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1 **Ask not what nature can do for you: a critique of ecosystem services as a**  
2 **communication strategy**

3 Bekessy, S.A.<sup>1,2,3</sup>, Runge, M.C.<sup>4</sup>, Kusmanoff, A.M.<sup>1, 2,3</sup>, Keith, D.A.<sup>5,6</sup> & Wintle, B.A.<sup>2,3,7</sup>

4 <sup>1</sup>ICONScience, RMIT University, School of Global, Urban and Social Studies, Melbourne,  
5 Australia.

6 <sup>2</sup>Centre of Excellence for Environmental Decisions.

7 <sup>3</sup>National Environment Research Programme, Threatened Species Recovery Hub.

8 <sup>4</sup>US Geological Survey, Patuxent Wildlife Research Center, Laurel, Maryland, USA.

9 <sup>5</sup>University of New South Wales, Centre for Ecosystem Sciences, School of Biological, Earth  
10 and Environmental Sciences, Australia

11 <sup>6</sup>New South Wales Office of Environment and Heritage, Australia

12 <sup>7</sup>University of Melbourne, School of Biosciences, Melbourne, Victoria, 3010, Australia

13  
14 Corresponding author: Bekessy, S.A. ([sarah.bekessy@rmit.edu.au](mailto:sarah.bekessy@rmit.edu.au)) + 61 3 9925 1858

15 RMIT University, School of Global, Urban and Social Studies, GPO Box 2476, Melbourne,  
16 Victoria, 3001, Australia.

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22 **Abstract:**

23 Given the urgent need to raise public awareness about biodiversity issues, we review the  
24 effectiveness of ‘ecosystem services’ as a frame for promoting biodiversity conservation.  
25 Since its inception as a communications tool in the 1970s, the concept of ecosystem services  
26 has become pervasive in biodiversity policy. While the goal of securing ecosystem services is  
27 absolutely legitimate, we argue that it has had limited success as a vehicle for securing public  
28 interest and support for nature, which is crucial to securing long-term social mandates for  
29 protection. Emerging evidence suggests that focusing on ecosystem services at the expense of  
30 the intrinsic value of nature is unlikely to be effective in bolstering public support for nature  
31 conservation. Theory to guide effective communication about nature is urgently needed. In  
32 the meantime, communicators can increase their success by reflecting on their objectives and  
33 intended audience and revisiting the way nature is framed to ensure maximum resonance.

34

35

36 **Highlights:**

- 37 • The phrase ‘ecosystem services’ was devised in the 1970s to generate interest in  
38 biodiversity conservation.
- 39 • Framing nature as a ‘service’ might be decreasing public engagement in conservation.
- 40 • Positive messages of nature’s aesthetic, cultural and spiritual aspects may be more  
41 effective than messages about its utilitarian value.
- 42 • Communicators can be more effective by carefully identifying their audience when  
43 framing messages about nature.

44

45 **1. The rise of ecosystem services**

46 The concept of ecosystem services was developed as a communication tool in the 1970s to  
47 attract public interest in biodiversity conservation (e.g. Westman 1977). Highlighting  
48 humanity's dependence on the services provided by nature was thought to be a way of "*telling*  
49 *stories that link biodiversity to the things that matter to people*" (CBD 2014).

50

51 Since then, the term has achieved global prominence and has evolved an economic focus,  
52 facilitating the valuation of biodiversity in monetary terms (Costanza *et al.* 1997). This puts  
53 decision-making in terms that are easier to communicate to decision makers, allowing trade-  
54 offs to be evaluated in a single (typically monetary) currency (Deliege and Neuteleers 2015).  
55 Largely due to this fact, the last couple of decades have seen the economic dimension of  
56 ecosystem services take a visible role in decision-making settings. While commodification of  
57 nature does not originate from the ecosystem services literature, the application of ecosystem  
58 services concepts often leads to attempts to quantify and monetize elements of biodiversity so  
59 that they can be valued and traded against other benefits.

60

61 The concept of ecosystem services is now pervasive in environment policy agenda setting.  
62 For example, the publication in 2005 of the UNEP Millennium Ecosystem Goals  
63 (Millennium Ecosystem Assessment 2005) focused heavily on understanding the links  
64 between ecosystems and human welfare; the Intergovernmental Platform on Biodiversity and  
65 Ecosystem Services has a specific mandate to report on the services we derive from nature;  
66 the European Commission Biodiversity Policy includes a major initiative focused on the  
67 Economics of Ecosystems and Biodiversity (European Commission 2016) and the  
68 International Union for Conservation of Nature (IUCN) has committed substantial resources  
69 to implementing ecosystem services programs (IUCN 2016). Following this trend, a  
70 proliferation of programs focused on ecosystem services (sometimes mixed with intrinsic  
71 arguments for conserving biodiversity) has emerged from organisations such as The Nature

72 Conservancy, Conservation International, World Wildlife Fund, and Wildlife Conservation  
73 Society (Goldman and Tallis 2009). Market-based instruments that often involve the  
74 commodification of ecosystem services (Deliege and Neuteleers 2015) are fast becoming the  
75 policy instruments of choice for biodiversity management around the world (e.g. Ecosystem  
76 Marketplace 2016). While we acknowledge that the ecosystem service concept can  
77 encompass many types of services and values (Schröter et al. 2014), it is chiefly  
78 anthropocentric services, and often their corresponding economic valuation, that tend to be  
79 promoted through this frame.

80

81 Two important early steps for any communications strategy are identification of the intended  
82 audience and articulation of the desired outcomes. The use of ecosystem services as a  
83 framing concept may be effective for some audiences and some desired outcomes, but not all,  
84 and vagueness about the purposes of this term may undermine its success. Here we critique  
85 the effectiveness of the ecosystem services concept as a communication tool for engaging the  
86 public in biodiversity conservation, drawing on the sparse empirical evidence and existing  
87 knowledge about relevant social theories.

88

## 89 **2. The effectiveness of ecosystem services as a communications tool**

90 Research in communication, sociology, psychology, and political science has shown that the  
91 way in which an issue is ‘framed’ can influence the judgments an individual might make in  
92 relation to this issue. In reframing nature as a set of specific and quantifiable services,  
93 ecosystem services reinforces the market-driven view that nature is important only to the  
94 extent that it provides goods and services of (economic) value to humans (McCauley 2006;  
95 Coffey 2015). This view ignores any intrinsic values people may associate with nature (e.g.  
96 Schultz 2001), and depends instead on an assumption that people will be persuaded by the  
97 ‘value’ that is attributed to the services provided by nature. Many of the arguments for using

98 the ecosystem services approach are centered on the idea that it allows the value of nature to  
99 be better included and properly considered by policy makers. By providing a dollar value for  
100 these hitherto ‘free’ services, their value can be better weighed against competing values and  
101 interests, and thus afford ‘nature’ greater regard than it has historically received in such cost-  
102 benefit analyses. Although far from clear-cut, this seems a reasonable approach to informing  
103 a cost-benefit analysis in a specific decision-making context.

104

105 However, the ecosystem services logic has not been confined to this context, and often  
106 appears in the wider conservation discourse, including as a deliberate technique for  
107 promoting nature conservation (Kusmanoff et al. 2017a). Given that humans are not strictly  
108 rational (Ajzen 1991), are frequently influenced by emotions and other biases (Kahneman  
109 2011) (see particularly the advertising literature) and seldom change views owing only to  
110 being presented with new information (Gorman and Gorman 2017) (climate change is an  
111 example ), there is a question as to the effectiveness of the ecosystem services approach as a  
112 communication tool. Has this shift in the way we frame our relationship to nature delivered  
113 improvements in public engagement, conservation and environmental stewardship?

114

115 While academic publication on the topic of ecosystem services has grown exponentially in  
116 recent years (Cornell 2011; West 2015), interest in biodiversity conservation by the media  
117 has plateaued over the same time period (Legagneux et al. 2018). In contrast, the topic of  
118 climate change has up to eight times the level of media coverage compared to biodiversity, a  
119 discrepancy that cannot be explained by different scientific output between the two issues  
120 (Legagneux et al. 2018). These observations do not prove that the increased attention to  
121 ecosystem services is *causing* a plateau in media interest in biodiversity conservation, but  
122 these trends do suggest that the aim of increasing public interest in nature conservation has  
123 not been achieved via the increase in attention to ecosystem services. Importantly, over a

124 similar period, almost every indicator of the status of the world's biodiversity has trended  
125 negatively, including decreased forestation and decreased average likelihood of long-term  
126 persistence for birds, mammals and amphibians (CBD 2014). Legagneux et al. (2018) argue  
127 that awareness of these biodiversity conservation challenges is simply not reaching the public  
128 and that improved communication strategies are urgently needed to raise public awareness.

129

### 130 **3. Why ecosystem services may not be the best frame for public engagement**

131 The concept of ecosystem services has arguably been very successful at integrating  
132 conservation into mainstream economics and sustainable development practices and  
133 convincing academics to discuss, investigate, and write about the concept (Norgaard 2010).  
134 Other analyses have focused on the failure of the concept to inspire effective conservation  
135 action, particularly with respect to payment for ecosystem services schemes (eg. Büscher  
136 2012; Wynne-Jones 2012). Here we focus on the apparent failure of the concept of ecosystem  
137 services to engage the public in biodiversity conservation.

138

139 Assuming for the moment that engaging the public in conservation was an intended outcome,  
140 there are a number of possible explanations as to why use of ecosystem services may not  
141 have been effective in achieving this outcome. The first is that programs focusing on  
142 ecosystem services may be adopted at the expense of targeted conservation programs for  
143 biological diversity at genetic, species and ecosystem levels of organization (McCauley  
144 2006). The focus on ecosystem services may not be delivering umbrella protection to  
145 biodiversity, rather it could be taking attention and resources away from threatened species  
146 (McCauley 2006). The evidence for this claim is equivocal with some studies showing a  
147 possible diversion of resources, such as the focus of the Australian Government on  
148 maintaining functioning ecosystems rather than preventing the extinction of the Christmas

149 Island pipistrelle (Lunney et al. 2011), and others arguing that threatened species programs  
150 have not suffered as a result of the focus on ecosystem services (Goldman and Tallis 2009).  
151

152 A second possibility is that the capacity for the public to engage with environmental issues  
153 has been dominated by climate change at the expense of biodiversity. Verissimo et al. (2014)  
154 found evidence to support such trends in the coverage of these topics within the scientific and  
155 popular press, as well as the relative distribution of funding from key agencies. While  
156 correlation does not imply causation, this result *does* point to the failure of conservation  
157 advocates to communicate the biodiversity crisis in as compelling a way as has been  
158 articulated for climate change, and this is supported by recent analyses (Legagneux et al.  
159 2018).

160  
161 It could be that framing biodiversity in terms of ecosystem services is not an adequately  
162 broad or effective communication approach to result in widespread change. People are  
163 generally more motivated to change behaviour by antecedent values, attitudes and social and  
164 personal norms than by logical arguments (Ajzen 1991). Hence, supplying technically  
165 correct, logical information about the value of a tree to the economy is unlikely to effectively  
166 communicate to the public why it shouldn't be cut down. Combining ecosystem services and  
167 empathy arguments is also unlikely to work. Confusing the message by selling the idea of the  
168 economic benefits of nature, while also appealing to its emotional qualities feels incongruent  
169 and possibly offensive for some people who have an emotional connection to nature (Futerra  
170 2015).

171

#### 172 **4. Ecosystem services may undermine intrinsic values**

173 The intention behind the use of ecosystem services to promote biodiversity conservation is  
174 that representing arguments for nature as services that nature provides ultimately leads to a



175 deeper appreciation of the intrinsic value of biodiversity (Goldman and Tallis 2009). This  
176 argument suggests that such an approach may engage people who do not already have high  
177 levels of intrinsic care for nature. We know of no evidence that indicates that reinforcing  
178 instrumental values can actually generate intrinsic values; to the contrary, as we discuss in the  
179 following paragraph, there is evidence that it can *undermine* intrinsic values.

180

181 Motivational crowding-out is the process whereby intrinsic altruistic motivations for  
182 behaviour are replaced by extrinsic self-interested motivations when an external (generally  
183 monetary) reward is offered for the behaviour. The classic example is the child who is paid  
184 by her parents to complete a household chore; once the child expects to receive money for the  
185 task, they are willing to do it again only if they receive a similar monetary reward (Frey and  
186 Jegen 2001). This is a concern for monetary incentives in conservation (Bekessy and Cooke  
187 2011; Rode et al. 2015). By framing nature as a collection of ecosystem services, these  
188 anthropocentric benefits have the capacity to act as extrinsic motivations for practicing  
189 conservation and may act to crowd-out intrinsic motivations to care for the environment. It  
190 has been demonstrated that even communicating an aspect of nature in terms of economically  
191 framed ecosystem services (i.e. in terms of valuation) can crowd-out intrinsic motivations for  
192 conserving that aspect of nature (Kusmanoff 2017) and lead people to contribute less money  
193 to a natural resource conservation fund (Goff et al. 2017). In the case of conservation  
194 advocacy, if people are consistently compelled to support conservation of nature that  
195 provides valuable ecosystem services, their intrinsic value of nature may be crowded-out  
196 such that they come to care less (or not to care) for those places in nature that do not offer  
197 sufficiently valuable (in dollar terms) services.

198

199 For crowding-out to occur, the external incentive (e.g. money or in this case the ecosystem  
200 services) must be a factor in driving the behavior. For people who already have a strong

201 appreciation of nature, the ecosystem services provide an additional reason to care for nature,  
202 but do not drive this care (the reinforcement of previously held beliefs is referred to as  
203 ‘crowding-in’). However, for those people with only a little intrinsic care for nature, the  
204 ecosystem services may be their most tangible and compelling reason to conserve nature, and  
205 thus crowd-out the small degree of intrinsic motivation initially present. This means that for  
206 people with low intrinsic care for nature, ecosystem services framing of conservation  
207 messages may be counterproductive at fostering those values, while for people with a higher  
208 intrinsic care for nature, these messages may reinforce that care but will not increase the  
209 recruitment of conservation supporters. If the purpose of an ‘ecosystem services’ frame is to  
210 engage the people who hold little previous intrinsic care for nature, it may be doing the exact  
211 opposite.

212

## 213 5. **How *should* we frame biodiversity messages?**

214 There is surprisingly little research into how people respond to biodiversity messages, but  
215 this information is important to understanding why policies, management approaches and  
216 campaigns work or not. The potential support for conservation policy and priorities to arise  
217 from public concern (Martín-López *et al.* 2009) makes communicating biodiversity issues in  
218 ways that resonate with the general public a critical task.

219

220 So what *do* we know about how the conservation of nature should be communicated to  
221 improve public engagement? The first point is that the term biodiversity itself seems  
222 problematic, with repeated surveys pointing towards a gross lack of understanding of the  
223 term (for example, 62% of EU citizens did not know the meaning or had never heard of the  
224 term biodiversity, Gallup 2010). 'Nature' is a less technical term that more people understand  
225 and relate to; indeed the Intergovernmental Platform on Biodiversity and Ecosystem Services  
226 has embraced this term (Díaz *et al.* 2015).

227

228 Telling horror stories about the biodiversity crisis and the loss of species is a strategy that is  
229 unlikely to convince skeptics of the need for action (Christmas *et al.* 2013). The key problem  
230 with such horror stories is that people who will respond to these messages are those who are  
231 already concerned (Christmas *et al.* 2013). In an experiment to discover best approaches to  
232 convince climate skeptics to be pro-environmental, Bain et al. (2012) found that  
233 communicating the positive effects of climate action on interpersonal relationships or  
234 economic or technological development was more effective at encouraging pro-  
235 environmental intentions than communicating health risks of climate inaction. It is possible  
236 that positively-framed rationales are more effective at convincing skeptics than arguments  
237 focusing on negative consequences. Targeted studies focussed on biodiversity rather than  
238 climate change, however, are required to substantiate this claim.

239

240 Zelnio (2012) argues that ecosystem services could be the positive message needed to  
241 convince skeptics of the need to preserve nature and to motivate action. But research shows  
242 consistently low awareness of, and engagement with, provisioning, regulating and supporting  
243 services (such as provision of clean water) (Christmas *et al.* 2013).

244 From a marketing perspective, the raw material for biodiversity communications strategies is  
245 the stuff of dreams: that is, the innate interest, awe and wonder for *nature* that remains  
246 remarkably high in many parts of the world (e.g. Lindemann-Matthies and Bose 2008). A  
247 spiritual relationship with nature is central to many cultures and its stewardship is often  
248 perceived as a mandate from God (Negi 2005). Children naturally gravitate towards the  
249 wonder and fascination of the natural world (Kellert 2005): their first words are often the  
250 names of animals; books and films that appeal to children are about animals; favourite  
251 activities are zoos, aquariums and children's farms; and up to 90% of the dreams of children  
252 under 6 years are about animals (Peterson 2000). Hence, we argue that it is the aesthetic,

253 cultural and spiritual rewards that the diversity of life provides that is likely to drive most  
254 public interest in nature, not the delivery of services.

255

256 Some argue that framing nature as ecosystem services and focusing on ‘need’ messages is not  
257 just missing opportunities, it might indeed be a dangerous strategy that can actively  
258 undermine positive action for species conservation (Crompton 2010). There are two lines of  
259 argument. The first is that messages about the need for ecosystem services tend to reinforce  
260 egoistic values, which, in the long-term, undermine engagement with biodiversity (Crompton  
261 2010). The other argument is that focusing on services gives a false sense of security because  
262 it evokes the perception that ‘nature will find its way’ and will continue to provide services  
263 even if some component species are lost (Christmas *et al.* 2013).

264

## 265 **6. Room for ecosystem services**

266 We do not suggest that ecosystem services must always be counter-productive or offer zero  
267 value for conservation advocacy, instead we argue that there are better and more strategic  
268 ways to frame biodiversity conservation messages. Humans do ultimately rely on the  
269 multitude of ecosystem services that nature provides: clean air, clean water, pollination,  
270 recreation, and so many others. Societies would be wise to attend to the properties of the  
271 natural world that provide these services. In some instances, a focus on ecosystem services  
272 will lead to win-win outcomes for biodiversity, but this will not automatically be the case.  
273 Venter *et al.* (2009), for example, demonstrated that cost-effective spending for REDD+  
274 (Reducing Emissions from Deforestation and Forest Degradation) would protect little  
275 biodiversity. Hence, we need specific strategies for managing both ecosystem services and  
276 biodiversity, but should be opportunistic regarding potential synergies.

277

278 Whether or not synergistic strategies can be found, the concept of ecosystem services is not  
279 likely to be the omnibus communication tool that its originators had hoped it would be  
280 (Westman 1977). Indeed, as a broad communications strategy, it can have perverse outcomes,  
281 because it reduces the focus on nature to its utilitarian values, diminishing the focus on the  
282 fundamental aesthetic, ethical, spiritual, and stewardship values that are at the heart of our  
283 relationships with nature. In a decision-making context, a focus on ecosystem services tends  
284 to draw attention to variables that can be easily monetized, and away from those that can be  
285 more compelling in terms of communicating the importance of nature (Fisher and Brown  
286 2014).

287

288 Perhaps the deepest problem undermining nature messages is that communicators typically  
289 do not identify the desired audience nor define the objectives of communication strategies.  
290 Are we trying to protect biodiversity, conserve threatened species, set aside wilderness, create  
291 recreational opportunities, confirm the existence value of nature, or pursue a responsibility  
292 for stewardship? Are we trying to change people's beliefs, alter their values, or simply  
293 encourage them to behave in a way that will conserve nature? To whom are we  
294 communicating, what is the objective and how will we measure the success of our  
295 communication efforts? The answers to these questions will be key to deciding how best to  
296 frame nature to engage different sectors more actively in its conservation.

297

298 The common understanding that framing nature in terms of ecosystem services is a  
299 universally effective approach to promoting biodiversity conservation requires  
300 comprehensive evaluation. Indeed, the emerging (but slim) evidence points in the opposite  
301 direction—that focusing on 'services' rather than the awe and wonder of nature is unlikely to  
302 be effective in bolstering broad public support for conservation. Currently, there is little rigor  
303 behind our decisions to use different strategies for engaging the public with nature, with little

304 convincing research upon which to improve this situation. It is likely that there are situations  
305 in which communicating nature in terms of ecosystem services *will* be effective (for example  
306 securing commitments for funding initiatives at high levels of government or appealing to  
307 industry). But we need to examine carefully the circumstances in which the ecosystem  
308 services strategy will work. In the meantime, communicators should think carefully about  
309 their objectives and intended audience and frequently revisit the way nature is framed to  
310 ensure maximum resonance (see Kusmanoff et al. 2017b for a guide).

311

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319

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