



## Decline of ‘biodiversity’ in conservation policy discourse in Australia

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### ABSTRACT

Market-based instruments along with conceptualizing the environment as a collection of ‘ecosystem services’ have become increasingly common within environmental and conservation policy. This kind of thinking is also increasingly prominent in the public discourse surrounding environment and conservation policy, particularly in the context of communicating the importance of policy measures. Language used in public discourse can have a powerful influence on how people engage with policy issues, and changes within the biodiversity and conservation discourse may have consequences for public engagement in conservation. We explored how these factors are changing with time by documenting the use of the terms ‘bio’ and the prevalence of economic language in the text of 3553 media releases between 2003 and 2014 from the Australian Government environment portfolio, and 1064 media releases from the Australian Conservation Foundation (ACF). Results show that in the last decade, the term ‘biodiversity’ has become less prevalent whilst economic language has increased in both Australian Government and ACF communication. A further content analysis in a subsample of 745 media releases explored the prevalence of ecosystem services framing, results indicating that it has become a mainstream concept. While this may reflect a strategic response by these agencies to better engage with both the general public and decision makers within what is an increasingly dominant neoliberal paradigm, we argue it may also have unintended (possibly adverse) impacts on how people think about and engage with biodiversity conservation.

### 1. Introduction

How we think about an issue is significantly influenced by the way it is represented in the discourse within which it sits. Consequently, environmental discourse influences how ‘the environment’ is understood and addressed by society (Dryzek, 2013; Gustafsson, 2013), including how it is governed (Fairclough, 1992; Coffey, 2015). Given that we are in the midst of a ‘biodiversity crisis’, this raises questions about how biodiversity is represented within the discourse concerning public environmental policy. Biodiversity loss is recognized as one of the most critical environmental problems (Gordon, 2006; Gustafsson, 2013) and remains so, despite global efforts to tackle it (Butchart et al., 2010).

Public environmental policy is typically a responsibility of national governments, although this is often shared with regional state governments or other local jurisdictions who may have different priorities and objectives. Many national governments have specific responsibilities for biodiversity conservation as signatories to the *Convention on Biological Diversity* (1992). This makes environmental policy inherently political in its nature. It is also of central importance to conservation NGOs,

some of which have direct roles in conservation programs, but most of which seek to play some role in conservation advocacy. It has been argued that environmental NGOs are uniquely suited to build the links and advocate for the actions needed to curb biodiversity loss (Gunter, 2004). As a result, both governments and conservation NGOs provide a significant contribution to the public political discourse on environmental and conservation issues. Much of this discourse is in the form of media releases about prominent environmental policy issues of the day.

One approach to analyzing discourse is to identify different ‘frames’. While there is no precise universal definition of what a ‘frame’ is (Capella and Jamieson, 1997; Druckman, 2001), frames generally “select some aspects of a perceived reality and make them more salient in a communicating text” (Entman, 1993, pp 52). In this way frames can provide both a framework by which people “locate, perceive, identify, and label” information and events (Goffman, 1974, pp 21) and thereby understand the world, and also provide a central organizing idea which makes sense of relevant events, and highlights what is at issue (Gamson and Modigliani, 1989). All information exists within a frame of some kind, and it is well established that the way information is presented

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and framed can significantly affect the way people understand and respond (e.g. Harris, 1973; Tversky and Kahneman, 1981; Gamson and Modigliani, 1989; Entman, 1993; Druckman, 2001). As such, understanding how issues within a discourse are framed can provide insight into the way issues are thought about by a society.

Of interest to us is how the public environmental policy discourse has changed over the last decade, including the concept of ‘biodiversity’ and the use of economic rationales within the discourse. ‘Biodiversity’ is the contracted form of ‘biological diversity’ and lacks precise definition, but is generally used to conceptualize heterogeneity at multiple levels of biology, such as within organisms, within populations, within communities and within biomes (Haila and Kouki, 1994). As such, the same term can be used with different meanings within different contexts (Haila and Kouki, 1994; Kaennel, 1998), including as shorthand for ‘life on Earth’, or as a natural resource to be exploited (Haila and Kouki, 1994). Biodiversity loss has become one of the key issues of the environmental movement (Takacs, 1996) and is central to the discipline of conservation science. Arguably this connection has (at least previously) enabled biodiversity loss to remain a relevant public policy issue where concern for other environmental issues has been subject to the ‘issue-attention cycle’ (Hannigan, 1995). However, concern about biodiversity loss has seen the term ‘biodiversity’ used across many disciplines (Väliveronen, 1998) and in myriad ways, ensuring that it has become a more complex concept than its original ‘biological diversity’ (Takacs, 1996).

Concurrent with the evolution of the term biodiversity, is the genesis and increasingly prominent concept of ‘ecosystem services’. Ecosystem services are the useful and essential services that nature provides humans, for example, a supply of clean air, drinking water, food, building materials, pollination, etc. Originally developed in the 1970s as a communication tool to attract public interest in biodiversity conservation (Westman, 1977), it is arguably now “the dominant paradigm framing research and policy making in biodiversity, ecology and conservation biology” (Silvertown, 2015, pp 641) and facilitates the valuation of biodiversity in monetary terms (Costanza et al., 1997; Spash, 2008; Silvertown, 2015). This is consistent with the broader rise of neoliberal ideology in public policy since the late 1970s (Purcell, 2009), including within environmental policy (Coffey, 2015), and coincides with the more recent decline in power and authority (in the 2000s) of the environmental protections afforded at the national level of OECD countries (Mol, 2016).

Here we ask whether there has been an increase in the use of ‘ecosystem services’ within environmental policy communication, similar to that which has occurred within policy making, and if so, whether this corresponds to an increase in economic arguments appearing alongside environmental arguments in the policy communication discourse. We are also interested in how the frequency of use of the term ‘biodiversity’ within environmental policy discourse compares with its use within the scientific discourse. As a starting point in tackling these complex issues, we used Australia as a case study and analyzed the text of media releases from the Australian Government environment portfolio and the Australian Conservation Foundation (ACF), a large conservation advocacy NGO who “speak out for the air we breathe, the water we drink and the places and wildlife we love” ([www.acf.org.au](http://www.acf.org.au)). Thus biodiversity is a key element of what the ACF seek to protect, although (like the Australian Government environment portfolio) it is only one aspect of the greater ‘whole’ that is the target of their advocacy. As such, the context and manner in which the media releases from both organizations discuss biodiversity is of interest. We tracked use of the term ‘biodiversity’ and the prevalence of economic language over the period 2003 to 2014 in all Australian Government and ACF media releases. This time frame allows trends over this recent decadal period to be observed. We also investigated the prevalence of ecosystem services framed rationales within a subsample from each organization.

Because a discourse enables people to interpret information and

create meaning and narratives about issues, changes in the frequency of terms and concepts may be indicative of a change in how they are understood. We offer here an initial dataset to track changes in the way biodiversity is framed in this public discourse over time. Our vision is that researchers can contribute to this database and explore future trends, building on the data longitudinally, or with other terms, or from other sources and regions. To our knowledge, this kind of investigation has not previously been undertaken, and Australia makes an interesting initial case study, as it represents a large industrialized economy (member of the G20) and a nation with a long history of stable democratic government and which also has had a long standing conservation movement.

## 2. Methods

In order to be able to understand how the data from the policy discourse compares with the scientific discourse, we first interrogated the Web of Science database (Web of Science, 2016) and recorded the proportion of publications for each year that included the terms ‘biodiversity’ and ‘ecosystem services’ within title, abstract or keywords between 1995 and 2015.

We then analyzed the policy discourse by first conducting a text search to document the prevalence of key terms in 4617 media releases. These comprised of 1064 media releases published by the Australian Conservation Foundation between 2004 and 2014 and 3553 media releases published by Ministers within the Australian Government environment portfolio (‘Australian Government’) between 2003 and 2014. The ACF releases were downloaded from the ACF website ([www.acf.org.au](http://www.acf.org.au)) and the Australian Government releases from 2003 to 2012 were provided by the Department of the Environment and those from 2013 to 2014 were downloaded from the Department of the Environment website ([www.environment.gov.au](http://www.environment.gov.au)). The ACF provides an appropriate NGO comparator to the Australian Government, as it campaigns on a national level and is one of the most prominent national environmental advocates in Australia, although it may not necessarily be considered a proxy for all Australian NGOs.

All Individual media releases were subjected to key word searches. We searched for the term ‘biodiversity’ and for the term ‘econo’ as the root of ‘economic’, ‘economy’, and ‘economist’, allowing the inference that the presence of these terms indicate that economic considerations are present in a media release (Fig. 1). In order to compare use of these terms over time, we calculated the percentage of the total media releases that contained at least one instance of a term for each year, for both the ACF and the Australian Government media releases. Although the presence (or absence) of the term ‘biodiversity’ or of economic language doesn’t give any information about the broader frame within which these concepts are used, changes in the frequency with which these concepts are used can provide an indication that the way in which these concepts are thought of or are communicated, have changed.

We also conducted a more detailed latent content analysis on a subsample of 745 media releases. This comprised of 229 ACF (approximately 20% of all 1064 ACF releases) and 516 Australian Government (approximately 15% of all 3553 Australian Government releases) media releases to identify those that framed the environment in terms of ‘ecosystem services’ within any part of the document (Fig. 1). The specific term ‘ecosystem services’ itself was unsurprisingly not present in the media releases, as this is a technocratic term with little meaning for the public with whom the media releases seek to communicate. However, we were interested in the presence of statements that used this conceptual logic (present in many releases), which necessitated a content analysis, rather than a simple text search. Latent content analysis was necessary as there is no keyword or phrase that could be considered diagnostic for the presence of ecosystem services logic or rationale. Given that the Australian Government environment portfolio has from time to time included policy areas such as arts and heritage, to ensure that the sub-sample of Australian Government

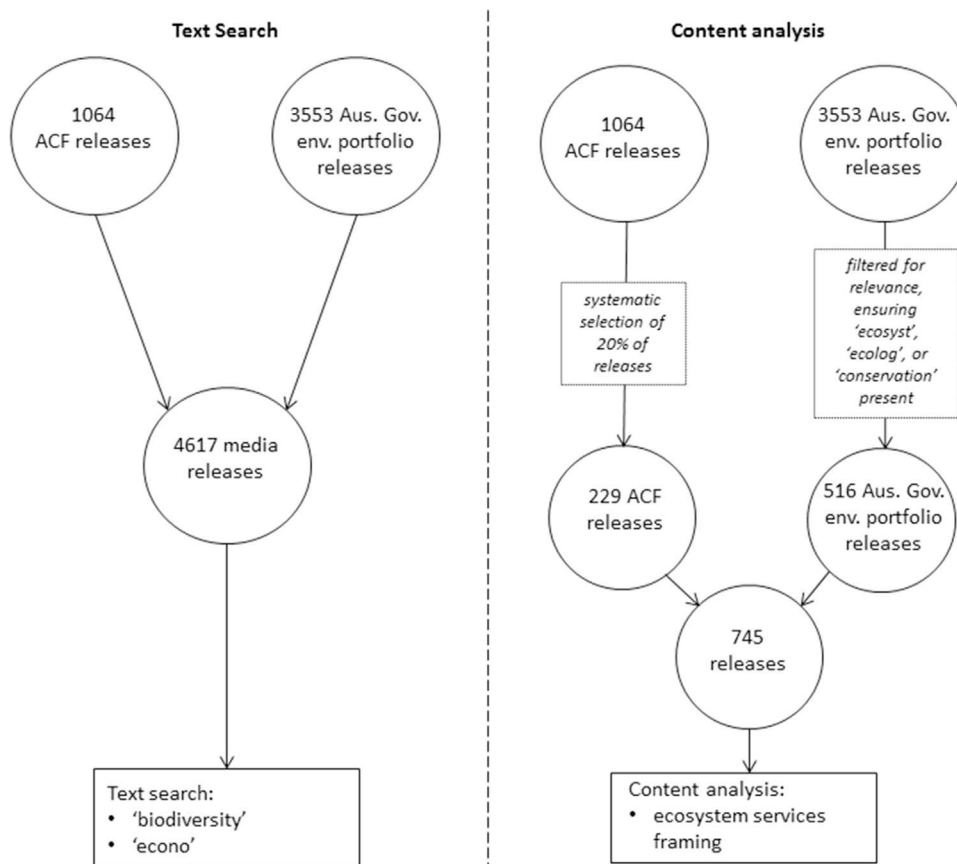


Fig. 1. Methodological flow chart for analysing media releases from the Australian Government environment portfolio and the Australian Conservation foundation (ACF). All releases were subjected to a text search for 'biodiversity' and 'econo' and a sub-sample of the releases were subjected to content analysis to identify use of ecosystem services logic. To ensure that the sub-sample of Australian Government environment portfolio releases were relevant, only those with at least one instance of the terms 'ecosystem', 'ecolog', or 'conservation' were selected. The ACF sub-sample was a systematic selection.

environment portfolio releases subjected to content analysis were relevant to the potential use of 'ecosystem services logic', only those with at least one instance of the terms 'ecosystem', 'ecolog', or 'conservation' were selected. This resulted in the 15% sub-sample on which the content analysis was undertaken. In contrast, all ACF releases were taken to be relevant to the potential use of 'ecosystem services logic', and a similarly sized sub-sample was generated by systematically sampling from each year over the period. We used a systematic approach to ensure appropriate representation of releases across the period 2004–2014. This involved the regular (periodic) sampling of the releases along the time sequence of their release. As such, these sub-samples are representative of the population of documents for which we wish to understand (i.e. relevant media releases from the Australian Government environment portfolio over the period 2003–2014 and all ACF media releases over the period 2004–2014). As our analysis is concerned with tracking the proportions of releases that contain specific content (i.e. ecosystem services reasoning), sample sizes of 15% and 20% are sufficiently large to allow inferences to be drawn (though with consideration for corresponding confidence intervals). The difference between the 15% and 20% sample sizes does not hinder comparison, and both sub-samples generate similar lengths for 95% confidence intervals.

To be counted as including an ecosystem services concept, media releases had to refer to a human benefit being derived from nature. The mere mention of a primary industry (e.g. fishing, forestry, etc.) was not itself sufficient, but where a media release taken as a whole created a connection between the environment and a resulting provision of a human benefit, this was sufficient to be counted as containing an ecosystem services 'frame'. For example, the following would be counted:

"Australia's marine environment generates \$52 billion annually for the national economy in tourism, fisheries and other areas..." (ACF, Sept 13 2004).

In contrast, the following would not be counted as an ecosystem service frame:

"The Great Barrier Reef is one of our most significant environmental assets." (Minister Garrett, June 18, 2008).

Although both examples attribute 'value' to the environment, the latter does not link the environment with the provision of any particular service or human benefit.

To ensure reliability of the coding, approximately 10% (77 out of 745) of the coded documents were reviewed by an independent coder who agreed with the primary coder in 92% (71 of 77) of cases. The method for calculating confidence intervals for proportions recommended by Newcombe and Altman (2000) was used to calculate 95% confidence intervals for the proportions of media releases that contained ecosystem services frames.

The Australian Government media releases we used for this analysis are available as pdf files via the Open Science Framework at <https://osf.io/jbvtw/>, as are the sub-sample of releases from the Australian Conservation Foundation that were subjected to the content analysis.

### 3. Results

References to 'biodiversity' over the last decade or so in the world wide scientific literature (available on Web of Science) have increased significantly from 671 out of 1,024,674 publications in 1995 (0.07% of total publications) to 19,107 out of 3,806,894 publications (0.5%) in 2015. References to 'ecosystem services' have also increased markedly over the same period, from just 5 instances of its use out of 1,024,674 publications in 1995, to 2384 out of 3,806,894 publications in 2015. As a percentage of the total publications, this represents an increase from effectively zero to 0.06% (Fig. 2).

In contrast, there was an overall decline in the use of the term 'biodiversity' in media releases from both the Australian Government

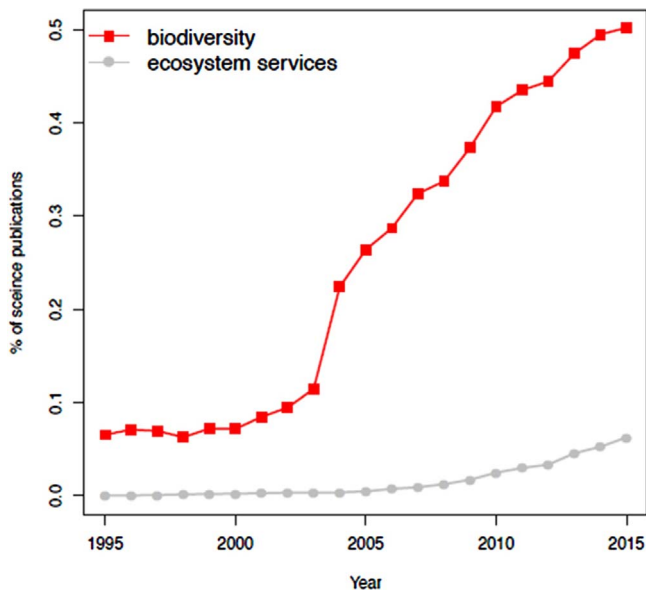


Fig. 2. Percentage of scientific publications containing ‘biodiversity’ and ‘ecosystem services’ within the title, abstract or keywords. Data derived from Web of Science (<http://apps.webofknowledge.com>).

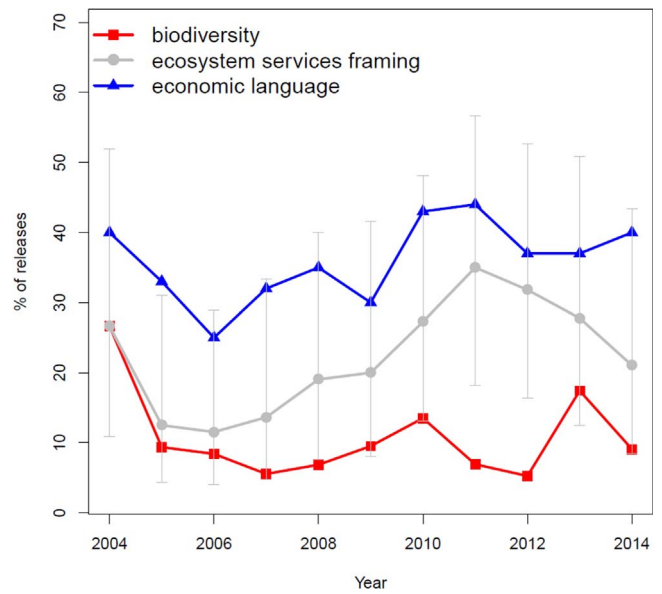


Fig. 4. Percentage of the 745 Australian Conservation Foundation media releases that contain ‘biodiversity’, ‘econo’ and ecosystem services framing over time. Error bars are 95% confidence intervals for ecosystem services framing (n = 229).

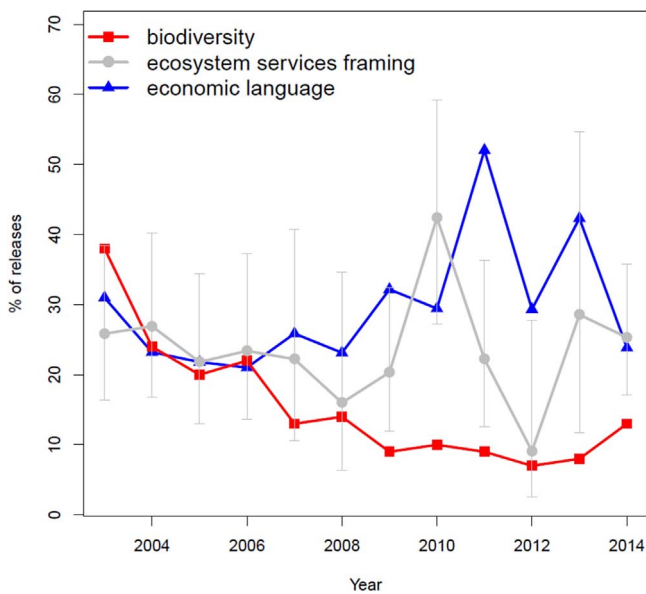


Fig. 3. Percentage of 3553 Australian Government environment portfolio media releases that contain ‘biodiversity’, ‘econo’ and ecosystem services framing over time. Error bars are 95% confidence intervals for the ecosystem services framing sub-sample (n = 516).

environment portfolio (Fig. 3) and the ACF (Fig. 4). This decline is steeper for the Australian Government, although there is a small but noticeable increase in use of the term in government media releases from 2014. This spike may be directly traced to a focus of the incoming Government at this time on threatened species, with 53% (17 of 32) of the 2014 releases that referred to ‘biodiversity’ also including references to ‘threatened species’ which included 16% (5 of 32) with specific reference to a newly appointed Threatened Species Commissioner. Interestingly, this coincides with a steeper decline in ‘biodiversity’ for the ACF releases between 2013 and 2014.

In general, both ACF and the Australian Government tend to use economic language in their media releases more often than they use the term ‘biodiversity’ (Figs. 3 and 4). For the Australian Government this occurs after 2006, while for the ACF economic language was dominant for all years. Averaged across the 2004–2014 period, the ACF uses

‘biodiversity’ in only 9% of its media releases, yet it uses economic language in 36%. Over a similar period (2003–2014), the Australian Government uses ‘biodiversity’ in 16% of media releases and economic language in 29%.

Despite the increase in use of economic language, there is no clear trend in the use of ‘ecosystem services’ framing which varies between 9% and 42% of the sampled releases for the Australian Government (Fig. 3) and 12% and 35% for the ACF (Fig. 4) across the period, though there is a suggestion of a peak in ecosystem services framing around 2010 to 2011. The presence of economic language and of ecosystem services framing trace similar curves within each agency, although this is different for each agency and more similar for the ACF than the Australian Government. The ecosystem services and ‘biodiversity’ lines noticeably separate around 2009 (Australian Government) to 2010 (ACF), with ecosystem services framing subsequently more prevalent than ‘biodiversity’ through till 2014 where the dataset ends. The data for the ACF shows a consistent increase of ecosystem services framing across five years from 2006 to 2011. This represents the most consistent trend across the data.

#### 4. Discussion

Temptation to over-interpret the data should be resisted, particularly owing to the large confidence intervals. The presence of ecosystem services framing in Australian Government media releases will partly be influenced by the public service practice of developing ‘standard words’ in relation to an issue. In such cases once approved language has been developed for a given issue, this same language tends to be re-used whenever the same issue is addressed, until it is eventually superseded by new language. As a result, if ecosystem services language is used in an initial release about an issue that remains topical, subsequent releases will likely also use this same language, reflecting a local peak in the data. For example, the 2010 peak in the Australian Government data is influenced by five separate releases concerning the ‘East Marine Region Assessment’ that each use the same ecosystem services language. A corresponding peak in the ACF data is dominated by releases concerning the Murray-Darling Basin.

The data raises some important questions. Foremost, what is driving the observed decline in use of the term ‘biodiversity’ in the media releases? It is interesting that although use of ‘biodiversity’ is increasing



in the scientific discourse, our results show its use declining in the policy discourse. This raises a question of whether this reflects a deliberate strategy by communication practitioners to replace ‘biodiversity’ with alternative terms considered to be more effective for communicating policy. Perhaps owing to its lack of fixed definition and broad usage across disciplines, ‘biodiversity’ is a concept that political communicators find unhelpful for engaging people; it has even been suggested that the term be deliberately avoided (Shanahan, 2008). In any case, rather than the specific intentions of individuals, we are chiefly interested in what the data can tell us about how these organizations understand and discuss these issues, and how this may both reflect and potentially influence the understanding and perceptions of the wider public. Our results (particularly in relation to the Australian Government releases) indicate not that ‘biodiversity’ is little used in such communications, but rather, that its usage has *declined*. This may reflect a change in the way ‘biodiversity’ is understood, or a change in the level of public or government support for biodiversity conservation, and likely also corresponds to changes in the way biodiversity and similar concepts such as nature are framed. The rise of the biodiversity concept itself displaced similar (previously abundant) concepts such as ‘wilderness’ and ‘nature’ in conservation discourse (Takacs, 1996), and perhaps it too is now falling from favor and currently in the process of being supplanted by an alternative concept. Alternatively, other environmental issues (climate change for example) may have come to occupy the limited discourse space available (Veríssimo et al., 2014), and the resilience to the issue-attention cycle previously enjoyed by biodiversity loss (e.g. Hannigan, 1995) may have been lost.

Here we have only analyzed for the presence and absence of the term ‘biodiversity’, but these results raise interesting questions that could be explored by future research specifically designed to interrogate these questions.

Results also show that economic language is often (and increasingly) present in the policy discourse, and is more commonly used than the term ‘biodiversity’ (Figs. 3 and 4). This may be counter-productive to promoting conservation goals; a growing body of literature raises concerns about the way utilitarian framing of ecological concerns may influence human perceptions of and relations to nature in a manner counterproductive to conservation (Rees, 1998; McCauley, 2006; Spash, 2008; Gómez-Baggethun et al., 2010; Kosoy and Corbera, 2010). It is well established that extrinsic rewards (typically monetary incentives) can ‘crowd-out’ intrinsic motivations for conservation behaviors and result in a reduction in targeted behaviors over the longer term (e.g. Frey and Jegen, 2001; Stern, 2008). Thus there is reason to expect that communications that simply mention an economic value for components of biodiversity may have similar effect (see Kusmanoff, 2017). We speculate that through emphasizing the financial benefits of nature, the intrinsic motivations for biodiversity that drive public interest in nature may become crowded-out and gradually eroded. The observed trend for conflating economics and conservation occurs in the context of the growing dominance of ‘ecosystem services’ (Silvertown, 2015).

Various authors have explained the lack of community support for biodiversity conservation as a result of the public’s lack of knowledge about the benefits of biodiversity (Hunter and Brehm, 2003; Buijs et al., 2008). The increase in economic considerations within the policy discourse may thus reflect a strategic approach to communication, based on this view. However, the inclusion of economic considerations within environmental policy communications implicitly supports the assumption that it is a lack of economic quantification of the environment that results in its destruction (see Coffey, 2015). This serves to reinforce the (neoliberal) view that nature is important only to the extent that it provides goods and services of economic value to humans (McCauley, 2006). The unintended consequence of this view may be that through emphasizing the value of biodiversity, an expectation is created whereby nature must be seen to have a demonstrable and quantifiable value in order for it to warrant protection. Such a worldview would

make it even more difficult to motivate people to support the protection of ‘ugly’ and ‘useless’ biodiversity. This is perhaps as important as ever as we move further into the era of the Anthropocene (Crutzen, 2002). In recognizing the inevitability of human induced environmental changes that define the Anthropocene, arguments are being mounted that ‘ecosystem function’ rather than individual organisms should be the goal of biodiversity conservation policy (e.g. Hughes et al., 2017). In advocating this view, it is important that such approaches not be reduced to a biocentric (rather than anthropocentric) version of the ecosystem services concept. There is a risk that, like the anthropocentric ecosystem services approach, a biocentric equivalent would provide an apparently legitimate fig leaf behind which policy makers may abdicate responsibility for species-level biodiversity conservation on the grounds that it is ‘too hard’, owing to cost, lack of resources or disruption to business as usual (as seems to have occurred in the case of biodiversity offsets).

## 5. Conclusions

Although this study is centered on this limited Australian case study, the trends identified are worthy of note. Irrespective of the reasons behind the trends identified, because discourse is constructive as well as reflective (Fairclough, 1992), such changes may both exert and reflect change. In reinforcing the view that nature is of economic value, such policy communiques unavoidably place biodiversity conservation within an economic frame. This arguably promotes an understanding of ‘biodiversity’ as a resource to be exploited and undermines its alternative understanding as the ‘life on Earth’ (e.g. Spash, 2008). As it is well established that the way information is framed can significantly affect the way people understand and respond to it, it is likely that this will influence the public understanding and enthusiasm for biodiversity conservation. Conservation communicators should strategically consider how to phrase and frame messages for greatest immediate impact, as well considering how this may also shape the discourse over time.

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