necessarily natural capital itself, so their options may be limited in this way.

> *[...] it is the total stock of capital employed by the economic system, including natural capital, which determines the full range of economic opportunities, and thus wellbeing, available to both present and future generations. Society must decide how best to use its total capital stock today to increase current economic activities and welfare, and how much it needs to save or even accumulate for tomorrow and, ultimately, for the wellbeing of future generations.*
>
> *Barbier-2019 (p. 18)*

> *The measurement of the NC depends on the choices of society: to use it in the present or to preserve it for the future. [Referring to Fenichel et al. (2016) and Fenichel & Hashida (2019)[20].]*
>
> *Furtado & Panhoca-2020 (p. 3)*

The value of these services is determined through various processes (identified as non-market valuation in some papers), including the observed demand and use of ecosystem services by subjects, or otherwise articulated expressions of value.

> *Natural capital creates value because it generates flows of ecosystem services. One approach for estimating the value of natural capital is to estimate the present value of the flow of ecosystem services it generates. Biophysical models can be used to estimate the volume of these flows, and nonmarket valuation methods (e.g., the hedonic property price method, choice experiments) can then be applied to estimate the value of these service flows (NRC*

[20] Fenichel EP et al. (2016) *Proc. Natl. Acad. Sci. Unit. States Am.* **113**(9):2382-87; Fenichel EP & Hashida Y (2019) *Oxf. Rev. Econ. Pol.* **35**(1):120–37.

*2005; Polasky and Segerson 2009; Barbier 2013)*[21]*.*

*Polasky & Daily-2021 (p. 89)*

*[...] regardless of whether or not there exists a market for the goods and services produced by ecosystems, their social value must equal the discounted net present value (NPV) of these flows (Barbier, 2011; Fenichel and Abbott, 2014; Fenichel and Hashida, 2019)*[22]*.*

*Barbier-2019 (p. 17)*

*The value assigned to the benefits from ecosystem services received by communities will exert influence through feedback to the size and scale of intervention [...]*

*Maseyk et al.-2017 (p. 214)*

In order to improve the definition of natural capital assets, Hein et al.-2016 describes concepts to understand ecosystem service flows beyond their net present value, including an ecosystem's service flow capacity (sustainable harvest rate under current conditions and management), potential supply (regardless of demand), and capability (ability to sustainably generate an ecosystem service when prioritising it and accepting a decline in the ecosystem's capacity to generate other services). Hein et al.-2016 "equate[s] 'supply' and 'use' of the service" (p. 4), as per the principles of the System of National Accounts, and additionally consider the demand for a service in the capacity and capability dimensions. The analysis of natural capital measurement in Furtado & Panhoca-2020 describes studies in which natural capital is similarly defined and measured according to the use of ecosystem service flows.

*This type of bottom-up approach also has the characteristic of measuring the interactions of several areas of study to determine the definition of the NC (Fenichel and Hashida, 2019).*

*Couharde et al. (2011)*[23] *also argued that the NC should be measured by observing the need to use resources. The NC variables are those used by people and offered to the market as products from fishing, agriculture, hunting, and mining.*

*Furtado & Panhoca-2020 (p. 3)*

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[21] NRC [National Research Council] (2005) *Valuing ecosystem services: Towards better environmental decision-making*, National Academy of Sciences; Polasky S & Segerson (2009) *Annu. Rev. Resour. Econ.* **1**(1):409-34; Barbier EB (2013) *Environ. Dev. Econ.* **18**:133–61.

[22] Barbier EB (2011) *Capitalizing on Nature: Ecosystems as Natural Assets*, Cambridge University Press; Fenichel EP & Abbott JK (2014) *J. Assoc. Environ. Resour. Econ.* **1**:1–27; as previous.

[23] Couharde C et al. (2011) *Eur. J. Dev. Res.* **23**:151–73.

### 4.313 Community presentation

The third presentation of the natural capital concept identified from the papers in the dataset is the community presentation. It is characterised by a broad, open, or holistic view of human-nature relationships, a nuanced account of the role of the economy, and an emphasis on making decisions for human communities as a whole. Compared with the service flows presentation, in which the flow of ecosystem services is central in various ways, the community presentation places emphasis on the components on either side of those service flows (the source and recipients) and the route between them. Nine papers in the dataset show this presentation: Bateman & Mace-2020; Costanza & Daly-1992; Costanza et al.-1997; Costanza-2020; Daly-2020; de Groot et al.-2003; Helm-2019; Mace-2019; and Mayer-2019. Most of these papers explain or reiterate the principles of the concept and/or discuss an approach to applying it, while Costanza et al.-1997 presents a 'worked example' of a global natural capital valuation as a way to demonstrate its importance to humanity.

The subject's wellbeing or meeting their wants and needs are maximised in the community presentation. Both are mentioned by most examples and neither stands out as a sole objective across the presentation, but the goal of maximising one of these closely related outcomes is always clearly visible. Maximising wellbeing is apparent as the priority in some papers by reiterating it as the desirable outcome, including de Groot et al.-2003, Costanza et al.-1997, and Costanza-2020. Meeting wants and needs is present in these examples in effect (shown via the measurement principles described or within the ways the subject benefits) but as a means to bring about wellbeing, the primary goal. In others, the idea that wellbeing improvements are a result of meeting wants and needs is noted but the latter is the goal rather than the means to reach it. For example, in Helm-2019 the outcome of preference satisfaction is functionally prioritised by the following goal:

> *The aim is to give people the maximum scope to exercise their choice, not to make them necessarily happy. There is more to a good life than utility on this view. (p. 6)*

Maximising the ability to meet wants and needs is a functional outcome of maximising the choices available, even though in Helm-2019 this is explicitly based on a deontological rights-based approach and a rejection of 'classic' wellbeing-maximising utilitarianism. Mayer-2019 also describes a deontological obligation that maximises the choices available to subjects, with the same functional outcome of maximising met needs and wants.

The community presentation of the natural capital concept is further characterised by allowing an inclusive range of routes to the objective – that is, a broad range of ways to improve wellbeing or a broad range of needs and wants to meet. For example, de Groot et al.-2003 articulates this by describing an extensive range of socio-cultural features and mechanisms that bring about the desired

outcome, wellbeing in this case, and so should be considered a factor contributing to criticality of natural capital (the paper's topic), in addition to and in combination with ecological and economic factors, such as:

> *Natural areas contribute crucially to many of these [health-determining] needs by providing, among others, [...] physical space for nature-based sports, recreational activities and social gatherings (thus strengthening social ties and cohesion) and opportunities for relaxation and reflection (thus reducing stress and enhancing mental wellbeing). […] [Amenity benefits] are often derived from the aesthetic qualities of a given natural area and the recreative possibilities it offers, such as the appreciation of a pleasant natural scenery, the joy of learning and understanding during nature hikes and naturalist expeditions and the experience of solitude and contemplation in natural surroundings. Although difficult to measure, the amenity value of nature contributes significantly and maybe even critical to human wellbeing. […] most people feel the need to experience a sense of continuity in their environment. (p. 195)*
>
> *To many people, saving natural areas and endangered species for bequest or ethical reasons is (very) important to their feeling of wellbeing [...] (p. 196)*

The possibility of an inclusive range of routes to the desired outcome is sometimes implied by clear statements of the desired outcome. These statements make the outcome central to understanding and applying the natural capital concept, a defining requirement rather than a likely and generally agreeable end result. The quote from Helm-2019 above is an example of such a statement. Another comes from Daly-2020, an opinion article titled 'A note in defense of the concept of natural capital', when the fundamental role of a wellbeing objective in the underlying philosophy is highlighted:

> *Costing nature does not tell us that it is devoid of intrinsic value. It actually presupposes that nature has both intrinsic and instrumental value. Instrumental value derives from its contribution to intrinsic value. I take the locus of intrinsic value to be the sentient capacity of all creatures to enjoy life. (p. 1)*

Alternatively, the importance of the outcome may take the form of questioning the objective of the concept's application, which is seen in Mace-2019 and Mayer-2019.

The range of ways that the desired outcome can be reached is also expanded in the community presentation of the natural capital concept by including considered benefits, beyond the most readily apparent and accounted for. One way this is shown is through the extensive list of possible benefits in de Groot et al.-2003. Another is by cautioning against valuation processes likely to overlook them, for example:

> *[...] people's perceptions are limited, they do not have perfect information, and they have limited capacity to process the information they do possess (Khaneman, 2011)[24] so the connection between an individual's perception of an object or action's ability to achieve their goals and the reality of that connection may be very imperfect. An object or activity may therefore contribute to meeting an individual's goals without the individual being fully (or even vaguely) aware of the connection.*
>
> *Costanza-2020 (p. 2)*
>
> *In [conventional cost-benefit analysis], it is not just that everything is monetized, but that this monetization is achieved by techniques that reveal the underlying consumer preferences [...] The problems involved in these exercises are well known. The prices emerge from current consumers' preferences, against their imperfect information.*
>
> *Helm-2019 (p. 8)*
>
> *[...] false accounting risks being far more destructive than no accounting. Indeed, so serious is the risk, apparently worthy attempts to protect our natural capital through recognizing its value threaten to have precisely the opposite effect of hastening its eradication.*
>
> *Mayer-2019 (p. 110)*

The inclusion of more carefully considered benefits (rather than only cautioning against their exclusion) in the community presentation is shown in these papers and others alongside the ways they incorporate the interests of a wider range of subjects, so these are described together later in this section.

An inclusive range of ways to reach the objective of maximising wellbeing or satisfaction of preferences is not universal across papers that otherwise correspond with the community presentation. Those that do not describe or imply this in the ways discussed above, often because it is outwith the paper's focus, but otherwise show definitive features of the community presentation (including Costanza & Daly-1992, Costanza et al.-1997, Mace-2019, and Bateman & Mace-2020) generally acknowledge the complexity involved in the processes that give rise to these outcomes. In particular, these papers and several others describe a nuanced or complex role of economic factors in bringing about the objective, which is another characteristic feature of this presentation. This appears in two ways. First, interaction with human activity or economic factors, such as human, social or

[24] Kahneman D (2011) *Thinking Fast and Slow*, Farrar, Straus and Giroux.

manufactured capital, are established as frequent or essential requirements to obtain beneficial items from nature. For example:

> *Each form of capital stock generates, either autonomously or in conjunction with services from other capital stocks, a flow of services that may be used to transform materials, or the spatial configuration of materials, to enhance the welfare of humans. Costanza et al.-1997 (p. 254)*
>
> *[...] many of these benefits lie several steps away from functions and processes of the natural environment and they involve multiple interacting processes in nature as well as inputs of produced material and human labour and resources.*
>
> *Mace-2019 (p. 57)*
>
> *For example, while there may be crop relatives that exist in nature, the benefits that people derive from food and agriculture require, at the very least, human labour and ingenuity, energy and machinery, and transport systems.*
>
> *Bateman & Mace-2020 (p. 777)*

Establishing the role of these interactions in obtaining benefits from ecosystem services is not unique to the community presentation, but it is given notable weight when explaining the natural capital concept. This is highlighted by several papers (Costanza & Daly-1992, de Groot et al.-2003, Mace-2019, Bateman & Mace-2020, and Costanza-2020) using a figure of embedded or multiply-interlinked components illustrate these interactions in addition to explaining them in the text.

The second way in which economic factors have a more nuanced role in the community presentation is through the type of economic engagement with natural capital that will result in the best outcome for people. In the community presentation, humanity's reliance on natural capital makes it a constraint on economic growth, but this need not be a constraint on human wellbeing or meeting human needs and wants. This is in part through breaking down a direct equivalence between 'the economy' and human wellbeing. For example, Costanza et al.-1997 points out:

> *A large part of the contributions to human welfare by ecosystem services are of a purely public goods nature. They accrue directly to humans without passing through the money economy at all. (p. 255)*

As well as the economy not automatically translating to human wellbeing, in several examples of this presentation the economy sits within the wider ecological system and is subject to the constraints that entails:

> *We believe that, if we are to achieve sustainability, the economy must be viewed in its proper perspective, as a subsystem of the larger ecological system of which it is a part [...]*
>
> *Costanza & Daly-1992 (p. 40)*

> *Built capital and human capital (the economy) are embedded in society, which is embedded in the rest of nature.*
>
> *Costanza-2020 (p. 3)*

> *Nature does not do everything, but it does underpin almost everything on which society depends, making its contribution both extensive and fundamental [...]*
>
> *Mace-2019 (p. 60)*

Improving human wellbeing is an objective of this early paper. To achieve this, Costanza & Daly-1992 first distinguishes between two sources of economic expansion – increasing economic throughput, which they call 'growth', or increasing economic efficiency, which they call 'development' – and states that while both can bring about improved human wellbeing:

> *Growth is destructive of natural capital and beyond some point will cost us more than it is worth—that is, sacrificed natural capital will be worth more than the extra man-made capital whose production necessitated the sacrifice. At this point growth has become anti-economic, impoverishing rather than enriching. Development, that is qualitative improvement does not occur at the expense of natural capital. There are clear economic limits to growth, but not to development. (p. 43)*

Daly-2020, holding the wellbeing of sentient creatures to be important, describes how "the concept and limitative role of natural capital undercuts growthism's feel-good fairy tale of ever more things, for ever more people, forever", with a proposed solution of "moving from a growth economy to a steady-state economy" (p. 3) with lower natural capital throughput.

Other examples of the community presentation of the natural capital concept do not make such clear statements about limits on 'economic growth', but note that changes from standard economic processes are required in order to manage natural capital for the best outcome for the subject. The term 'economic growth' appears (in a way similar to the 'development' meaning of economic expansion described by Costanza & Daly-1992) in Helm-2019, when describing how polluters paying for damage to natural capital would result in land use and environmental quality changes "in the direction of a more efficient economy. This would increase economic growth, properly measured" (p. 11). Mayer-2019 cautions that "[u]nrestrained adoption of economic approaches to managing natural

capital is therefore not only unjustified but also inappropriate and potentially catastrophic" (p. 118) and argues that a greater focus on the cost of maintaining natural capital assets would result in a better outcome by providing a counterbalance to economic approaches to valuing its outputs. Overall, unrestrained economic growth is generally not conducive to maximising benefits to subjects from natural capital in the community presentation.

The subjects – the people whose wellbeing is to be improved or whose needs and wants are to be met – within the community presentation are members of society or humanity, with a strong emphasis on fair distribution and future generations (i.e. intra- and inter-generational equity). As indicated by the label used for it in this analysis, this is a core defining feature of this presentation, which underpins several of the features already described.

One way in which the interests of future generations are shown to be important in the community presentation is through raising concerns about the practice of discounting in natural capital valuation. Costanza & Daly-1992 explains discounting as follows:

> *[...] discounting at best only reflects the subjective valuation of the future to presently existing individual members of human society. Discounting is simply a numerical way to operationalize the value judgment that (1) the near future is worth more than the distant future to the present generation of humans, and (2) beyond some point the worth of the future to the present generation of humans is negligible. (p. 42)*

Helm-2019 similarly notes that "[a]nything beyond 2100 is practically irrelevant" (p. 5) under these practices and questions:

> *Do we really have no obligations to future generations to bequeath these renewables to them, so that they can benefit from the optionality they provide? The neoclassical answer is that it doesn't much matter, provided we give them compensating manmade capital [...] (p. 6)*

Valuation of natural capital on the basis of the net present value of service flows is also identified as a problem regarding the inclusion of future generations, as their options may be limited as a result of current generations valuing natural capital according to their own limited understanding. For example:

> *These ecosystem accounts [based on estimates of net present value of ecosystem services] [...] remain partial and biased estimates of the potential contributions of any ecosystem to society and inevitably prioritize currently known needs over future options.*
>
> *Mace-2019 (p. 57)*

> *There is [...] a systematic undervaluation of natural capital that comes from our inability to determine the option values that future generations will derive from its preservation and the irreversibility associated with its destruction. The option value does not just come from unanticipated new demands for ecosystem services but also from new forms of services themselves.*
>
> *Mayer-2019 (pp. 114-5)*

In the community presentation, future generations should be provided with options, not simply sources of service flows or inputs to economic production. In some cases, this is based on the rights of future people as citizens and obligations on current generation:

> *[...] future citizens are entitled to a set of assets which gives them the opportunities to make their choices about how they want to live their lives, and how they want to organize production.*
>
> *Helm-2019 (p. 6)*

> *[Natural capital's] distinctive features [...] make it fundamentally different from other forms of capital. They make its option values to future generations particularly large and difficult to evaluate. They make its preservation and promotion of exceptional value, and they impose particular obligations of guardianship and trusteeship upon us.*
>
> *Mayer-2019 (p. 118)*

An inclusive range of ways to reach the objective (of improved wellbeing or satisfied preferences) is a characteristic feature of the community presentation of the natural capital concept, as mentioned above. In addition to including or allowing for the possibility of a wide range of known and articulated benefit types, more carefully considered benefits from natural capital are included in this presentation. This is also a way in which the range of subjects is expanded to include future generations and all of society with fair and equitable distribution. Providing future generations with options is one such considered benefit. The 'consideration' process is especially visible in Bateman & Mace-2020 and Mace-2019 in suggestions about how to facilitate the maintenance of natural capital that is capable of providing them, through measurement and management approaches that appropriately account for key ecosystem features rather than only on what is valued at the current time:

> *One way to do this is to base accounting around the core features of ecosystems and ensure that these fundamental functionings and capabilities are maintained for future generations*

*and not squandered in present-day endeavours to maximize a small set of currently highly valued services.*

*Mace-2019 (p. 65)*

These considered benefits also include those related to overall community wellbeing – especially those that may not be perceived (and therefore not articulated in valuation processes) by individuals – which emphasises both inter- and intra-generational equity among the subjects. This is shown, for example, through proposals of valuation processes that require individuals to act as members of a community, in which case it would be expected that they:

*[...] would engage in much discussion with other members of the community and come to consensus on the values that would be fair to all members of the current and future society (including nonhuman species), incorporating scientific information about possible future consequences as necessary.*

*Costanza-2020 (p. 2)*

In addition to valuation via expressed and readily observable preferences, the role of governmental public policy in supporting less visible needs is emphasised in the community presentation of the natural capital concept. Several examples describe this, including Costanza & Daly-1992, Costanza et al.-1997, Helm-2019, Mayer-2019, Costanza-2020, and Bateman & Mace-2020, which gives further evidence for the importance of societal equity as a feature of the subject in the community presentation. For example:

*Given inequalities of power and influence, there is also a growing imperative to explicitly consider how limited resources at a variety of scales are shared between the competing claims of different groups in society. Within a political and moral economy such decisions cannot be guided only by simple heuristics.*

*Bateman & Mace-2020 (p. 781)*

Finally, the community presentation includes one of the few papers specifying indigenous people as a subject which benefits from natural capital. Again, this is related to the additional consideration given to potential ways that the subjects could benefit, in this case through potentially:

*[...] strong spiritual ties to their natural environment that is expressed in many religious ceremonies, social customs and rituals (sacred sites and objects of worship). Communities defined by locality or by ethnic or cultural appearance may identify features of their habitats*

*as 'critical' natural capitals in view of their symbolic or functional significance in defining group identity (Noel and O'Connor, 1998).*

*de Groot et al.-2003 (pp. 195-6)*

In terms of what it consists of, natural capital itself in the community presentation are those aspects of nature that provide services to people, as in other presentations, but with the additional point that they should not be viewed primarily as service providers when measuring and managing them. One way this is evident is the prevalence of emphasising system qualities as important natural capital in addition to tangible entities and processes. Connections within and between systems, multifunctionality, minimum ecological thresholds, complexity, and other ecologically-relevant factors are described as an important part of natural capital that should be accounted for in de Groot et al.-2003, Helm-2019, Mace-2019, Bateman & Mace-2020, and Costanza-2020, and acknowledged in Costanza et al.-1997. These descriptions often appear when natural capital measurement approaches are being discussed or proposed, for example:

*[...] even if all these preference and information obstacles [of conventional cost-benefit analysis] could be overcome, there remains the problem that the environment rarely comes in discrete marginal units. On the contrary, the environment comes in systems, where interconnections and interdependencies are central. An ecosystem is a set of mutually dependent parts. Some are more important than others, notably keystone species. No ecosystems are fully understood, and often the impacts of destroying one part leads to unintended consequences to the rest.*

*Helm-2019 (p. 8)*

*[...] the key features of natural systems that need to be taken seriously into account in natural capital accounting are to do with the complex system properties of the natural environment. The non-linearities in benefit–asset relationships, the irreversibilities, multifunctionality, adaptability, and resilience are key features of natural systems that need to be taken into account.*

*Mace-2019 (p. 65)*

Rare, threatened, and irreplaceable aspects of nature are sometimes highlighted as especially important natural capital to account for (e.g. in Bateman & Mace-2020 and Mayer-2019) in this presentation, and occasionally described as nonsubstitutable. Natural capital is not always described as nonsubstitutable with other forms of capital in theory, but substitution is often argued to be unfeasible in earlier papers and unwise or unethical in recent papers, due to the existence of unknown

but potentially necessary features of natural capital that may be important to future generations. The sources of less tangible benefits (either wellbeing or met needs and wants) are included as a result of the range of ways to benefit in the community presentation of nature capital, such as overall nature that people hold a goal to preserve (Costanza-2020), ecologically non-essential but appreciated species, and places of cultural significance (de Groot et al.-2003).

A final characteristic of the community presentation is that natural capital, as an overall concept, is not something that belongs to private owners; it is inherited by humanity and comes with a trustee or stewardship role. Although the papers do not necessarily make the same proposals, these ideas are demonstrated in persuasive discussions about how to approach natural capital policy in Costanza-2020, Helm-2019, and Mayer-2019. Costanza-2020 suggests using principles of common property rights, the "basic idea behind [which] is that resources created by nature or society as a whole should belong to all of us, including future generations" (p. 5), and the implications of applying them to natural capital assets:

> *Since the resources under discussion were created by nature and enforcement of property rights requires the cooperative efforts of society as a whole, rights to the resource should also belong to society as a whole. Individuals who wish to use the resource for private gain should compensate society for the right to do so.*
>
> *Costanza-2020 (p. 5)*

In outlining the case for an accountancy approach to natural capital, where the process is implied to undertaken by and for society or humanity, Helm-2019 and Mayer-2019 explain the obligation to act as stewards of our natural capital:

> *[...] for the most part we did not make [natural assets]. We inherited them and we have inherited them because our predecessors chose to preserve them or were incapable of destroying them in their entirety. Our capacity to destroy natural assets and incentives to do so are greater than at any time in the past. We therefore need to be cognizant of our roles and responsibilities as well as our rights and rewards.*
>
> *Mayer-2019 (p. 115)*

> *Once we think of nature as a universal right, and hence a universal obligation for each generation to bequeath to the next, the concept of stewardship emerges. We, the current generation, are the stewards of natural capital, held in trust for the next generation.*
>
> *Helm-2019 (p. 6)*

**4.314 Intermediate, partial, and other presentations**

Seventeen of the 22 papers in the dataset included sufficient characteristics that were similar enough to other papers in the dataset to be used as the basis for identifying and describing the profit, service flows, and community presentations of the natural capital concept. Four of the remaining five papers featured intermediate or partial versions of the presentations: DesRoches-2020; Fisher et al.-2021; Gray-2018; and Mancini et al.-2017. These papers are about questions related to the interface between natural capital research and other fields – in contrast to the papers already discussed, which are mainly related to environmental-economic policy – so the features of the presentations they include are described here for comparison. The fifth remaining paper, DesRoches-2018, is a theoretical study that did not correspond closely with the other presentations, but it articulates an aspect that is only occasionally briefly mentioned elsewhere in the dataset and so this is described here for a more complete picture of the current understandings of the concept. They are listed with the rest of the papers in the dataset and their respective presentations in Table 4.4 (in section 4.315).

DesRoches-2020 and Fisher et al.-2021, which respectively outline a formal definition of critical natural capital and a framework to integrate economics with nature-human health studies, each show a version of the natural capital concept that is intermediate between the service flows presentation and the community presentation. Both papers feature natural capital being valued by/for the current generation on the basis of stated, known preferences (DesRoches-2020) or externally observable effects (Fisher et al.-2021) associated with identified service flows, which corresponds with the service flows presentation. However, Fisher et al.-2021 includes a substantial review of empirical studies of the relationships between ecosystem services and human health (wellbeing), showing a characteristic of the community presentation by examining this connection. The definition of critical natural capital developed in DesRoches-2020 has two parts – the second part corresponds to the service flows presentation, as mentioned, while the first part uses the subject's survival (wellbeing), i.e. the outcome, as the defining feature, allowing for an open range of routes to the objective as in the community presentation.

Gray-2018 describes 25 major geosystem services – goods and services of benefit to human society that come from geological functions and features, such as construction and industrial materials (e.g. stone, minerals for fertiliser), storage (e.g. municipal landfill, carbon capture and storage), and cultural or historic associations (e.g. sites associated with folklore) – and explains their variable inclusion in natural capital approaches. The account of the natural capital concept in this paper shares several features with the community presentation – highlighting the importance of interconnected components, an orientation towards natural capital entities themselves, and a fairly wide range of routes to the objective can inferred from the geosystem services listed (including some which could

be described as more deeply considered benefit sources, such as the knowledge of the past in fossil records). However, the scope of the paper is such that the relationship between the subject and natural capital or the identity of the subject are not discussed in detail. As a result, it is mostly compatible with the community presentation but does not articulate one of that presentation's main characteristics (society or humanity with intra- and inter-generational equity as the subject).

Mancini et al.-2017 proposes new ways to conceptualise the stock and flow components of the ecological footprint concept, with a view to informing a research agenda to improve the ability of ecological footprint accounting to track natural capital depletion. In the ecological footprint concept, the difference between the rate at which a human population uses ecosystem services and the rate at which the biosphere can regenerate them is monitored by comparing the assets hypothetically required – i.e. the ecological footprint – with the assets actually available – i.e. biocapacity. This shows how far consumption overshoots regenerative capacity and therefore likely deplete the ability of natural capital assets to maintain that capacity.

Mancini et al.-2017 outlines the multiple ways stock and flow elements relate to each other (beyond simply stocks yielding flows) and proposes new definitions of the biocapacity and ecological footprint components that account for this complexity. The importance of addressing ecological complexity is similar to that seen in the community presentation, but ultimately the version of the natural capital concept in this paper appears to be closest to the service flows presentation, as known current use of ecosystem service flows and the ability of natural capital to meet that demand are the most relevant features. However, although an orientation towards service flows and a view of natural capital as a service provider characteristic of the service flows presentation are present in the version of the concept in Mancini et al.-2017, the objectives of the paper mean that it does not go into detail about the subjects or how they benefit. It also frames observed use of services as an objective measurement, rather than an expression of subjective preferences as is common in the service flow presentation. As with Gray-2018 and the community presentation, Mancini et al.-2017 is therefore mostly compatible with the service flows presentation but does not articulate the full range of characteristics.

The remaining paper in the dataset to discuss is DesRoches-2018, a philosophical examination of the relationship between the concepts of 'nature' and 'natural capital'. The paper examines different understandings of nature and relates these to the natural capital concept to establish if natural capital includes only that which has no human influence or if it includes nature modified through human influence and if so, whether there a point at which the level of human influence makes it cease to be natural capital. Ultimately DesRoches-2018 defines natural capital as follows:

> *[...] the concept of natural capital denotes a rich variety of natural and economically valuable processes that are relatively—not absolutely—detached from intentional human agency. (p. 2)*

Across the rest of the dataset, the extent to which modified nature is presented as natural capital is mixed and no strong pattern is apparent in the different presentations. Some papers describe natural capital providing services without any input from human factors, others place high importance on the ability to modify it in the definition they give, or describe 'cultivated capital' as a separate but related type of capital. The objective of DesRoches-2018 is to test and improve the coherence of the concept on this point (and only this point); in the context of this chapter's analysis it can be seen as an additional clarification of the natural capital concept that is relevant across all presentations.

**4.315 Findings context check**

This section briefly reports the relationship between the natural capital concept presentations and selected features of the research field. The presentations of the natural capital concept found in papers in the dataset are shown in Table 4.4 alongside the publishing journal, countries the authors were based in, and any co-author clusters from the co-authorship diagram (Fig. 4.2) the authors are in. The presentations in the fourteen papers by authors in the co-authorship network diagram (or authors whose papers are studied in Furtado & Panhoca-2020) are shown on the diagram in Figure 4.3. The contents of Table 4.4 and Figure 4.3 are outlined below (with reference to the cluster labels from Fig. 4.2).

The service flows presentation appears in documents from a relatively wide range of contexts: the six papers showing this presentation are by authors from across the range of geographic regions covered by the dataset; and the five of these papers on the co-authorship diagram are in five co-author clusters (C, D, E, F and a fifth via Furtado & Panhoca-2020). One paper showing a partial service flows presentation is by authors in another co-author cluster. The community presentation is prevalent across the dataset but appears in documents from a narrower range of contexts: the nine papers showing this presentation are mostly by authors based in the USA, Netherlands, or UK; the seven of these papers on the co-authorship diagram are in three co-author clusters (six in B, two in C, one in D); and all papers added to the dataset as a result of citations by the initial article collection showed the community presentation. One paper showing a partial community presentation does not appear on the co-authorship diagram. The two papers showing the profit presentation of the natural capital concept are by authors based in the UK, and do not appear on the co-authorship diagram. There is some overlap between the co-author clusters in terms of which presentations are shown in papers by their authors (cluster B has community and intermediate presentations, and clusters C and D both

have community and service flows presentations), but overall this is not extensive. No authors with multiple papers in the dataset had papers showing different presentations.

**Table 4.4. Presentations of the natural capital concept for each paper in the dataset, alongside co-author clusters and author countries.** Author countries are those at the time of authorship as stated in the papers (including some who have with multiple affiliations). Co-author clusters indicate clusters from the co-authorship analysis diagram (Fig. 4.2) that any of the paper's authors were present in. (Abbreviations: NC = Natural Capital; A NZ = Aotearoa New Zealand; Aus. = Australia; Neth. = Netherlands; Switz. = Switzerland.)

| Presentation | Article | Journal | Co-author cluster | Author countries |
|---|---|---|---|---|
| Profit | Sullivan-2018 | *Sci. Tech. Stud.* | - | UK |
| | Özdemiroğlu-2019 | *J. Environ. Econ. Pol.* | - | UK |
| Service flows | Leach et al.-2019 | *Ecosyst. Serv.* | - | UK (11 of 13), Switz., Denmark |
| | Polasky & Daily-2021 | *Rev. Environ. Econ. Pol.* | C | USA |
| | Hein et al.-2016 | *PLOS One* | E | Neth., USA, Aus. |
| | Furtado & Panhoca-2020 | *J. Environ. Manag.* | * | Brazil |
| | Maseyk et al.-2017 | *Conserv. Lett.* | F | Aus., A NZ, Ireland |
| | Barbier-2019 | *Oxf. Rev. Econ. Pol.* | D | USA |
| Community | Daly-2020 | *Ecosyst. Serv.* | B | USA |
| | de Groot et al.-2003§ | *Ecol. Econ.* | B | Neth. |
| | Costanza & Daly-1992§ | *Conserv. Biol.* | B | USA |
| | Costanza et al.-1997§ | *Nature* (reprinted in *Ecol. Econ.*) | B | USA (10 of 12), Neth., Argentina, Sweden |
| | Costanza-2020 | *Ecosyst. Serv.* | B | Aus. |
| | Helm-2019 | *Oxf. Rev. Econ. Pol.* | C | UK |
| | Mace-2019 | *Oxf. Rev. Econ. Pol.* | C | UK |
| | Bateman & Mace-2020 | *Nat. Sustain.* | C | UK |
| | Mayer-2019§ | *Oxf. Rev. Econ. Pol.* | - | UK |
| Intermediate | DesRoches-2020 | *Int. Stud. Phil. Sci.* | ** | USA |
| | Fisher et al.-2021 | *Rev. Environ. Econ. Pol.* | B | USA |
| Partial - Service flows | Mancini et al.-2017 | *Ecol. Indic.* | A | Italy, Switz., USA |
| - Community | Gray-2018 | *Ecosyst. Serv.* | - | UK |
| Other | DesRoches-2018 | *Sustainability* | ** | USA |

§ Paper included in the dataset because it was frequently cited by papers in the initial article collection (see 4.222).
- Author(s) not present in co-authorship diagram because they were listed for fewer than five publications in the search results the diagram was generated from (see 4.222).
* Authors of articles reviewed by this paper were in an unlabelled co-author cluster on the co-authorship diagram (see Fig. 4.3).
** Author not shown in co-authorship diagram because they were not in the largest interconnected group found by the co-authorship analysis, but had five publications in the search results the diagram was generated from (see 4.222).

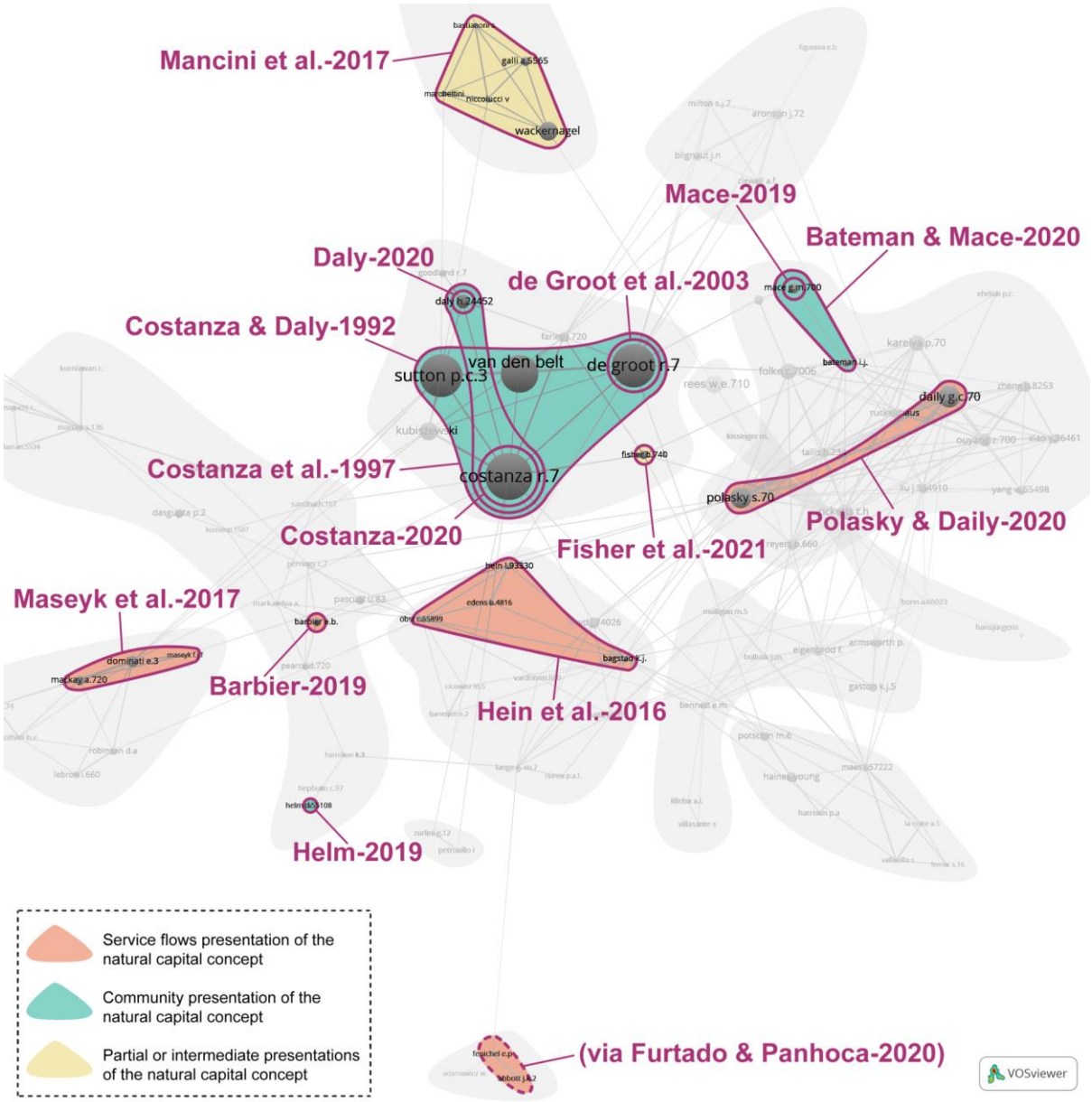


**Figure 4.3. Presentations of the natural capital concept across papers in the dataset displayed on co-authorship network diagram.** Base diagram is modified from a co-authorship diagram created using VOSviewer using results of Scopus database search on the topic of natural capital from 1988-2021, excluding documents with over 25 authors and authors of fewer than five documents in the search results. The diagram shows the largest connected group of authors and circle sizes correspond to the number of author citations. Grey shaded shapes mark the co-authorship clusters which include authors of papers in the chapter's dataset (see Fig. 4.2 for cluster labels, which are not shown in this figure). Solid coloured lines around author names represent papers from the dataset and the dashed coloured line represents a paper that was not in the dataset itself but was reviewed by a paper in the dataset. Only papers with at least one of the authors in the interconnected group are displayed (fourteen out of 22 dataset papers). The fill colour of shapes indicates which presentation of the natural capital concept appears in the paper.

## 4.32 Ethical compatibility of natural capital concept presentations with conservation practice

This section reports the assessment of compatibility between the natural capital concept presentations and the empirical-ethical values of nature developed in Chapter 3. The findings of the compatibility assessment are described below and the presentations' compatibility with important features of the empirical-ethical values are summarised in Table 4.5.

**Table 4.5. Summary of compatibility between natural capital concept presentations and important features of the ethical-empirical values from Chapter 3.** ✓ indicates high functional and/or conceptual compatibility with relatively few limitations, ~ indicates compatibility but only to a limited extent, ✗ indicates significant overall incompatibility, ✗/~ indicates some functional compatibility but conceptual incompatibility or vice versa. The empirical-ethical values share several important features with each other and so the compatibility with these features is highlighted in this table (see main text for direct discussion of the presentations' compatibility with individual empirical-ethical values).

| NC concept presentation | Compatibility with important features of ethical-empirical values | | |
|---|---|---|---|
| | *Beneficiaries* | | |
| | Society prioritised | Equitable & inclusive | Future generations |
| Profit | ✗ | ✗ | ✗ |
| Service flows | ✓ | ~ | ~ |
| Community | ✓ | ✓ | ✓ |
| | *Routes to outcome* | | |
| | Expansive range of benefits | Reflection, considered preferences | |
| Profit | ✗ | ✗ | |
| Service flows | ~ | ✗/~ | |
| Community | ✓ | ✓ | |
| | *Notable entities* | | |
| | Biodiversity, species | In place, local, own land | |
| Profit | ✗ | ✗ | |
| Service flows | ~ | ✗/~ | |
| Community | ✓ | ✓ | |

*Profit presentation assessment*

The profit presentation has low compatibility with the empirical-ethical values, or it is at least functionally very different to them. Its emphasis on income or profit obtained via benefits that can be measured in quantitative and/or monetary terms is antithetical to the emphasis on wellbeing or reflective relationships with nature in Missed Instrumental Value and Attributed Value. The emphasis on financial institutions and businesses as beneficiaries in the profit presentation mean it is not

directed towards the beneficiaries of the empirical-ethical values, which emphasise humanity and society, and is incompatible with their inclusion of equitable distribution of benefits and future generations as the beneficiaries. Although the profit presentation uses a 'holistic' view of nature as the material stock of natural capital (natural capital is framed as 'all of nature'), this is a rhetorical framing rather than an attempt to consider nature in a holistic way, as in Missed Instrumental Value.

*Service flows presentation assessment*

The service flows presentation is somewhat compatible with empirical-ethical values. Society is generally among the beneficiaries in this presentation, and society and/or humanity could be considered as a beneficiary that encompasses the various other beneficiaries (businesses, countries, etc.), giving it some compatibility with Missed Instrumental Value and Attributed Value. Future generations are included to some extent in some examples of the service flows presentation, who benefit by receiving sources of ecosystem services flows. The service flows presentation features a wide variety of potential sources of benefits for people and a view towards valuing these as fully as possible, which is also aligned with Missed Instrumental Value and possibly with the Value of X when this refers to ecological features of biodiversity.

However, the services flows presentation has significant points of incompatibility or insufficiency regarding the empirical-ethical values. The assumption of wellbeing benefits being delivered via the economy that is often seen in the service flows presentation undermines the extent to which it covers the range of benefits to humanity in Missed Instrumental Value (which includes benefits that are not delivered this way) and makes it incompatible with Attributed Value (as the reflective states associated with relationships with nature that are central to Attributed Value are not the same as 'wellbeing benefits' and many cannot be delivered by economic means without severely mischaracterising them). The assumptions of the valuation methods emphasised in the service flows presentation also reduce its compatibility with the empirical-ethical values. Observable and/or stated needs and preferences are the main contributing factors in these valuation methods, which is insufficient for the range of benefits in Missed Instrumental Value (where beneficiaries need not be aware that they are benefitting and it may not be possible to observe how they are benefitting) and Attributed Value (where preferences about nature may be difficult to state in a way that is compatible with the valuation methods mentioned).

The approach to valuation and assumptions of the relationships between beneficiaries and ecosystem features restricts the extent to which the service flows presentation fully encompasses some emphasised beneficiaries in the empirical-ethical values. The valuation methods prioritise current generations, making the service flows presentation insufficient for the empirical-ethical values

inclusion of future generations, and emphasise the provision of services to future generations rather than natural entities themselves, which is incompatible with Attributed Value (where the objects of reflection and contemplation are key). It is also possible that these valuation methods and their assumptions would mean that some members of society are less well accounted for than others, which means the services flows presentation does not meet the equitable and inclusive standards of Missed Instrumental Value and Attributed Value.

*Community presentation compatibility assessment*

The community presentation of natural capital concept is relatively compatible with the empirical-ethical values. It emphasises a wide range of benefits and ways to benefit from nature and interprets these in an 'open' way, such as acknowledging the complexity of connections between nature and benefits and not requiring that beneficiaries are necessarily aware of the benefits, which makes the community presentation compatible with Missed Instrumental Value in this regard. To some extent the community presentation also incorporates reflective relationships with nature in a way that is compatible with Attributed Value – such as proposing they are made visible through deliberative processes or are accounted for through environmental policies and presenting the process of meeting people's needs and preferences as more important than achieving states of wellbeing. However, not all examples of the community presentation have these features. Additionally, there may be some functional limitations as the more assessment-orientated examples of the community presentation tended to focus on benefits as the foundation of valuation, which are not fully compatible with Attributed Value, though the open interpretation of 'benefits' could make up for this to some extent.

Future generations, inclusive and equitable consideration of potential beneficiaries, and equitable distribution of benefits are important in the community presentation (often shown by stating the importance of governmental policy to promote inter- and intra-generational equity as a counterbalance to the effects of economic valuation), which is aligned with the emphasised subjects in Missed Instrumental Value and Attributed Value. The acceptance of reflective or deeply considered personal and community principles as a source of value in the community presentation increases its compatibility with the beneficiaries of Attributed Value, as it encourages the inclusion of communities with different principles and perspectives who may otherwise be more prone to exclusion. The focus in several examples of the community presentation on maintaining stocks of natural capital to be passed to future generations as natural entities (rather than as means of ecosystem service provision), which are viewed holistically as highly complex systems in this presentation, also helps make the community presentation more compatible with the beneficiaries of Missed Instrumental Value (as the holistic ecosystems necessary for survival are to be provided in as intact a state as possible) and Attributed Value (as the objects themselves are given higher priority compared to the other

presentations). This feature also makes the community presentation potentially compatible with the Value of X empirical-ethical value when it refers to ecological features (and this presentation's compatibility with Attributed Value could account for most other variations of the Value of X).

## 4.4 Discussion

This study found that the natural capital concept as a core concept is presented in several different ways, some of which are very compatible with the values expressed by participants. Three presentations of the natural capital approach were identified and labelled here as the profit presentation, the services flows presentation, and the community presentation. The community presentation has the highest degree of compatibility with the values that are important to conservation, and the service flows presentation has partial compatibility.

The community presentation emphasises a long term view, inclusivity within and between generations, and conceptualises natural capital from an ecological perspective. This presentation seems to resemble an 'ecological economics version' of the natural capital concept as a result of these features, which emphasise ecological limits (Pelenc & Ballet, 2015). It also included most of the more abstract accounts of the concept, which may be a reflection of ecological economics' original aim of bringing about substantial changes in the relationship between the economy and environment through an ecological framing (Gómez-Baggethun et al., 2010). The resemblance to ecological economics ideals can be partially explained by the authors of some of the papers with the community presentation, which included several authors involved with founding and/or developing the field, (e.g. Robert Costanza, Herman Daly, Rudolf de Groot, and Marjan van den Belt (ISEE, n.d.)). Some of these papers are the most highly cited on the topic of natural capital (Buonocore et al., 2018), and Costanza et al.-1997 is one of the most highly cited papers on environmental topics (Costanza et al., 2017). It remains so at the time of writing in 2022, with over 9,900 citations listed on Web of Science – more than four times that of the next most highly cited paper on natural capital, with which it has several authors in common.

This heavy influence appears to be reflected in the way the natural capital concept is currently presented, with community presentation being seen in the highest number of papers in the dataset. However, it was seen in the same number of papers as the service flows presentation if the all-time frequently cited papers are not considered (i.e. discounting Costanza & Daly-1992, Costanza et al.-1997, and de Groot et al.-2003), and in fewer papers than the service flows presentation if all frequently cited papers are not considered (i.e. also discounting Mayer-2019) or if later papers by the authors of the all-time frequently cited papers are not considered (i.e. discounting Costanza-2020 and

Daly-2020). This suggests that this presentation is strongly advocated for, with recent articles by founding authors of ecological economics and additional papers included on the basis of being cited by others with a similar presentation, but the meanings within it are not seen as broadly across the field. It does seem to be influential beyond the original ecological economics field, however, with a set of authors in different research clusters also using the community presentation. Most of these other papers showing this presentation were by UK-based authors who were by Natural Capital Committee members or founding members (i.e. Ian Bateman, Dieter Helm, Georgina Mace, and Colin Mayer (Natural Capital Committee, n.d.; UK Government, n.d.)), which against supports the idea that the meanings of this presentation are advocated for and shared among researchers.

The service flows presentation placed a greater emphasis on current generations in valuation, framed ecosystems as sources of service flows, and often included and implicit assumption of the connection between the economy and wellbeing. This presentation is closer to environmental economics' view of the relationship between the economy and the environment, where ecosystems are 'brought in' to the existing neoliberal or neoclassical economic paradigm (Illge & Schwarze, 2009; Ang & Van Passel, 2012). Some authors of papers showing the services flows presentation are members of the Natural Capital Project, including senior leadership members Gretchen Daily, the project's co-founder and editor of the influential 1997 book on ecosystem services, and Steve Polasky. Peter Kareiva is the Natural Capital Project's other co-founder (Natural Capital Project, n.d.) and a notable advocate for strongly human-orientated approaches to conservation in 'the new conservation debate' (Holmes et al., 2016), which suggests some likelihood that the set of conservation approaches that generated so much debate in the early 2010s might reflect some of the ideas of the service flows presentation. The service flows presentation was less compatible on conceptual and functional levels with the empirical-ethical values of conservation practitioners, which also points to an environmental economics-aligned service flows presentation as the source of conservation practitioners ethical reservations and questions about natural capital approaches.

It is possible that my awareness of co-author clusters may have inadvertently influenced how the presentations were categorised. However, only a simple check that the dataset had reasonably good coverage of the co-author clusters identified by the analysis within VOSviewer took place prior to conducting the analysis, so I was not overly familiar with the clusters when analysing the data, which reduces the potential influence of this knowledge on the analysis. The document details were also hidden when possible during the analysis to help minimise this further, as described in section 4.223. However, the possibility of some influence from this knowledge cannot be entirely eliminated.

The service flows presentation was seen across a wider range of research clusters and areas than the community presentation, including papers by authors unconnected or more distantly connected to prolific natural capital researchers. This suggests that the meanings of natural capital in this presentation have spread further than those in the community presentation. These papers usually had a more applied angle than those with the community presentation – papers showing this presentation included several making direct contributions to applications of the concept and several features of the service flows presentation can be seen in SEEA frameworks (Bagstad et al., 2021), for example. The mixed or partial presentations suggest that interpretations of the concept may become less consistent when moving further from the core research field or that some features of the concept or the relevant research fields are not fully captured by this study.

The long-term view, ecosystem-focus, and community-orientation of the community presentation meant that it is the most conceptually and functionally compatible with the empirical-ethical values of conservation practitioners. The community presentation is more 'open' to including a wide range of beneficiaries, relationships with nature, and features of nature. By comparison, the service flows presentation was more 'closed' to several features, with assumptions in place that mean there is limited provision for most of the values, by excluding several features of Attributed Value and being insufficient in several ways for Missed Instrumental Value – these assumptions are possibly the way that Missed Instrumental Value is 'missed'. The implicit assumption or ready acceptance that service flows and/or economic prosperity lead to human wellbeing premise in particular is a noteworthy feature of the service flows presentation. Conservationists have been found to have mixed views to economic tools, including several averse stances to them (Sandbrook et al., 2019), which is reflected in the mixed ethical compatibility between the empirical-ethical values of practitioners found in this study. Although benefiting humans is a core part of the various definitions of the ecosystem services concept and economic processes are often central, these relationships are complex and not fully understood (Barnaud & Antona, 2014; Schröter et al., 2014), especially regarding the role of economic prosperity (Suich et al., 2015; Thorén & Stålhammar, 2018).

Another interpretation of the differences between the community presentation and the service flows presentation is that the former is a conceptual ideal while the latter represents the actual implementation, and the differences between the two presentations is a result of the different objectives of the papers rather than different underlying meanings. However, the reflections of the surrounding research field suggest this does not fully explain these differences, and the presentations vary in ways that appear to be relevant to the empirical-ethical values of conservation practitioners. The more compatible community presentation is closer to the 'original' version as advocated for in ecological economics in the 1990s. Some participants mentioned a 'true' or 'pure' form of natural

capital approach that they would be in favour of (see section 2.322), which seems to be reflected in these findings. It may be that the natural capital concept is more ethically compatible with conservation in theory than in practice.

The papers showing the profit presentation were by authors taking a very different stance to natural capital approaches intended for use by private businesses and there are some remaining differences between the two accounts, which suggests that there may be additional complexity in interpretations of the concept that is not fully captured in this study. This presentation appeared to be functionally incompatible with empirical-ethical values of conservation practitioners, but this may be partly explained by the fact they are not aimed at them. The view of natural capital accounting in the Natural Capital Protocol (Natural Capital Coalition, 2015), for example, share some resemblance to the vision of natural capital accounting in Helm-2019 and Mayer-2019, which showed the community presentation, and both presentations include an 'all encompassing' view of nature in some sense, so they may be more conceptually compatible than they appear from the assessment in this study. However, given the emphasis on commercial and financial organisations as the beneficiaries and even owners of natural capital, the idea in the profit presentation that natural capital includes 'all nature' can be interpreted as encroachment rather than encompassing the holistic character of the nature required for humanity's survival, as in Missed Instrumental Value. Further work directed towards examining tools and outcomes of applying the concept would help to assess the compatibility of the tools these papers discussed.

This study is part of an interdisciplinary project at the intersection between multiple disciplines. Interdisciplinary research ideally involves multiple researchers to bring expertise in multiple disciplines (Lyall, 2008), but the methods of the study in this chapter are restricted by the nature of doctoral research, where a single individual conducts the research. The findings of this study show some conceptual insights into the ethical compatibility between the natural capital concept and ethical concerns of conservation practitioners identified in Chapters 2 and 3. In addition to giving conservation practitioners some information to inform their responses to ethical concerns about the shift in environmental decision-making towards heavier use of the natural capital concept, these insights could be used in further work by policy analysts to review the ethical fit between conservation practice and specific natural capital approaches, which could include a further empirical element by assessing the outcomes of using these approaches.

# 5 – Discussion

## 5.1 Research aims and summary of key findings

This project aimed to empirically understand the relationship between conservation practice and ethics, and to investigate applied philosophy and environmental ethics as a source of insights to help navigate ethical questions in conservation. In particular, it aimed to bring these insights to ethical questions about the use of natural capital approaches in conservation. An interdisciplinary approach was taken. This began with the use of social science methods to empirically establish the ethical landscape of conservation and the place of natural capital approaches within this. Next, a concern that contributes to ethical questions related to natural capital approaches – the difficulty in articulating and advocating for values of nature that conservation practitioners are concerned will be undermined by natural capital approaches – was examined through the lenses of philosophical value theory and environmental ethics. Finally, the ethical compatibility between conservation objectives and natural capital was evaluated by using document analysis to identify the current presentations of the concept and comparing these with the ethical insights about conservation practitioner concerns.

Ethical challenges were encountered in strategic level conservation practice with regard to engagement with other organisations, including involvement with multi-stakeholder decision-making processes and decisions about whether and how to engage with other parties. Although the exact nature of the ethical questions themselves is difficult to determine, it is apparent that a determination to keep to their moral principles is both highly important to conservation practitioners and a source of considerable practical challenges. Conservation practitioners are seen to consider themselves and their colleagues as highly ethical people with a strong connection to a moral stance, but believe that it is seen as an unsuitable topic to discuss in the course of their professional work, whether this is within the organisation or conservation or during engagement with other parties. Although they also see themselves as scientists who prefer to use objective approaches to decision-making, awareness of the importance of their moral stances and an interest in more explicit discussion was also expressed. These conservation practitioners working in strategic level conservation for the most part expressed cautious opinions about the use of natural capital approaches in conservation. They described ethical considerations and concerns about risks to various values when natural capital approaches were used, which were generally worries and fears rather than observations as many organisations had not engaged in the use of these approaches. The reasons for these worries were based on the concept itself as well as how it might be used by others. They described a repetitive debate about natural capital approaches within conservation as well as in public and academic debate.

In the applied philosophy section of this project, examples of values in nature that participants felt were important to conservation or conservationists and were at risk when using natural capital approaches (VNRN) were examined using principles of philosophical value theory and with regard to environmental ethics theories. These values were found to be composed of two sets of empirically-defined values – those defined by their relationship to a subjective valuer and those defined by the item that had the value. The role of the subjective valuer further divided the first category into several subcategories – values where the valuer benefited from an item, attributed or recognised value in an item, or was absent. Environmental ethics interpretations of deontological and utilitarian ethics were found to be suitable sources of normative support for empirical values based on benefits or reflection, with those based on reflection finding support through a different line of reasoning to those based on benefits in both ethical theories. Intrinsic value without any subjective valuer was rarely described, though this may have been part of the meaning behind a 'value of biodiversity' that many participants described but provided few additional details about; these values were difficult to find normative support for.

In the assessment of the compatibility between the natural capital concept and conservation, three main presentations of the natural capital concept were identified through a document analysis of systematically selected papers from 2016-2021. These indicate that multiple versions of the concept exist, and it is possible to trace potential lineages of the ideas in the concepts within the research field. The most dominant presentations of the concept are focused on services flows from natural capital or natural capital itself as an object humanity is the steward of. Both have some compatibility with the values of nature identified as important to conservation practitioners, with the community presentation having a more complete level of compatibility with these values.

## 5.2 Ethical engagement with natural capital approaches

This study found that conservation practitioners have some moral reservations about the use of natural capital approaches in conservation, but that some versions of the core concept are relatively compatible with the values in nature that conservationists are concerned about. Natural capital approaches or natural capital-based advocacy applying features of the presentation of the concept that arose from ecological economics are more likely to be suitable tools for conservation practitioners to use or promote without unduly compromising their ethical principles or ethical objectives. This presentation emphasises inter- and intra-generational equity, a holistic, considered view of the ways people benefit from and relate to nature, natural capital viewed as ecosystems and their qualities rather than primarily as service providers, and natural capital conceptualised as humanity's to steward.

The community presentation was generally more foundational and abstract than the other presentations. Most of the major natural capital accounting frameworks rely on valuation of ecosystems in terms of ecosystem service flows, such as the System of Environmental Economic Accounting (SEEA) (Farrell et al., 2021), indicating that they are more aligned with the service flows presentation of the natural capital concept identified in this thesis. This presentation was less fully compatible with the ethical objectives of conservation practitioners identified in this project, but much of this is a problem of incompleteness rather than incompatibility. Taking the interests future generations and an inclusive range of views were where this iteration fell short of the ethical priorities of conservation practitioners. These have proven controversial to account for using any kind of monetary valuation (Neuteleers & Engelen, 2015) and very difficult to adequately account for and incorporate into natural capital frameworks overall, but some progress is being made (Costanza, 2020) that could make major applications of the natural capital concept a more ethically acceptable tool from the perspective of conservation practitioners.

Concepts of 'relational values' have been explored in ecosystem services research in response to the challenges of economic valuation and its associated framings of value in nature. 'Relational values' in this context usually refers to principles and beliefs that mean people consider nature to have some type of importance (Chan et al., 2018), using the meaning of 'values' referred to as 'principles' in this thesis (see section 1.11). This research is part of a trend in ecosystem services research towards orientating nature valuation around cultural principles rather than monetary valuation of cultural ecosystem services (Ishihara, 2018; Kenter, 2018). Such worth-conferring relational principles can be based on collective or individual relations with nature (Chan et al., 2016; Kenter et al., 2016a) and are essentially analogous to the various possible reasons for assigning, attributing, and recognising value in nature in participant accounts of VNRN categorised as Assigned and Attributed Value and Inherent Value. Participatory and deliberative valuation methods approaches that incorporate these relational principles into processes of nature valuation have been developed (e.g. Gould et al., 2015; Kenter et al., 2016b; Kenter et al., 2016c). Incorporating these approaches into applications of the natural capital concept could go some way towards making them more ethically appropriate for use or promotion in conservation practice by expanding the range of benefits included and incorporating some influence from reflection and considered preferences.

Reintroducing the concept of critical natural capital is another way that applications of the natural capital concept could be adapted to be more aligned with the ethical priorities of conservation practitioners. Critical natural capital is natural capital that is essential for life support and/or cannot be replaced with another form of capital (i.e. natural capital that must remain intact). The concept, like natural capital, was developed by economists in the late 1980s (DesRoches, 2020). The critical

natural capital concept underwent a period of development in the early 2000s, when there was raised global awareness of the catastrophic scale of the threat to life-sustaining aspects of the environment (Ekins et al., 2003a) but no adequate criteria to identify natural capital as 'critical' (Brand, 2009). This period of development mainly included an EU-funded research project called CRITINC to develop an analytic framework for identifying critical natural capital in order to apply the principles of strong sustainability in environmental policy (Ekins et al., 2003a) and the resulting special issue of *Ecological Economics* on critical natural capital in 2003. Several features by which to define critical natural capital were elaborated in this special issue, including ecological, socio-cultural, economic importance, and threat (De Groot et al., 2003). The CRITINC framework for the application of the concept was developed (Ekins et al., 2003b) and an illustrative application of the framework for the UK was published (Ekins & Simon, 2003). However, while studies on natural capital have increased exponentially (Buonocore et al., 2018), critical natural capital has been explored surprisingly little since 2003; see Figure 5 for a visual overview of this discrepancy.

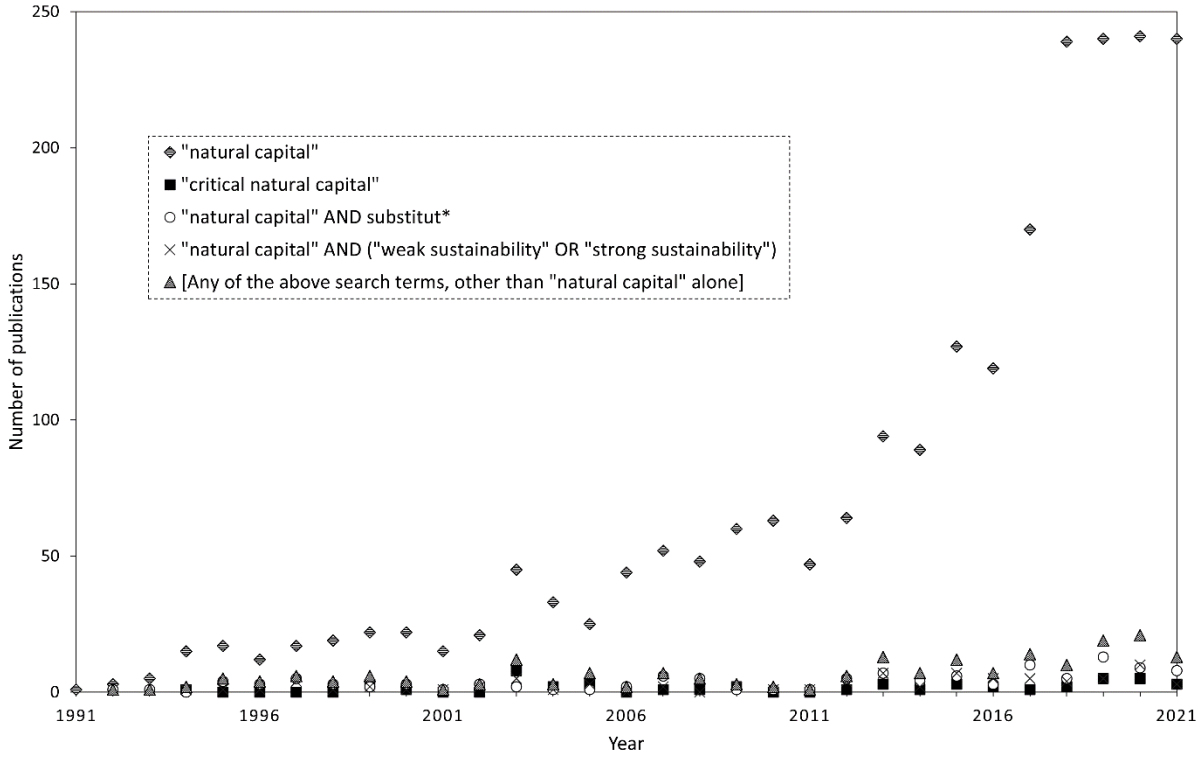


**Figure 5. Number of publications per year on the topics of natural capital and critical natural capital from 1991-2021.** Numbers of publications are the numbers returned by Web of Science searches using the terms shown in the figure key in the topic field. Also shown are the number of publications on concepts closely related to critical natural capital.

Employing the concept of critical natural capital within natural capital approaches could be useful in reaching a consensus between those holding different viewpoints (Saner & Bordt, 2016). The ethical-empirical value of Missed Instrumental Value identified and examined in this thesis is essentially the

value of natural capital that is critical for ecological and life support reasons. Ecological resilience (Brand, 2009) and the phenomenon of ecological thresholds beyond which ecosystem functioning is impaired (Pelenc & Ballet, 2015) have both been identified as ecological features that indicate criticality. Scientifically-minded conservation practitioners and conservation practitioner-scientists who are familiar with the ecological reasons why ecosystems must often be maintained intact or in a high quality condition may find critical natural capital a useful concept to translate the extent of this importance into the language of natural capital. There are also arguments for criticality of nature on the basis of it being the object of collective and personal relational principles (Chiesura & De Groot, 2003; Douguet & O'Connor, 2003) and a decision-support framework to assess this criticality as a moral obligation (Pearson et al., 2012). This could provide a basis for articulating the empirical-ethical Attributed Value in natural capital terms (and without disregarding the importance of reflection and contemplation in participants descriptions of this value and the normative foundations identified for it). For financially-motivated policymakers or long-term investors who remain unconvinced, economic realities also provide a compelling basis for criticality, such as the high cost of substituting natural capital with manufactured capital (Dietz & Neumayer, 2007) and the impossibility of indefinite substitution of natural capital, as production of manufactured capital requires natural capital for raw materials and energy (Pelenc & Ballet, 2015). Conservation practitioners or researchers engaged in high level policy advice regarding natural capital would be particularly well-placed to raise the profile of critical natural capital in natural capital discourses, and in doing so could shift them closer to the vision of ecological economics seen in the community presentation of the concept, which meets more of the ethical priorities of conservation practitioners overall.

## 5.3 Navigating the ethical landscape

The findings and their implications discussed above regarding conservation practitioners' ethical concerns about natural capital approaches go some way towards understanding and addressing them. In order to complete the full cycle from conservation practice to philosophy and back again, some further steps are needed to help conservation practitioners resolve the ethical challenges around the difficult strategic choices they face in their work. One route for some concerns related to the use of natural capital approaches in conservation is that mentioned in the discussion of Chapter 4 (section 4.4), which is to bring practitioner-orientated ethical scrutiny to specific natural capital tools, policies, and applications. However, another important route that is demonstrated by the findings of Chapter 2 would be to develop solutions that would help conservation practitioners navigate the ethical aspects of their work themselves. Several areas of research may provide tools to assist with this.

Overall, the findings of this project show that conservation practitioners have a strong orientation towards both people-focused conservation and nature-focused conservation, placing importance on people valuing nature as well as nature itself. Research about relational values from ecosystem services research could be useful to conservation practitioners in another way than attempting to expand the coverage of natural capital assessments. Many relational value approaches – including participatory and deliberative valuation methods (e.g. Gould et al., 2015; Kenter et al., 2016b; Kenter et al., 2016c) and frameworks to use within them (Kenter et al., 2019; O'Connor & Kenter, 2019) – focus on eliciting and understanding the vast array of relational principles people and communities might hold. This could be useful to conservation practitioners faced with decision-making environments where there is a risk that a community's principles, or their own principles will not be sufficiently accounted for but where they wish to make an ethical argument for the relevance of these principles. While the specific reasons for assigning (or attributing etc.) value to nature was not a key characteristic of the way participants spoke about VNRN, these contemplative and communicative methods could help establish the features that these values rely on for normative support to strengthen arguments for their protection – such as establishing that a part of nature is 'the object of an intrinsically valuable state' (i.e. it has inherent value, giving it support within utilitarian ethics) or that it contributes to a valuer's idea of a good life (i.e. it has moral relevance to members of the moral community, giving it moral significance to account for in a deontological approach).

Deliberative methods building on relational values research could also help conservation practitioners to articulate their own principles, which was another factor in the ethical challenges they described. For example, the Life Framework of Values by O'Connor & Kenter (2019) suggests how intrinsic value in nature may be brought into environmental decision-making that works within ecosystem services frameworks in the form of 'articulated intrinsic values', which may be a way for some of the Value of X-type values that participants were concerned about to be articulated.

An interesting area for future research that might bring together these ideas and a community-orientated version of natural capital thinking would be to investigate a moral basis for non-substitutability of nature and therefore for an ethical aspect of determining critical natural capital. The existence of additional ethical reasons for non-substitutability of parts of nature, and therefore for designating these parts as critical natural capital, is sometimes mentioned but not expanded upon in discussions of critical natural capital criteria (e.g. De Groot et al., 2003; Dietz & Neumayer, 2007; Brand, 2009; Saner & Bordt, 2016). One paper explicitly aims to understand an ethical aspect of critical natural capital, basing this on a deontological ethic in which some features hold infinite or 'protected' values (founded on, for example, cultural reasons) and ought to be deemed non-substitutable (Pearson et al., 2012). Preventing ethical violations against sentient nonhumans is also mentioned as

a potential reason for criticality (Brand, 2009). Irreversibility is given as a reason for non-substitutability of natural capital (e.g. (Dietz & Neumayer, 2007; Pelenc & Ballet, 2015)), which implies that permanently losing features of nature must be avoided, but an explicit ethical basis is not associated with these arguments. Acceptance of intrinsic value of nature is given as a reason why some might argue for non-substitutability of parts of nature (Saner & Bordt, 2016).

## 5.4 Concluding Remarks

In common with other studies of conservationist viewpoints and the hopes described when advocating the use of both social and economic approaches to conservation, there is a lot of common ground to be found between conservation practice and the goals of society – the goals of multinational corporations less so. If conservationists are willing to being their ethics to the table, hopefully the challenges can be brought into the open and addressed for a fairer approach to the environment.

# Appendix: Interview topic guide

KEY: Regular font for key questions; bullet points for essential follow up questions (to be asked if participant does not answer this in the main question, or changed to use as a probe to find out more if only mentioned briefly); underlined indicates options in questions/notes to self; *italics for background and signposting*; [square brackets for probes and prompts to use as necessary].

## Opening

*I am investigating practical ethical questions in conservation, with the overall aim of improving the way ethical questions are resolved in conservation. The aims of this interview are to identify some of the key ethical questions or themes faced in conservation decision-making and to understand how these are currently addressed. I am also interested in understanding the effects of the natural capital approach on ethical questions. At this stage, I am mainly looking at conservation plans and strategies.*

*I am interested to you know what you think and what occurs to you in response to these questions. Understanding the practical side of ethical questions in conservation is a fairly new subject, so I want to understand any views you have of these issues based on your experience in the conservation sector.*

*To start with, I have a few brief questions about you and your work.*

Bio.i) Can you tell me a bit about yourself, your work and your role within this organisation?

- How long have you been in your current role?
- When did you begin working in conservation?
- What are the main areas of conservation work you have been involved in over the course of your career?
- Have you spent any notable amount of time working in a field other than conservation?

## SECTION A: What ethical considerations and questions are there

*Now I would like to ask some questions about the ethical considerations and questions that occur in conservation.*

i) Can you tell me about any times you have been aware of some kind of moral or ethical consideration in conservation?

- Can you tell me a bit more about [x]?

- What is/are the main ethical consideration(s) in that case? What are the main things that matter? Why do you think that is an ethical matter?
- Do the ethical considerations cause any difficulties?

ii) Are these areas (just discussed) the main areas of conservation you have found ethics to be particularly relevant to, or are you aware of any others?

  - [Examples in notes.]
  - [Prompt for further examples if necessary.]

- What is/are the main ethical consideration(s) in those areas? What are the main things that matter? Why is ethics relevant to that area?
- Do ethical considerations cause any difficulties in these areas?

## SECTION B: Natural capital approach

*I'd like to ask a few questions related to the natural capital approach. As you'll know, this is becoming an increasingly prominent approach in conservation and is heavily emphasised in the 25 Year Environment Plan recently published by the UK Government.* (NB some but not all proposals in this document apply to devolved countries but close working with devolved administrations is reiterated several times.) *It has interesting and debated implications within environmental ethics and I am interested in finding out more about how ethical questions are affected when using this approach in practice.*

iii) What is your experience of the natural capital approach?

- What do you think of it?

iv) In your experience, has the use of the natural capital approach affected ethical questions in conservation? If so, how?

- Have you noticed any new moral considerations come up?
  - [Are these new altogether or are they existing considerations manifesting in new ways?]
- Have any become more or less relevant?
- Can you give any examples of times where some of these considerations are faced?
- Has the natural capital approach changed how ethical questions are treated? If so, how?

- [E.g. Does it clarify or obscure, address or avoid ethical issues.]

v) What effects do you think the natural capital approach might have on ethical questions in conservation in the future?

## SECTION C: How are ethical questions addressed

*Next, I would like to find out about how ethical issues are handled in conservation, particularly relating to conservation plans and strategies.*

vi) In your experience, how are ethical questions in conservation addressed?

- [By them personally or by others, as far as they know.]
- [Not at all, indirect/direct, ad hoc/systematic, formal/informal, compulsory/voluntary, internal/external/inter-organisational.]
- [E.g. rules-of-thumb, discussion and consensus-reaching, existing policies, policy guidelines, advocacy group guidelines, stakeholder input, existing precedents, "traditional wisdom".]

- *Find out details* Who, what, when, why, how?
- Who is involved? What do they do? When does this happen? Why does this happen? (How are they brought to the attention to decision-makers?) What is the goal? What is the end point? How do they decide? How are they discussed?
- Can you tell me about any examples?

(Only ask question viii if they identified any clear ways of addressing ethical questions.)

vii) How successful do you think [these methods] are in resolving ethical questions?

- [E.g. policy compliance, reducing conflict with stakeholders/organisation members/the public/interest groups.]

- (If unsuccessful) Why is that?
- Do any ethical questions stay unresolved or are there any that are particularly difficult to resolve?

## SECTION D: Decision support requirements

*I'd like to find out more about what is needed to address these questions.*

viii) Have you ever heard of any training about ethical matters in conservation?

- [Internal or external to organisation.]

Bio.ii) Have you ever happened to have any kind training in ethics? This could include training in professional or business ethics, or from another area of work or study.

ix) Are you aware of any support tools or materials that can be used to inform ethical judgements in conservation?

- [E.g. Personal understanding, literature research of issues, past examples/precedents, policy or advocacy group guidelines, organisation's position statements.]

- (If there are some) Do you think these are sufficient?
- (If none/insufficient) Why do you think that is?

x) Is there anything you think might help in evaluating or resolving ethical questions?

- [Examples of types of tools/materials in notes.]

## Closing

*Those are all my main questions. Before we finish up:*

xi) Is there anything else you think I should have asked about or that you feel might be relevant to the topics we've discussed?

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