

## Putting Ambiguity to Work: Biodiversity and Rules of Engagement for Vagueness in Science

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### Abstract

‘Biodiversity’ is widely recognized as an extremely ambiguous concept in conservation science and ecology. It is defined in a number of different and incompatible ways in the scientific literature, and is also “exported” beyond the scientific community, where it may take on a host of other meanings for governments, policy-makers, non-governmental organizations, and the general public at large. One might respond to this ambiguity by either pushing for its clarification, and by extension the adoption of a single, univocal biodiversity concept, or by rejecting the term entirely, replacing it with a relevant, more precise concept in each context. In this paper, I argue for a third approach. Drawing on literature describing change in large organizations, I explore ways in which ambiguity might be seen as productive – as a manner, at the very least, in which we can enable action by a mixed coalition of actors with different and, at times, contradictory interests and value commitments. I explore how this literature – in particular, a taxonomy of rhetorical uses of ambiguous concepts – could enable us to put the ambiguity of biodiversity to work for us, offering us a way to intervene in conflicts about the concept by helping to develop both clearer descriptive analyses and normative “rules for engagement” in debates surrounding biodiversity.

**Key words:** biodiversity; ambiguity; vagueness; organizational change; pragmatic ambiguity

### 1. Introduction

Biodiversity is perhaps a paradigmatic example of a vague or ambiguous concept in the sciences.<sup>1</sup> Keeping our sights firmly on the scientific community for the

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1 While profitable work could be done categorizing different (and distinct) concepts of *vagueness*, *ambiguity*, and *polysemy*, I will for present purposes restrict myself to the term ‘ambiguity’, in the sense of a term permitting more than one definition in a given domain of discourse. Importantly, and as will become clear below, I mean the term to have no inherent negative normative or empirical implications. I will also occasionally refer to ambiguous *concepts*, by which I mean a concept the primary (or only) term referring to which is ambiguous. Whether this means that the concept itself is vague, that the term in fact refers to a family of concepts, or some other interpretation, is not pertinent for the analysis that follows.

moment, this ambiguity is occasionally cited as a source of worry regarding the relationship between ecology, taxonomy, and conservation biology. In the introduction to their excellent survey of biodiversity concepts, James Maclaurin and Kim Sterelny write

We shall see that, from the beginning, there has been a potentially troubling ambiguity in thinking about biodiversity in conservation biology (and hence applied ecology). The ambiguity is between what conservation biology wanted to conserve and the mechanisms of conservation. Biodiversity is sometimes thought of as a measure of what we want to keep, but it is sometimes also thought of as a tool: a measure of an instrumentally important dimension of biological systems. (Maclaurin and Sterelny 2008, 2)

Put differently, biodiversity has, at times, served as a measure of an objective, independent property of ecosystems, while at other times its measurement has been tightly connected with the practical concerns of conservation biology. (One might be reminded of Goodhart's Law, often phrased as the claim that "when a measure becomes a target, it ceases to be a good measure.") Insofar as conservation biology – dubbed a "crisis discipline" by one of its founding figures (Soulé 1985) – is tied up with a whole host of non-epistemic value judgments (Conix 2019), practice surrounding biodiversity finds itself pulled in a number of different, sometimes incompatible, directions.

Definitions of the term from an applied ecology perspective still give pride of place to *species richness*, or the number of species present in a given area, though there is a broad consensus that this number is a poor standalone measure.<sup>2</sup> After all, we want to preserve a wide variety (at the risk of circularity, a genuine diversity) of species, and we also recognize the importance of ecosystem-level interactions and the complex interconnections between species. Given this, we might simply supplement the concept of species richness with phylogenetic information (yielding a concept sometimes known as *taxonomic distinctness*; Maclaurin and Sterelny 2008, 163). But we might also replace species richness entirely, hearkening back to the history of taxonomy, which began with efforts like those of Linnaeus to categorize organisms based solely on their phenotypic traits, to argue that it is a diversity of forms or morphologies that should be prized (*phenotypic richness*, which can in some cases radically differ from species richness; Maclaurin and Sterelny 2008, 43). Or we

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2 A related problem is the ambiguity inherent in many taxonomic concepts, which makes species inventories themselves uncertain (Garnett and Christidis 2017; Cuyppers, Reydon, and Artois 2022).

could choose to focus on *community structure*, placing at the center of our analysis precisely those interconnected relationships between organisms which we know are so important to ecology. We could see this community diversity instead as a *diversity of niches* available (or potentially available) within a given ecosystem, hoping that natural selection will have done a good job of filling them, and thus that this is an apt proxy measure for biodiversity (Sarkar 2002, 142). We might also adopt what Maclaurin and Sterelny call the “methodological attractions” of defining biodiversity as *genetic diversity* (Maclaurin and Sterelny 2008, 142–45), since low-cost, high-throughput genetic sequencing has made such data one of the easiest ways to quickly take a longitudinal survey of an ecosystem.

Importantly, while all of these definitions can be found in the literature and in contemporary practice, not one is uncontroversial or without significant and readily apparent problems. And equally importantly, this has not brought work in contemporary conservation biology or taxonomy to a standstill, nor has it slowed the rapid spread of biodiversity as a concept outside of the scientific community. At least at the time of writing, in Western Europe, nearly any group gathered for nearly any reason – whether it includes biologists, philosophers, and conservationists, or executives, lawyers, and politicians – would likely sign on to a “consensus statement” that biodiversity is something worth protecting. It seems somewhere between unlikely and entirely impossible that all the people involved in such a group could be operating with the same definition of the term.

All signs, then, point to biodiversity as a deeply ambiguous concept – both as it’s used in science and as it’s exported from the scientific community. In this paper, I want to investigate this ambiguity as a kind of call to action. What are the various responses which the scientific and philosophical communities might take when faced with this kind of ambiguity? In the end, drawing on literature from the study of organizational change, I argue that we have good reason to think both that this ambiguity will be ineliminable, and that this is not necessarily a bad thing. With careful philosophical reflection, we can put ourselves in a position to analyze the ambiguity inherent to discussions of biodiversity and, perhaps, to turn it to our advantage.

## 2. The Upside of Ambiguity

What kinds of approaches to ambiguous concepts, within and beyond science, are already found in the literature? A natural reaction to ambiguity is to treat it as a kind of self-evident problem to be eliminated, whether with further scientific research or philosophical conceptual analysis. No less than Aristotle wrote in the *Rhetoric* that clarity is the very function of language: “we may, then, start from...the stipulation

that language to be good must be clear, as is proved by the fact that speech which fails to convey a plain meaning will fail to do just what speech has to do” (Aristotle 1984, *Rhetoric* III.2, 1404b1). A similar response can be traced in the scientific literature, especially in data science, where clear definitions are crucial for the widespread use of and contribution to online data resources (Sternier, Witteveen, and Franz 2020; Lean 2021). As Beckett Sternier and colleagues describe the position (which, notably, they do not endorse):

In the biological and biomedical sciences, what we will call the Definitional Consensus Principle has dominated the design of data discovery and integration tools:

**Definitional Consensus Principle (DCP):** The design of a formal classificatory system for expressing a body of data should be grounded in a consensus about the definitions of the entities that are being classified. (Sternier, Witteveen, and Franz 2020, 2)

On this kind of view, though we might advance piecemeal while working under different definitions of an ambiguous term, the primary goal should always be seen to be eventual consensus and the elimination of ambiguity. I do not have the space to develop this argument in detail here, but I agree entirely with Sternier *et al.* that the current state of affairs in taxonomy offers us good evidence that taxonomy and ecology are in no position to adhere to anything like the DCP (and thus that concepts like ‘species’ and ‘biodiversity’ are likely to remain ambiguous). As they put it, as a result of persistent disagreement in classification, “our collective understanding of biodiversity is...too fractious to be adequately grounded in a single substantive consensus view about the meaning of terms” (Sternier, Witteveen, and Franz 2020, 4).

Moving to the other end of the spectrum from the DCP, one might also respond to the apparent ambiguity of biodiversity with skepticism about the concept’s utility. Sahotra Sarkar argues that we can at best obtain a kind of working, nearly-vacuous definition of biodiversity extracted from conservation practice. “Put bluntly,” he writes, “biodiversity is to be (implicitly) defined as what is being conserved by the practice of conservation biology” (Sarkar 2002, 132). Even more provocatively (in a paper entitled “Save the Planet: Eliminate Biodiversity”), Carlos Santana has argued that, as surrogates for or indicators of biodiversity fail to be robustly correlated, biodiversity has become a kind of catch-all term for conservation biologists, masking the more precise invocations of “biological value” that would be needed to faithfully describe what we actually hope to conserve (Santana 2014).

Perhaps the skeptics are right. Unlike in the case of the DCP, I have no argument even to gesture at here to support a continued search for a workable interpretation of biodiversity. As authors discussing scientific pluralism have amply discovered, it is difficult to offer a convincing case either that we have a single, yet pluralist concept C which deserves an integrated analysis, or that we have a hodge-podge, *bricolage* concept C which deserves to be broken apart and dismantled. What I want to do in this paper is tackle the problem from the opposite direction, presenting a positive argument that an ambiguous understanding of biodiversity can still be useful for a concept that reaches beyond the scientific community. In this sense, my approach is not that different from responses to other forms of skepticism elsewhere in philosophy: when conclusive refutations of skepticism are not to be found, the best result is likely to construct a positive picture of that which the skeptic fears we are unable to find.

The idea that ambiguity of various sorts can be useful for scientific practice is not a new one. The classic notion of “boundary objects” developed by Susan Star and James Griesemer (1989), for instance, describes the intentional construction of ambiguous objects of scientific knowledge, such that these can be used by different actors for different purposes. This idea, however, is also not quite what I have in mind in the present context. Boundary objects are “scientific objects which both inhabit several intersecting social worlds...and satisfy the informational requirements of each of them” (Star and Griesemer 1989, 393). While this could be extended to accounts of concepts like biodiversity, one aspect of boundary objects would make this difficult. Boundary objects are traditionally literal *objects*, pieces of scientific knowledge that are used to negotiate, to borrow Star and Griesemer’s example, relationships like those between trappers, collectors, and other non-scientists and the world of academic museum research, translating between otherwise separate social and intellectual worlds. The extension of this notion to an element of the conceptual architecture of a science, i.e., to biodiversity, isn’t straightforward.<sup>3</sup> While this could be a useful and important enterprise, this won’t be my project here.

Another place where imprecision of concepts has been emphasized as a positive feature in science is in the support of other epistemic goals – particularly, in *integration* of scientific knowledge. Beginning with and drawing on Ingo Brigandt’s analysis of the concept of the gene (Brigandt 2010; see also Waters 2014), it has been argued that notions of evolutionary novelty, homology (Brigandt 2012), and

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3 Among other reasons, it would mean that the concept of biodiversity, like the physical objects at work in Star and Griesemer’s examples, is in some sense given for all parties, and it is only the different uses for which various parties employ that concept that gives biodiversity its problematic character.

biological lineage (Neto 2020) exhibit a particular sort of productive ambiguity, allowing biologists to temporarily form alliances to explain complex features (like the evolution of novelty) by temporarily integrating a wide array of fields (like population genetics, paleontology, developmental biology, and ecology) in pursuit of one particular, local explanatory aim. An interesting empirical confirmation of the same phenomenon is found in work by Peter McMahan and James Evans, who described a small but significant predictive effect that ambiguity in the abstracts of articles will lead to increased interdisciplinary engagement across fields (between natural sciences, social sciences, and humanities; McMahan and Evans 2018). While this sense of integration is important, it also does not seem to be the way in which biodiversity operates. The various groups that utilize the notion of biodiversity don't seem to be united around *epistemic* or *explanatory* goals – they are not attempting to build theories or do science together. Rather, biodiversity's use is more pragmatic, oriented toward directing action. Further, the interdisciplinary connections in these analyses of integration remain within the scientific or academic community, which is significantly narrower than the scope of my work here.

Beckett Sterner has recently offered an argument particularly relevant to the one that I will develop, claiming that ambiguity in scientific language can do positive work, but that its utility is context-sensitive (Sterner 2022). His approach is to separate invocations of ambiguity by the pragmatic context in which they are used: communication, reasoning, innovation, and joint action. He employs this taxonomy to evaluate a number of “rules” for ambiguous language that can be extracted from the philosophical and science-studies literature. One of these enjoins scientists to “use polysemic terms because they enable joint action if enough contextual information exists for each listener to select a practically adequate, personal interpretation” of the term (Sterner 2022, 9). The present paper is an attempt to offer a deeper evaluation of precisely this kind of rule in this context – to explore in more detail how a norm applying to joint action could be useful and how philosophers could contribute to understanding it better.

### **3. Organizational Change and Biodiversity**

It is not only in the analysis of scientific language or scientific concepts that arguments have been made for the positive value of ambiguity: similar claims have in fact been defended across the humanities and sciences. Benjamin Page has argued that, for all that ambiguity is probably still a bad thing overall in politics, it is in the rational best interest of political figures to encourage ambiguity in order to maximize their base of support and avoid alienating their constituents (Page 1976). Dennis Gioia and colleagues have noted that in corporate vision statements,

ambiguous phrasing of goals enables more employees to feel as though they have something to contribute to the common enterprise (Gioia, Nag, and Corley 2012).

But perhaps the area of study where the implications of ambiguity have been explored the most thoroughly is in the context of organizational change. Say a large organization (like a corporation or a university) wants to implement sweeping change. How tightly should their goals, or the key concepts underlying their desired future direction, be defined? How clearly should they be communicated by management to organization members? Here, we see precisely the same dilemma surrounding ambiguity that we saw with regard to the sciences. The “classic” view of organizational communication has it that the primary aim is and ought to be clarity: ambiguity challenges leadership, poses problems in crafting and implementing a clear strategy, and hinders collective action (Jarzabkowski, Sillince, and Shaw 2010, 220–21). Others, however, argue for a productive role for ambiguity.

Before doing so, however, I should respond to one obvious objection. Of course, there are some relatively obvious senses in which the “users” of biodiversity might resemble organizations – the “scientific community” might bear some “organization”-like properties, and some genuine organizations (such as IPBES, CITES, or the IPCC) are involved. But if we want to be able to talk in general about the concept of biodiversity, we have to be thinking about a much more amorphous “organization,” something like the entirety of global biodiversity management. This, clearly, is no traditional organization. But this problem has been anticipated in a number of ways in the literature on the structure of organizations. In particular – perhaps especially because of their lack of a clear, hierarchical structure – work on ambiguity has historically been tied to studies of what is known as the *garbage-can model* of organizational choice (Cohen, March, and Olsen 1972). Here, we don’t think of organizations as following any kind of linear decision-making process: rather, we think of

a choice opportunity as a garbage can into which various kinds of problems and solutions are dumped by participants as they are generated. The mix of garbage in a single can depends on the mix of cans available, on the labels attached to the alternative cans, on what garbage is currently being produced, and on the speed with which garbage is collected and removed from the scene. (Cohen, March, and Olsen 1972, 2)

We model, then, “streams” of problems, solutions, participants, and “choice opportunities” (i.e., occasions of decision-making), with knowledge that changes in each of those streams can, and likely will, be independent from one another: what

set of problems are seen to need resolution before a decision can be made, for instance, can change without any apparent change in the solutions available or the choice opportunity itself.<sup>4</sup> On the one hand, it becomes easier to see the ways in which global biodiversity management might resemble *this* sort of organization. And on the other, the independence of these various streams allows for new forms of problem solution to emerge, an idea to which I will return in the conclusion. But, in short, the fact that global biodiversity management or conservation lacks a tight organizational structure isn't an immediate reason for us to think that perspectives from organizational change will be inapplicable here.

A classic source with which we can begin our discussion is an article by Eric Eisenberg, who lauds the positive value of ambiguity in organizational communication. The fixation of traditional communication scholarship on clarity, he argues, is a mistake:

The overemphasis on clarity and openness in organizational teaching and research is both non-normative [i.e., it ought not be our target for good communication] *and* not a sensible standard against which to gauge communicative competence or effectiveness. People in organizations confront multiple situational requirements, develop multiple and often conflicting goals, and respond with communicative strategies which do not always minimize ambiguity, but may nonetheless be effective. (Eisenberg 1984, 228)

The use of ambiguity as a communicative strategy, then, is often effective, because it permits differing interpretations to be fostered by diverse participants with diverse aims and motivations. "Strategic ambiguity," he writes later, "is essential to organizing because it allows for multiple interpretations to exist among people who contend that they are attending to the same message" (Eisenberg 1984, 231). Hélène Giroux, drawing on a case study of the spread of "quality management," writes that ambiguity enables the interests of each participant to be "*translated*, in the sense that they are reworded in the different 'languages' of the communities present. They are also translated in the sense of a *displacement*: goals and interests are presented as equivalent, or they are redefined such that conflicting individual interests are obscured and shared collective interests are created" (Giroux 2006, 1228). Paula Jarzabkowski and colleagues, summarizing other literature, note that this ambiguity allows us to attribute or construct different meanings for our goals, to encourage participants to sign on to a higher-level meaning that doesn't contradict their

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4 The fact that the model was inspired by a participants' analysis of change management in a university is a point the humorous implications of which are left to the reader.

interests, or to permit different interpretations of a situation but agree on a course of action (Jarzabkowski, Sillince, and Shaw 2010, 221).

This good-making property of ambiguity – roughly, that ambiguity in goal-setting may allow us to create sites for agreement in pursuit of concrete action that would not be present if a narrow definition of the goal were required – goes by many different names: Jos Benders and Kees van Veen call it *interpretive viability* (Benders and Van Veen 2001), and in the rest of this article I will follow Giroux in calling it *pragmatic ambiguity* (Giroux 2006). My overall aim in this article, then, can be rephrased: it is my task to explore the implications of pragmatic ambiguity for biodiversity and conservation.

Of course, before continuing it is important to underline that even authors who laud the benefits of pragmatic ambiguity note that ambiguity can still have negative consequences. As we already saw in the brief introduction of the garbage-can model, the very modeling assumptions in play there allow for methods of making decisions that seem not to actually resolve the problems that underlay the creation of the choice opportunity in the first place. Eisenberg adds both that ambiguity can enable the plausible deniability of the communicated message while still saving face, as well as “the maintenance of privileged positions” or the re-entrenchment of existing power differentials (Eisenberg 1984, 235). Jarzabkowski *et al.* argue that ambiguity “enables partial and multiple meanings and interests to proliferate, which obscure action” (Jarzabkowski, Sillince, and Shaw 2010, 221). We will thus need to take care in analyzing each case, balancing the potential impact of these negative effects with the possibility of pragmatic ambiguity’s benefits.

### *3.1. Detailing Pragmatic Ambiguity*

First, I should offer a clearer defense of the idea that pragmatic ambiguity does indeed appear in the context of biodiversity and conservation. At least since the influential assertion of the claim by David Takacs (1996), it has been largely taken as writ that biodiversity *is* indeed an ambiguous concept; I won’t offer any further discussion or justification of that claim here. What I want to do instead is point to several of the features of organizational or decisional situations highlighted as particularly important in the literature on pragmatic ambiguity and demonstrate that these, indeed, are present in the case of biodiversity.

Jarzabkowski *et al.* offer three different characteristics that they say will be especially likely to encourage the appearance of ambiguous goals. “Ambiguous goals,” they write, “are typically associated with particular characteristics, such as multiple constituencies that place legitimate demands upon the organization... diverse power that constrains the exercise of senior management power...and lack of

direct control over resources” (Jarzabkowski, Sillince, and Shaw 2010, 220). These three criteria seem to be essentially omnipresent in the case of biodiversity conservation. Taking them in reverse order, it is practically self-evident that the global conservation community lacks control over the resources that would be required to effect genuine change. The reforms that would be needed to implement large-scale conservation plans require distributed stakeholders to work together; conversely, local choice opportunities, when they occur, will likely never rise to the notice of the global community. Thus, decision-making power is unusually dispersed. Lastly, and most importantly, the idea that the demands placed upon global conservation efforts by diverse stakeholders are legitimate ones is worthy of emphasis. To extract one example, for all that it is certain that too much emphasis has historically been given to traditional, productivity- and output-based economic measures, the correct way to redress this imbalance is emphatically not to declare economic concerns illegitimate, a point that has been extensively argued in the recent Dasgupta Report, which presents alternative economic models that take the value and importance of natural resources and biodiversity into account (Dasgupta 2021).

Eisenberg points out that ambiguity “is especially important to organizations in turbulent environments, in which ambiguous goals can preserve a sense of continuity while allowing for the gradual change in interpretations over time” (Eisenberg 1984, 233). The trajectory of conservation biology in the last forty years offers us ample confirmation of the “turbulence” of the environment here. The shifting scientific commitments, epistemic norms, and non-epistemic value judgments that have driven conservation biology are by now widely acknowledged (for an overview, see Odenbaugh 2021). In that sense, having our efforts focused on a somewhat ambiguous term like ‘biodiversity’ may have enabled scientists, policy-makers, and others to remain united around a goal despite these other shifting concerns.

Finally, we can also point to a different kind of productive role for ambiguity, one which might be notably important in the case of biodiversity. As Gioia *et al.* have argued, “ambiguous goals are not the end states to be achieved but are triggers for challenging members’ understandings and engaging them in novel sensemaking” (Gioia, Nag, and Corley 2012, 365). Put differently, recognition of the ambiguity of goals can serve to push actors that make use of biodiversity to recognize and engage with this ambiguity in their own approaches to conservation. For instance, work like the above-mentioned Dasgupta Report can not only directly provide us with arguments for the preservation of biodiversity (say, in terms of the future economic value that would be lost were it to be destroyed), but also can give us an opportunity to rethink our own values: Why is it that we want to preserve biodiversity in the first

place, and would our arguments for that position change if they were expressed in, for instance, economic terms rather than in terms of its intrinsic ethical value?

To sum up, it seems that almost all of the characteristics that would, according to scholars of organizational change, create a situation with ambiguous goals and the possibility for the appearance of pragmatic ambiguity arise in the case of biodiversity and conservation biology. Already, diagnosing the problem in these terms is an interesting advance, and has the potential to put the philosophy and practice of conservation in dialogue with a literature in management and organizational science that is seen to be relatively remote. But we can also draw from this literature other insights more directly useful for understanding the potential stakes for pragmatic ambiguity in this case.

### *3.2. A Taxonomy of Ambiguous Rhetoric*

To do so, I will turn to a meticulous analysis of the nature and function of pragmatic ambiguity by Jarzabkowski *et al.* (2010). These researchers performed a three-year, empirical, ethnographic study of an extended change process in a university (more precisely, efforts for a business school to “internationalize” in order to receive an accreditation). In addition to examining the decision-making process in the abstract, they also observed meetings, collected e-mail messages and internal documents, and performed interviews with numerous participants. In this case, “internationalization” was a perfect example of an ambiguous goal: tenured faculty’s research-focused definition of the term had little to do, for instance, with deans’ insistence on international teaching opportunities.

Among other insights, they extracted from this extensive data set a kind of taxonomy of rhetoric surrounding decision-making in the pursuit of ambiguous goals. This rhetoric, they argue, can be divided along two axes, making up four “quadrants” for analysis. First, discussions of an ambiguous goal can be *situated*, by which they mean that the conception of the goal is particular to a small sub-group of stakeholders, construed in terms of their position and interests. (Think, for instance, of scientists defining ‘biodiversity’ very narrowly in terms of a particular indicator or surrogate, with little room made for the possibility, or even recognition, of alternatives.) Or, by contrast, that rhetoric could be what they call *accommodative*, crafted explicitly to take a position that makes room for the interests of other groups. Along the second axis, rhetoric might be *narrow*, speaking always and only from a single perspective and minimally ambiguous *per se*, or it could be *wide*, explicitly recognizing the existence of divergent or conflicting interests and goals.

Each of the four “quadrants” or combinations of these axes, then, offers us a window onto a different rhetorical way of approaching an ambiguous goal. *Situated-*

*narrow* rhetoric “is situated within the interests and position of the actor and narrowly defines the [ambiguous goal] in relation to those interests and positions” (Jarzabkowski, Sillince, and Shaw 2010, 229). We could think, here, of scientific journal articles on biodiversity published in specialist venues, which acknowledge only a single definition of biodiversity and are not intended for consumption by a larger audience. Internal corporate reports would likely have the same kind of characteristics. *Situated-wide* rhetoric, on the other hand, “adopts a situated position upon the [ambiguous goal] but also acknowledges that [it] has different meanings to other players” (Jarzabkowski, Sillince, and Shaw 2010, 231). This kind of rhetoric, in their study, most often occurred in the context of arguments in favor of one view against the others, disputes between parties, or laments about the difficulty of arriving at a consensus. In the case of biodiversity, we might expect to find situated-wide rhetoric in contexts like IPCC committee meetings or debates over the listing or de-listing of endangered species – each side arguing, from the point of view of their own understanding of biodiversity, that this understanding should be the dominant one for the present choice opportunity.

Thirdly, *accommodative-wide* rhetoric “uses wide definitions of the [ambiguous goal] to accommodate a range of situated interests” (Jarzabkowski, Sillince, and Shaw 2010, 233). This kind of rhetoric explicitly avoids confrontation or conflict, and by extension tends to discourage the proposal of any specific course of action. As such, it is frequently found in, for example, mission and vision statements. For biodiversity, we might expect accommodative-wide rhetoric in places like the consensus, multi-stakeholder reports of the IPBES or the IPCC, for which maximal accommodation is practically mandatory. Finally, *accommodative-narrow* rhetoric “accommodates the interests of a range of actors but does so by attributing a narrowly defined label to the goal” (Jarzabkowski, Sillince, and Shaw 2010, 235). Put differently, this kind of rhetoric involves the temporary clarification of a broad, ambiguous goal in order to enable collective action on a smaller scale – collective action that may be recognizable as in the best interests of all parties involved, even if they might not want to permanently adopt the narrow definition of the goal. This kind of rhetoric may be most indicative of the pursuit of local conservation actions. Perhaps all participants might not want to definitively sign on to the concept of biodiversity that gave rise to a specific recommendation for a conservation project – say, protection of a given local species. But all participants might agree that, for the moment, “biodiversity” could mean protecting this species, enabling consensus around a particular course of action.

To be clear, while some of these four classes of rhetoric might seem intuitively more desirable than others, there is no question here of normatively privileging some over others. As Jarzabkowski *et al.* argued:

All constituents used all types of rhetoric over the three years, rather than converging on one position or the other over time. Constituents were able to shift between the [types] as they saw fit to justify and validate their own, colleagues' and organizational interests and actions, often adopting positions [of each type] during the same passage of speech, interview, or meeting. (Jarzabkowski, Sillince, and Shaw 2010, 240)

We should expect, that is, that all four sorts of rhetoric will be thoroughly intermixed in almost any case of interaction within or between groups. A too-quick conclusion – for instance, that because accommodative-narrow rhetoric allows for local action, we should be pushing groups to engage in more of it – would therefore be unsupported by their analysis.

What we might hope for instead, then, is an approach that helps us explore the varied *contexts* in which each of these types of rhetoric tends to be generated. What pushes disparate actors to deploy each of these kinds of rhetoric? What ends do they have in mind when they use them? Perhaps more provocatively, can we develop something like “rules of engagement” based upon these analyses? Here’s one potential, albeit underspecified, example. As we saw above, situated-narrow rhetoric seems to be the objective when local conservation actions are the order of the day; it allows the ambiguous term “biodiversity” to be substituted with a local replacement, a smaller-scale concept that could allow for temporary coalition-building. With this in mind, a fine-grained analysis of the role that “biodiversity” plays in a particular community could explore whether or not actors are using ambiguity in this sense. If a group is ostensibly united around the goal of fostering local action, we should be especially sensitive to efforts to replace accommodative-narrow rhetoric with other types, which could indicate attempts to undermine the collective effort. Either moves to retrench via situated-narrow rhetoric (refusing, that is, to accommodate the perspective of other actors even for the purposes of a local coalition), or efforts to offer platitudes via accommodative-wide rhetoric (without giving the precision necessary for temporary local action) would be *normatively* inappropriate in this circumstance. Careful philosophical analysis could, in cases like these, allow us to intervene productively in active debates surrounding biodiversity, turning what might have seemed like a pernicious use of ambiguity into an opportunity for conceptual clarification and even normative guidance.

To be clear, any such project will face significant challenges. First and foremost, it’s not clear that we have the empirical data we need to study these questions in many important situations surrounding biological conservation. Jarzabkowski and colleagues’ analysis required the collection of a quantity and kind

of data that is extremely challenging to obtain. Sterner has argued that the information that we need to detect and classify ambiguity, even just within the limited scope of data-centric biology, will be hard to come by (Sterner 2022). That problem will only become more acute as we attempt to explore the science-society interface, or users of biodiversity outside of science. What kinds of sources could potentially be relevant here? Public-facing reports are sometimes available, to be sure. In select contexts, internal discussions might be available to well-positioned researchers – for example, where there are groups like CITES that engage in extended debate about practical actions concerning biodiversity, notes or testimony might be available. But obtaining, for instance, the positions on biodiversity of actors in the corporate world, in government, or in non-governmental organizations, may pose a significant challenge. For practical purposes, restricting our focus to the scientific community may be a necessity, but to do so is to exclude from such an analysis a number of the most potentially interesting sites of ambiguity, as I have already argued at length here.

Second, ambiguity is at its heart a notion about communication, and thus entails not only complexity about the intentions and goals of the communicator, but also the receiver. Eisenberg notes that pragmatic ambiguity (like, I would add, any information-theoretic concept) “is not an attribute of messages; it is a *relational* variable which arises through a combination of source, message, and receiver factors” (Eisenberg 1984, 229). At the very least, then, this is a three-place relation, concerning the communicator’s goals, the communicator’s linguistic choices, and the receiver’s interpretation of those messages. This, too, radically increases the scope of our analysis, and makes it more difficult to make inferences from, for instance, only published or publicly available documents.

A broad-scale analysis of the state of play of biodiversity will therefore be an extremely difficult proposition. But even these dilemmas do not rule out the possibility of small-scale engagement with biodiversity in particular circumstances. Individual taxonomic or conservation decisions can be analyzed in relatively fine detail, and in these cases, being able to treat the ambiguity behind the concept of biodiversity as an asset and a site for further exploration rather than as a failing is an unarguably welcome development.

#### **4. Conclusion**

I have argued here that, rather than being simply the result of confused or confusing scientific or philosophical fundamentals, the ambiguous nature of the concept of biodiversity can actually be put to work to our advantage, offering us ample material for philosophical analysis, and potential sites for productive empirical and normative

intervention. I thus join a growing chorus of authors supporting a positive role for ambiguity in scientific concepts, at least in some cases (Sterner, Witteveen, and Franz 2020; Sterner 2022).

Drawing on literature about organizational change, we've seen that maintaining some level of ambiguity can in fact be crucial when we seek to unite a vast array of actors around a single goal, and to maintain this unity in the face of rapidly changing demands for decision-making and turbulent external environments. As Giroux aptly notes, "the process of organizing is founded on the creation of alliances – real or apparent, transitory or durable – between parties with different and sometimes divergent interests" (Giroux 2006, 1232). This "coalition building" has certainly received some analysis already in the philosophical literature (e.g., Takacs 1996), but placing it within a theoretical perspective like the taxonomy offered by Jarzabkowski *et al.* could allow us to deploy novel philosophical tools in our efforts to evaluate it.

Generalizing a bit, then, a broader moral of this story might indicate that in circumstances where we can carefully analyze, describe, and explore the consequences of ambiguous scientific language, we may find that ambiguity plays a whole host of roles that are not immediately apparent. In particular, these roles might be invisible to us depending on our focus – recall, for instance, that potentially productive purposes for an ambiguous concept of biodiversity became much clearer when they were explored in the context of biodiversity's "export" from the scientific community and use at the science-society interface. Even if ambiguity could pose various kinds of problems in a narrowly-drawn disciplinary context (or, to use Jarzabkowski *et al.*'s taxonomy, if ambiguity is problematic in situated-narrow rhetoric), there may be all-things-considered reasons to preserve ambiguity in a global sense if it permits these other roles in other areas. In that sense, negotiating the transitions between different rhetorical contexts – for instance, moving from situated-narrow scientific discussions of biodiversity to accommodative-wide invocations in consensus reports to which scientists might contribute – is difficult, and these transitions will be particularly important sites where conceptual uncertainty is negotiated. These interfaces have already been the subject of some discussion, especially in the context of climate change and the production of IPCC reports (Edenhofer and Kowarsch 2015; Havstad and Brown 2017), but they doubtless deserve further philosophical scrutiny.

While this is an aside not directly related to ambiguity, the garbage-can model of organizations, as it might be applied to conservation, also yields some interesting potential consequences worthy of further investigation. Recognizing that collections of problems, solutions, participants, and choice opportunities all can change independently lets us see that problems can be resolved not only in the

“classic” way – that is, resolved in the process of making a decision – but in a number of other ways as well (see Cohen, March, and Olsen 1972). We might act by *oversight*: if, at the time that a choice opportunity arises, the relevant problems are tied up in or associated with *other* choices, we might decide quickly, without ever realizing that those already-recognized problems affect our new choice. We also could make decisions by what Cohen *et al.* call *flight*: when we defer action for long enough, the problems that are associated with a decision-making process might become attached to *other* decisions, leaving an “empty” decision that is, almost by magic, now relatively low-stakes and easy to resolve. One might think, for example, that a number of decision-making opportunities in biodiversity management and conservation, blocked as a result of various problems in the 1990s, may have found the problems that made them so difficult suddenly associated with more pressing decisions surrounding climate change, breaking their association with biodiversity and opening up a window for decision-making by flight. The implications of these alternative kinds of decision-making deserve to be explored more thoroughly as well.

While scientific language may be a peculiar sort of communicative enterprise, particularly rigidly structured and with highly refined norms, it remains a communicative enterprise (Rouse 1990). The presence of ambiguous terms within scientific discourse should thus be no more or less surprising than their presence throughout human communication. The question, then, surrounds the norms for ambiguity’s effective deployment. As we have seen, it seems too hasty to conclude that the invocation of an ambiguous concept either means that one definition must be pursued at the expense of all others, or that the ambiguous concept should be eliminated from scientific practice. This leaves philosophers of science with the unenviable task of more carefully exploring the uses of such ambiguous concepts, in an effort to determine what kinds of norms ought to govern their invocation. When is ambiguous language being used to reinforce status-quo power differentials, or provide plausible deniability for actors attempting to resist action? When, on the contrary, is it being used to provide us with enough flexibility to build coalitions permitting local action, even when we might disagree about the underlying values behind those actions? These questions can be tackled, though they will require a complex synthesis of rhetorical or linguistic analysis, ethics, and philosophy of science. Given the centrality of debates surrounding such ambiguous concepts to many pressing contemporary global issues, this seems to be work that philosophers of science would be remiss not to pursue further.

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