REVIEW

Should biodiversity and nature have to earn their keep? What it really means to bring environmental goods into the marketplace

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Abstract Pursuit of economic gain has sponsored much of our planet's despoliation. Yet conservation increasingly operates as an economic sector that markets biodiversity, ecosystems, and nature as natural capital, service provider, or option value. This essay first elucidates what basic moral *theory* says about the principle that the goodness of biodiversity and nature is largely economic. It explains why economic valuations may be morally unimportant, inapt for environmental goods, and subversive of more important ideals. It also shows why neither econometric notions of option value nor Daniel Faith's qualitative one credibly applies. The essay then turns to what an economic conception of goodness implies for conservation *practice*. It refers to two prominent conservation organizations, whose conservation principles match the market-based ones of the World Business Council on Sustainable Development's. The environmental record of the latter organization's practices according to these principles predicts what their adoption for conservation entails.

Keywords Biodiversity · Economic value · Ecosystem services · Markets · Option value · Sustainable development

INTRODUCTION

Conservation biologists are and see themselves, primarily, as scientists. And indeed, conservation biology seeks to answer many scientific questions that concern rates of extinction, causes of change in ecosystem processes, and so on. Yet at bottom, conservation biology is a branch of normative or moral philosophy. That is because this discipline ultimately employs answers to scientific questions to answer categorically normative or moral questions such

as: whether actual states of biodiversity are *good* or might possibly be better or worse, whether actual ecosystems function *well* or might possibly function better or worse, and what *ought* we humans to do in order to realize greater *goodness* in these things. It is therefore crucial to understand that promoting a project to conserve biodiversity, ecosystems, or nature as *right* by virtue of its expected *economic* benefits—in terms of natural capital, ecosystem services, or options to realize these economic benefits in the future—entails a commitment to two normative principles. The first is a principle of goodness: What is economically good in these ways is good (full stop). The second is a principle of right action: Insofar as a conservation project promises to promote the economic good, it is permissible or right.

Yet it is difficult to find in the conservation literature any broad explanation of what basic moral *theory* says about how economic valuations relate to the goodness of such things as biodiversity and nature. And when it comes to understanding general implications of a *practice* of conservation centrally guided by economic evaluations, it is difficult to find more than scattered anecdotes with little predictive credibility.

To be sure, the conservation literature contains some discussions of the role of economics. But these typically are highly restricted in scope and unrevealing of the moral structure of economic evaluations. For example, Meinard et al. (2016) make many helpful observations about models of preferences, which underlie economic valuations. Those authors join Silvertown (2015) and others in offering anecdotes that cast doubt on preferences as a sound basis for judging something good. However, these discussions offer little general insight into how preferences or desires relate *in principle* to the goodness of what is preferred or desired, or how preferences reflected in economic

valuations affect other important ideals. Others fall short of generality by focusing on important but restricted applications of econometric evaluation to conservation, such as the discussion by Spash (2015) of biodiversity offsets. One might have higher hopes for essays authored by normative philosophers, such as Batavia and Nelson (2017) and Mathews (2016). But while they argue for *non-economic* theories of nature's value, they offer no systematic treatment of the normative credentials of economic valuations. Heise (2016) and others offer invaluable explications of the culturally coded, hidden meanings embedded in conservation *language*. But these discussions fall short of addressing the *soundness* of the normative propositions that this language expresses.

This essay seeks to redress these serious lacunae. A paradoxical quality in the genesis of economics-driven conservation, which I am not the first to note, is a helpful starting point: Relatively unfettered pursuit of economic gain, it is safe to say, has for many decades sponsored much of our planet's despoliation. This observation may seem to suggest a need to *restrict* economic markets in certain ways. However, in the last two decades, a preponderance of conservation biologists, conservation institutions, policy makers, and economists have drawn a polar opposite conclusion: They have championed the principle that properly valuing environmental goods for conservation requires *expanding* the domain of economic activity to include market evaluations and transactions in heretofore excluded *environmental* goods. In other words, conservation is now largely guided by the moral principle that what is good and right with regard to biodiversity, nature, and other environmental goods ought to be determined, in large part if not entirely, by economic reckoning. Yet conservation writings that take this approach either assume or only anecdotally defend this principle according to which a conservation project is permissible or right by virtue of its realizing such economic goods as natural capital, ecosystem services, or the option value of retaining this capital or these services for future use.

This normative view of biodiversity and nature—as provider of present or future (natural) capital goods, primary products, and (ecosystem) services—is famously and tellingly captured in the title of Gretchen Daily and Katherine Ellison's (2002) enormously influential *The New Economy of Nature: The Quest to Make Conservation Profitable*. The “new” in the title suggests that it supplants Carl von Linné's (1775) older view of “The œconomy of nature,” which he thought, consists in the careful and sparing, and in *that* sense, efficient use of natural things to realize God's ends. In contrast, the *new* economy consists in nature's bio-parts playing roles in realizing goods and services that, in a *market-based* sense, “efficiently” satisfy persons' preferences or desires for these things.

This essay proceeds in two steps to assess this market-expansionist, “new economy” view, according to which the goodness of environmental goods resides largely or principally in their economic value. It first spotlights several crucial elements grounded in basic normative or moral *theory*. Largely overlooked individually and essentially never collectively considered, these elements include: (i) the normative (or moral) *unimportance* of economic values in general (Section “[Why economic valuations are normatively unimportant](#)”); (ii) how economic valuations fall especially short of plausible normative requirements for environmental goods (Section “[How economic valuations are inapt for environmental goods](#)”); (iii) how market-derived values may push aside or corrupt other, very important ideals (Section “[Value conflicts: How markets subvert normatively important values](#)”); and (iv) because option value figures prominently in influential, economically oriented valuations of environmental goods, why neither formal econometric conceptions nor informal “comparative” conceptions of option value (as represented by Daniel Faith) credibly apply to such things as biodiversity, ecosystems, or nature (Section “[Option value](#)”).

From normative deficiencies of econometric conservation principles in theory, the essay turns to implications of adopting them for widespread conservation *practice* (Section “[Economic principles in practice: The WBCSD, IPBES, and the natural capital project](#)”). A well-situated test case provides strong evidence for what these implications might be quite generally. The case involves two preeminent, international *conservation* organizations—the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES) and the Natural Capital Project (NatCap). Both the IPBES and NatCap promote conservation grounded in market-based principles that the World Business Council on Sustainable Development (WBCSD)—a preeminent, international confederation of *businesses*—actually utilize to guide practices of WBCSD members. Their extensive environmental record is therefore a highly credible predictor of what is entailed by promotion of these principles as a salient basis of conservation.

The essay concludes (Section “[Conclusion: The tragic irony](#)”) by observing the tragic irony embodied in a practice of conservation according to principles that, we should expect, promote environmental destruction and injustice.

MARKETS, ECONOMIC VALUE, AND ENVIRONMENTAL GOODS IN PRINCIPLE

Why economic valuations are normatively unimportant

Some fact (such as the economic value of a capital good or service) is normatively important (or relevant) if that very

fact or some fact that it entails provides a good reason to think that some thing (such as biodiversity) is good or that we ought to bring about or preserve some state of affairs (such as that an ecosystem has certain functional properties).¹ In contrast, either a tangible article or a service is economically valuable when some persons actually desire or value it *and* express this desire by entering into some transaction for it in a market. Often, an actual market for a thing gives rise to that thing's economic evaluation. But the absence of a real market is no obstacle to economic evaluation. Economists can and routinely do fabricate imaginary markets out of the constructs of contingent evaluation, hedonic pricing, "shadow" pricing, and others (JNCC 2017). Economic valuation of biodiversity, ecosystems, and many other environmental goods is often based on "transactions" in these imaginary markets.

A transaction to consume some thing in any kind of market reflects a person's desire for it in her willingness to pay for it. Less often observed is that it also reflects that person's *ability* to pay for it. Economic value, by definition, most strongly reflects desires of the rich. This fact justifies some initial moral concern.

A second, broadly concerning fact is that economic reckoning *proscribes* any consideration of *why* some person, whether rich or poor, desires a thing. An absolutely essential element of modern welfare economics, this exclusion achieves crucial simplifications that permit derivation of its two fundamental theorems (described below), which set it up as a universally applicable evaluative instrument. The exclusion also entails that economic values take no account of whether or not some desired or (economically) valued thing is *worthy* of being desired or valued. Yet, as Debra Satz (2010) observes, many desires expressed in market transactions originate from idle whimsy. The objects of desires are not uncommonly maladaptive, perverse, or even vile—that is, not worthy of satisfaction—sometimes even by the lights of the person whose desires they are. Stripped of rationales for desires, economic values reflect only the bare psychological fact of their existence, insofar as they may be manifested in market transactions. Consequently, a thing's economic value provides no normatively or morally important reason to believe that that thing is good rather than bad. This is not to say that many times, people desire good things. But even then, the fact that these good things happen to be desired is not what principally makes them good or a reason to think them good.

¹ An improbable example may nonetheless vividly illustrate the concept of normative relevance. My aversion to (or strong preference against) orange outerwear is not an important reason for my fellow boaters not to pull on orange flotation vests.

This simple observation explains many facts that might otherwise seem mysterious. It explains why marketing campaigns do not generally increase the world's goodness by encouraging people to desire things more or to desire more things. It also explains why we can truly say that slavery was not good, even though for millennia, it had enormous economic value as a consequence of the psychological fact that (predominantly well-off) slaveholders desired and valued institutionalized enslavement. And it explains why accounting for the goodness of things need not fall into an infinite regress: If things were principally good merely because persons actually desired or valued them, then persons would need to justify their desire for a thing by desiring to have that desire, which they couldn't justify except by desiring (at a third level) to have that second-order desire, and so on.

A related, third cause for moral concern arises from the fact that the economic value of a thing is yoked to changeable market-affecting factors, such as fashion, the weather, marketing campaigns, and the relative attractiveness of alternatives. It is also yoked to judgments of corporate leaders about whether sale of the thing might help achieve business objectives. As a consequence, a thing's economic value may change with changes in these sorts of factors, which appear to have little if any moral relevance.

It is true that many if not all values supervene on empirical conditions that could have been otherwise. Some, even, are quite transient. The beneficial value of my ice axe surges when I enter steep and icy terrain; it abruptly transforms into the burden of non-edible dead weight as soon as I step off the glacier onto a mountain meadow. And of course, even much more stable and much more important moral assessments are contingent on empirical facts. The *non*-normative, empirical fact that a child may be maimed if struck by a vehicle is crucial to the *moral* judgment that I *ought* to swerve my car when one darts in front of it. However, the value of many or most things that matter a lot, such as the value of a human life, do not materialize or vanish with quickly changing contingencies. It therefore seems highly implausible that these things—things of great moral concern—matter on account of their economic value.

Another, fourth, source of moral concern attaches to injustices that may and often do attach to pursuing what economists call "Pareto-efficient states." A Pareto-efficient state is one in which no Pareto-improvement is possible, while state A is a (Pareto) improvement on state B if and only if at least one person is (economically) better off by virtue of preferring A to B and no one is made (economically) worse off by virtue of preferring B to A. Pareto efficiency is the gold standard of economic improvement, which welfare economics' two fundamental theorems

specify conditions for achieving.² Yet this economic norm ignores three salient moral considerations. First, it is based on persons' actual preferences independent of their worthiness, not on the goodness of things. Second, those who benefit or most benefit from a Pareto improvement are systematically most likely to be those who are already best off. That is because the relative wealth and power of these persons place them in the best position to promote Pareto improvements that preponderantly further benefit *them*. Third, the requirement to make no one worse off is in principle and in fact often satisfied by offering just enough compensation to those who shoulder the preponderance of burdens to garner their acceptance of (therefore, preference for) this arrangement. However, preferences implicitly refer to actually available options; a person's preference to assume onerous burdens is undoubtedly often due to her relative poverty and powerlessness, which affords her few if any other options. The section "[Economic principles in practice: The WBCSD, IPBES, and the natural capital project](#)" discusses how this kind of Pareto improvement is a key part of what the World Business Council on Sustainable Development (WBCSD) calls "sustainable development," which features in that organization's name.

To avoid the mistaken impression that I'm overstating my case, I need to be clear about what I am saying and what I'm not saying about economic valuations and their normative relevance. I am *not* claiming that economic valuations never or cannot possibly represent morally relevant information. I *am* claiming that, in general, one cannot justifiably presume that an increase in economic value represents an increase in what is good, or presume that acting to increase economic value is right.

Still, you might ask, "How could greater economic value *not* be normatively important?" One might pose this question by reference to some familiar economic measure such as the GDP (although a very imperfect measure of a nation's total economic output and not a measure of total economic value or efficiency). After all, one might think, greater GDPs are positively correlated with greater employment and less poverty; and surely those things are good. For at least two reasons, this line of thought does not go far. First, a higher GDP does not *entail* either higher employment, less poverty, or any other good. In fact not infrequently, the GDP is *negatively* correlated with goods: Higher GDP's often derive from greater automation, which can deprive more workers of decent jobs (Acemoglu and Restrepo 2017). Environmental transgressions can also

drive the GDP higher by virtue of the economic boost from large and long-running cleanup projects. Good economics can entail bad public health: An economic analysis by Arthur D. Little (2000) for Philip Morris determined that promoting cigarette smoking in the Czech Republic would boost the Czech economy by also promoting the early death of smokers, thereby reducing expenditures on their health care. And as the current decades-long trend in the U.S. economy illustrates (Karabel and Laurison 2011), higher GDP's can greatly enrich the already rich, while further impoverishing the already poor. In short, there is no good reason to think that a higher GDP will, in any particular case, make the world better.

Second, even if (contrary to fact) there *were* an overwhelmingly positive *correlation* of facts about higher GDPs with other facts—for example, about alleviation of suffering—that *are* normatively important reasons to consider the world a better place, it would be incorrect to think that this bare correlation conferred normative importance on higher GDPs. Justifying that conclusion requires establishing that manipulation of the GDP has causal efficacy—that by acting to elevate it, we may thereby effect a diminished level of suffering. While I do not have the space to fully explore this suggestion, the common occurrence of negative correlations should be a source of significant initial skepticism that a significant causal connection of the right kind exists.

How economic valuations are inapt for environmental goods

Aside from their *general* normative unimportance, at least four salient characteristics of economic valuations (some evident from the foregoing discussion) may independently disqualify them as centrally important for salient *environmental* goods such as biodiversity and nature.

First is the radical instability of economic values due to how radically contingent they are on market conditions, which may abruptly change. There may be compelling reasons to think that biodiversity, species, individual living organisms, ecosystems, and nature are things that matter greatly, and that this is in no small degree because their goodness is not hostage to the vagaries of consumer demand or related production and marketing decisions for products—for example, sunscreen, paint, and coffee—that may make them economically valuable. If that is so, then their economic valuations are strikingly inapt as a basis for judging their goodness.

Take coffee, for example. Bees may be economically valuable for pollination services that increase a coffee crop's quality or yield. Of course, if consumer demand for coffee were to decline, or if other changes in market conditions were to make its production economically untenable, then a

² The First Fundamental Theorem specifies idealized conditions under which any competitive market economy at equilibrium achieves Pareto efficiency. The Second Fundamental Theorem specifies conditions under which any given Pareto-efficient state can be achieved at some market equilibrium via redistribution of property and initial endowments.

farmer might replace coffee with a more lucrative crop such as pineapple that is not bee-pollinated. Like an invisible appendage, the agricultural pollination function would then be summarily amputated from those busy and unsuspecting insects. Reduced to non-contributing slackers in the service economy, their (economic) value and that of their forest home would plummet. Not a mere possibility, this in fact happened consequent on the global coffee crisis of 2001–2004 (FAO 2004), after Ricketts et al. (2004) completed their still-heralded study of how bees and their forest habitat earned their keep via the bees' coffee-production-boosting pollination service.³ Moreover, robotics projects such as that of Graule et al. (2016) evidence the possibility and perhaps, inevitability that, in the not-too-distant future, biological pollinators will increasingly be rendered dispensable by more efficient automata that supplant them in this work. Those who *consistently* embrace the principle that economic values are preeminent in assessing the value of living things should insist that these sorts of declines in the value of pollination services makes it permissible to raze the forest without concern for apian declines.

Second, it is highly likely that many if not most environmental goods—for example, most species, and most terrestrial and aquatic ecosystems—have economic value as natural capital or service provider that is negative, inconsequential, or dwarfed by the economic value of projects that spell their demise. For example, very likely, nearly every species that is on IUCN Red List of Threatened Species™ or that is designated “endangered” under the United States' Endangered Species Act falls short of earning its space on the planet. Economic reckoning therefore most likely rationalizes plowing through beluga whales to more efficiently utilize Cook Inlet for developing Alaskan oil and gas (Bryson 2009). Most likely, it also rationalizes Rio Tinto's decision to (as economists would say) “develop”—by lopping down—part of the Malagasy littoral forest that impeded efficient extraction of ilmenite that lay under root (Section “[Economic principles in practice: The WBCSD, IPBES, and the natural capital project](#)”). That mineral's value as natural capital resides in its being the world's preeminent source of titanium dioxide, which satisfies market-expressed desires for the cosmetics and white paint in which it ends up. Similar facts relating to services give rise to what we may call the “Service Level Principle of Permissibility,” according to which it is permissible to develop (even if this destroys) any service-deficient ecosystem.

A third characteristic of economic valuations that may independently make them normatively unimportant for environmental goods is rooted in their basis in desire-given

reasons, even aside from their expression in market transactions. Valuing some thing, as economic valuations do, based on the mere fact and strength of persons' desire for it necessarily makes such valuations insensitive to qualities of those desires and qualities of their objects that are the basis of normatively important distinctions. As the previous subsection observed, desires can be whimsical or well considered; they may arise from malevolence as well as from beneficence; they may reflect vice as well as virtue. Their objects may similarly span the spectrum from the good to the morally repugnant, and not infrequently, even persons who have morally questionable desires are cognizant of this.

An important consequence of this normative leveling of desires and their objects is that economic valuations lack a capacity to reflect unique normative qualities that commonly distinguish and are integral to the goodness of some very important kinds of goods. For example, they are ill equipped to account for the fact that reciprocation is crucial for the goodness of friendship, but not for the goodness of your iPhone *or* for the goodness of biodiversity or nature—because these latter are not the sorts of things that can reciprocate in the relevant sense. Economic valuations may also be too blunt an instrument to account for the fact that the good of beneficence crucially requires serious consideration of the interests of other living things; this cannot play a role in relationships with things—such as your iPhone *or* biodiversity or nature—that do not have interests or a good of their own. Nor can they account for any good that does not, in the sense of serving persons' desires, benefit people. There is also reason to believe that qualities central to the goodness of biodiversity and nature systematically elude economic evaluation: These things would seem to be good in centrally important ways whether or not any person benefits from them, despite the fact that they cannot reciprocate, and despite that they have no interests of their own.

Although this view cannot be properly expounded here, it is important to note that there are strong reasons to believe that most biologists hold it. Ask one why he has devoted his life to studying tropical ecology; you're not likely to hear a story about how, from an early age, he was concerned about the ecosystem services of tropical biomes. You're much more likely to hear about childhood bug watching and a fascination with patterns in nature.⁴ The

³ This fact that has not escaped others—for example, Meinard et al. (2016) and Silvertown (2015).

⁴ The story of a youth entranced by bugs and by patterns in nature is the first paragraph of Stanford ecologist Rodolfo Dirzo's Ecological Society of America profile from 2004 (<https://esa.org/history/dirzo-rodolfo/>). However, after joining Stanford that year, his publications (for example, recently in Ceballos et al. 2017) express concerns for nature principally (or perhaps entirely) as a service-providing engine. Yet I have observed the Prof. Dirzo of his ESA profile in a Stanford classroom—passionately marveling at patterns of plant–herbivore interaction, punctuating his remarks with exclamations about how beautiful they are, rather than about how proficient they are at providing useful services.

dearth of published works by biologists that propound any but an economic view is easily explained by how very difficult it is to characterize the goodness of any thing, including our planet's creatures, and how relatively easy it is to retreat to increasingly pervasive economic language.

A fourth disqualifying characteristic is neatly encapsulated in an anecdote (Hare 2007; O'Neill 2015) about the late Zsa Zsa Gabor. That famous, nine-times-married socialite and actress, pushing back against perceptions of her superficiality, is supposed to have claimed, "I am constantly finding new ways to do good for people... I have found a way of keeping my husband young and healthy, almost forever." Asked how she brings about this good, she purportedly responded: "I get a new one every five years." Getting a new iPhone at regular intervals may be a good way to keep your iPhone ever new and current. But as some have pointed out (Spash 2015; O'Neill 2015) it seems mistaken to adopt the economic presumption that, in a similar way, it is permissible (or good) to compromise or destroy ecosystems or populations of organisms when substituting new ones for those that are discarded or given over to economic development. This idea is nevertheless the crux of "biodiversity offsets," a notion that provides the central guiding principle for the Business and Biodiversity Offsets Programme, which figures in section "Economic principles in practice: The WBCSD, IPBES, and the natural capital project," which discusses the practice of conservation rationalized by economics.

Value conflicts: How markets subvert normatively important values

In an attempt to surmount conflicts in conservation ideals and practice, Tallis and Lubchenco (2014) and 238 cosignatories called for "inclusive conservation" by "[identifying] what works and what fails in conservation." This plea overlooks the fact that no practice can be understood as "working" or "failing" without reference to some *norm* for success or failure. No practice can coherently embrace distinct norms when those norms yield *conflicting* views of what works and fails. And no conflict in views about norms for *conservation*—that is, how conservation ought to be pursued—can be resolved (or even understood) merely by glossing these conflicts in the language of success and failure.

Conflicts are important to understand because not a few who propound economic arguments on behalf of biodiversity or other environmental goods candidly admit that other arguments, but not these, persuade them. Underlying an impulse to, with little conviction, marshal these economic rationales appear to be the beliefs (a) that economic arguments provide a practically expedient route to convincing those who are dismissive of any but economic

arguments, and (b) that economic justification in no way diminishes the strength of other, closely held, but more-difficult-to-articulate reasons for conserving biodiversity and nature, which nevertheless may be held in reserve.

The second presumption—that economic rationales benignly complement other rationales grounded in important moral ideals—may be terribly mistaken. In fact, *economic* norms or valuations may conflict with other values in very pernicious ways. They may push aside, corrupt, enfeeble, or even wholly annul other important values that some things have. Michael Sandel (2012) is especially lucid in showing how this phenomenon arises in many different contexts. As he remarks, a market in votes, for example, would be an economic boon; it would efficiently get votes to those who most value, and can pay for, them. But this system would corrupt civic virtues and values central to self-governance.

It is also easy to see that a market in a thing may wholly annul its salient value. That is why (as Sandel also observes) you can't buy a Mercer Award or a Nobel Prize without foregoing its entire value, or purchase (or as an economist might say, "consume") a friend, except in the frivolous sense of decoration for your Facebook page (a practice that Facebook once allowed). A hired friend would not truly be a friend in the crucial sense of someone with whom one explores life and grows in self-understanding. Nor would someone be a friend, viewed principally as a bucket of services identifiable in advance, which define the benefits against which one weighed the costs of friendship's many burdens and inconveniences.

It is important to realize that when economic arguments are brought to the fore for why biodiversity and nature are valuable, something similar may happen: Elements most important to the goodness of biodiversity and nature may (like the goodness of friendship) fracture or dissolve when viewed centrally as buckets of capital goods and services whose benefits, provided that they outweigh the costs, earn the place of selected bio-parts in the world's bio-warehouse. This is why biologists who make economic arguments for conservation in the belief that this is an expedient tactic, may, in fact, be undermining, rather than bolstering what they believe to truly matter about biodiversity and nature.

Option value

Option value figures prominently into this essay because it figures prominently in claims that various aspects of biodiversity, living things, nature, and the environment generally may be seen as earning their keep by virtue of having it. A common response to the observation that few organisms—and almost none of the organisms on the IUCN Red ListTM or that are otherwise designated as endangered—

have any apparent current or future use or benefit, is to claim that these organisms nonetheless have option value. For example, it is often said that the potential for pharmacologically beneficial substances in living things endues them with sufficient option value to justify their preservation. Few who make such claims actually support them beyond anecdotes that fall well short of credible evidence (Maier 2012).

Characterizing these claims and their deficiencies requires distinguishing between two radically different conceptions of option value. One is a formal, very demanding notion from neoclassical economics. However, many of the numerous references to option value in the conservation literature may be to another, informal, and much less demanding conception. It is difficult to find anything more than in-passing phrases and gestures at what this conception might consist in—except in the writings of biologist Daniel Faith, who for a quarter of a century has written on the theory and conservation applications of biodiversity’s quantification and its option value.

In modern economics’ taxonomy of values, option value is commonly viewed as a distinct category that sits alongside use value (the utility of a consumable good or service) and nonuse value (such as existence value grounded in merely knowing that some thing exists). Economists define (positive) “option value” as: the premium—over and above the expected net benefit, which benefit is (again) over and above the thing’s cost—that people are willing to pay, *up front*, merely to retain the *option* of “consuming” it (as economists say) sometime later rather than immediately. To command positive option value, the thing must command this premium even though (i) the thing’s immediate use, sacrifice, or “consumption” might be quite valuable; (ii) there might be some great cost involved in keeping it around in addition to the (opportunity) cost of foregoing its immediate consumption; and (iii) despite a non-zero and sometimes substantial risk that demand for it might diminish—thereby reducing its value, erasing it entirely, or even transforming it into a liability, should demand to consume it shift to demand to be rid of it. These are such stringent requirements that few things meet them. So far as I know, no one who is aware of these requirements has shown or even attempted to show that any central environmental good, such as biodiversity, generally satisfies them. Discussions resembling Maclaurin and Sterelny’s (2008) that lack awareness of these requirements inevitably fall short (Maier 2012).

In his work on biodiversity’s option value, Daniel Faith (2013, 2015, 2016) advisedly eschews this econometric conception. As a starting point, Faith (1992, 1994) has long sought to establish that phylogenetic diversity reflects a diversity of “features.” As Faith is aware, some scientists (for example, Kelley et al. 2014) question

whether this assumption is correct because of the surprising frequency with which distinct phylogenetic lineages converge on common features; the diversity of features, therefore, may *not* be reflected in the diversity of phylogenies. I set aside the debate regarding this *non*-normative, empirical connection of phylogenetic diversity to feature diversity in order to focus on Faith’s argument for a *normative* connection from feature diversity (whether or not tightly connected to phylogenetic diversity) to biodiversity’s goodness. He views option value as the normative bedrock for this goodness, which he expresses (2015) in the motto: “The more [phylogenetic] biodiversity the better.”

According to Faith, what specifically makes greater phylogenetic diversity better is that (granted the debated empirical premise) it encompasses greater diversity of features, and this variety of features, in turn, engenders greater option value. Construing “better” in terms of option value allows Faith (2015) to reformulate his motto as: “more biodiversity means more ‘option value’.” This motto, he proposes, should be understood with reference to this definition:

“option value” – the benefit in maintaining elements/objects in the absence of knowledge about their specific future uses/benefits.

Its application to conservation minimally requires that option value provide a rank ordering or ordinal scale—which defines greater and less than relationships—in Stevens’ (1946) classic classification of measurement scales. However, Faith may think that option value actually works on an interval scale (in Steven’s classification scheme), which relates differing levels of option value by the *degree* with which they differ. Faith’s reference to quantification in an earlier (2013) statement, “Quantifying feature diversity measures possible future uses and benefits or option values,” seems to affirm that option value, like temperature, can be placed on a degree scale. However, he later (2015) appears to forswear this view when he states, “... option value, as used comparatively by Faith and others, does not require quantification of the actual societal ‘value’ of the options.”

Staying with an ordinal scale for option value would remove the requirement to make sense of the degree to which two states of diversity differ in it. This would make Faith’s views that much easier to defend. On the other hand, if different levels of option value are related only ordinally within the domain of option value, then this fact might make it more difficult to rule out the possibility (which Faith does not consider) that other societal values (outside that ordered domain) dwarf all option value. This is yet another difficulty that I set aside. I presume both the less demanding, more easily defended ordering capability

and that comparisons outside the domain of biodiversity's option value may yet somehow be achieved.

An exemption from measuring degrees of difference combines in a straightforward way with the *epistemic* exemption featured in Faith's definition (quoted above) of what option value *is* to arrive at this characterization of *having* option value, which more directly connects with its attribution to objects of conservation:

To have option value is to be beneficial in the future, although no one knows whether, why, how, or the degree with which it will later serve some beneficial purpose.

While there should be no doubt that this characterization derives directly from Faith's own words, the importance of seeing this equivalence warrants a few explanatory remarks. Regarding the derivation's pivotal point: Faith's original definition utilizes the definite article to refer to "*the* benefit" from "future uses/benefits." The definite article usually functions as a means of referring to some thing that we *know* to be actual such as *the* computer on which I am typing. But sometimes it doesn't, expressing only an unsupported hope or prediction, as when we refer to *the* fountain of youth, or (regarding some candidate before the general election) *the* next president of the United States. To take Faith's definition seriously, we must presume that it does not merely express an unsupported hope or prediction, but rather refers to an actual (future) benefit. Therefore, to have option value is "to *be* beneficial in the future," in the words of the formulation above. And of course, ignorance of *how* something serves some purpose (in that formulation) follows from ignorance of *why* it does.

This equivalent way of expressing Faith's definition has the advantage of making it easy to see that, as it stands, it cannot be reasonably said to apply to *anything*. For, to assert (now) that some thing has option value is to assert that it *is* beneficial in the future. But on what knowledge can this presumption about the future be based, other than knowledge that we also have now, which makes this state of future benefit expectable? Any such knowledge violates the stipulation of ignorance—that no one knows why, how, or the degree to which these benefits might arise. This stipulation is central to any definition of option value (not only Faith's) that seeks to identify a source of value that is *not* based on expected net benefits. More generally, computation of expected net benefits (or even whether they are positive or negative (in which case, they are liabilities)—the basis for most standard economic valuations—rely on knowledge of the likelihoods of various outcomes known to be possible. Faith's entire discussion would be superfluous if we supposed him to employ the term "option value" as an obscure way of referring to expected net benefits.

Of course, it is not unusual for a thing to have some property P without our (now) knowing it. However, we should not *believe* that any particular thing has property P in the absence of adequate reason to think that it does. Yet, to ascribe option value to some particular thing (such as phylogenetic diversity), Faith's definition apparently *requires* taking this sort of unreasonable stance with respect to the thing's property of being useful in the future.

Faith (2013) is consistent with Faith (2015) in supposing knowledge of benefit that is also supposed to be (now) unknown. This concordance may not be immediately evident because the manner in which the earlier work presents this supposition may obscure it. Faith (2013) states "that preserving sets of species with high PD [phylogenetic diversity] would be a good way to capture the future diversity corresponding to *known* [italics added] useful features of plants." From this premise he infers, "If these uses and benefits were *unknown* [italics added], conservation of PD would have maintained the option to benefit from them at some later time." This latter, counterfactual proposition, however, is *indisputably* true (granting, as this discussion does, that phylogenetic diversity reliably measures feature diversity). However, it is notably unhelpful. That is because it is true of *any* thing that, if we now *retrospectively* know something about its usefulness that we did not know at the time we discarded it, then we would have benefited from its preservation.

This problem must be fixed to make Faith's approach worthy of further consideration. To do this in the spirit of his approach, let us suppose that some thing need not necessarily *be* beneficial, but rather only that, with some plausibility, it be *potentially* beneficial—albeit still without regard to whether, why, how, or the degree with which it will later serve some beneficial use. This suggestion seems to be in accord with a formulation that Faith (2013) favors, when he mentions the "challenge... to find a 'robust proxy' for option value that effectively captures *potential* [italics added] future values to society."

This revision does indeed make it possible to reasonably ascribe option value to some things, including phylogenetic variety. Unfortunately, it does so with such promiscuity that essentially no thing is excluded: It is truly difficult to imagine *anything* in the world, including very bad and undesirable things—rubbish, for example—that do not have this kind of value. In fact, retaining everything (without regard to whether, why, how, or to what degree it will later serve some beneficial use) can be an obstacle to identifying what few things in the tangled jumble of all things retained may prove to be truly useful. Those who routinely do set aside things for their option value, so conceived, are known as hoarders. So while we should agree that phylogenetic variety or a variety of features have option value in this sense, we should reject the proposition

that a rationale for hoarding rubbish is an important reason to retain this kind of biological diversity.

One might think that the problem of promiscuity could be solved while preserving the essence of Faith's idea by replacing the excessively inclusive qualifying condition—that some thing be “plausibly, potentially beneficial” to have option value—with a stronger, more discriminating condition. One candidate for such a condition might be: “*expectably* beneficial (based on current evidence),” where the expectation in question is supported by correctly pointing out that, at any point in the past, biodiversity had some set of uses or benefits that were only later discovered. This credibly justifies an expectation that some currently unknown uses and benefits of biodiversity will emerge in our future. Whatever the strengths of this argument, it does not solve the promiscuity problem. The hoarder, with equal cogency, can argue that some number of items in which he could see no use or benefit turned out to be useful or beneficial at some later time. In fact, this is precisely the hoarder's justification for retaining refuse now, even though he now sees no use or benefit in so doing. A hoarder focused on rubbish could wield this argument to justify keeping rubbish with as great a variety of features as possible. This would be the option value of rubbish feature diversity.

What other candidate is there for a condition that is more discriminating than “plausibly, potentially beneficial”? It is difficult to think of what it might be, short of “will *be* beneficial for some persons or for humankind.” This qualification would allow Faith to say, with certainty, that retaining a greater variety of features that benefit humankind will benefit humankind. But it does so in the same unhelpful way of his original formulation of option value, which requires both knowing and not knowing about future benefits.

A final attempt to rescue Faith's notion of option value might reformulate it as:

the value (to humans) of unutilized or undiscovered uses or benefits of biodiversity.

Unfortunately, this suggestion also has the same deficiencies as Faith's original definition, although it may make these deficiencies less apparent. The formulation uses the present tense to refer to “the unutilized or undiscovered future uses or future benefits of biodiversity.” But once again, a mere reference to a possible future state of the world (in which biodiversity's previously unknown benefits arise) should not be confused with this future state actually coming into existence or with evidence that it will do so. This is not unlike references by hopeful Democrats to Hilary Clinton, made before the 2016 U.S. presidential election, as “the next president of the United States.”

The apparently insuperable difficulties that dog option value may surprise someone who focuses solely on the seemingly attractive and simple idea, central to Faith's conception, that it is the value (to humans) of unknown uses or benefits of biodiversity. But the attractiveness of the idea that biodiversity may provide some as yet unknown use or benefit is neither more nor less than the attractiveness of the same idea applied to essentially everything else. Few if any things are disqualified by the criterion that requires merely unutilized or undiscovered benefits that we cannot now know or assess. While uncontestably coherent, this idea is also uncontestably unhelpful if one aims to discriminate what is worth keeping from what is not.

Another problem arises from the fact that Faith's “idea of maintaining variety for possible future benefits” (2015) focuses on possible benefits to the neglect of possible harms or *burdens*. The selectivity of this sanguine reckoning tacitly embodies a substantive—and questionable—predictive claim. Great burdens and costs can result from retaining too much, as would happen from qualifying everything of possible benefit “in the absence of knowledge about their specific future uses/benefits.” The costs can be multifarious, as they often are for hoarders, whose behavior often has emotional, physical, social, financial, or legal consequences that make their life go less well. Additionally, there appears to be no compelling, a priori reason to suppose that if a greater variety of features did increase the likelihood that some would be beneficial, then that greater variety would not also include other features that were *detrimental* to humankind. For example, some features, such those possessed by a deadly and virulent pathogen or its vector, may amount to options for considerable human suffering.

A fix cannot be found in Faith's remark (2015): “different conservation outcomes represent more or less [sic] options retained, as indicated by comparing the amount of variation retained.” If interpreted to *stipulate* the equivalence of options and variation, then this statement *guarantees* that more options accompany greater variation. This is not a reason to believe that this thing, *stipulated* as equivalent to variation, is good or that more of those things are better. On the other hand, if Faith's remark is interpreted as expressing a contingent, empirical relationship between options and variety, then it cannot serve to *define* option value. Still lacking a viable definition, we cannot understand what this relationship consists in, let alone judge whether or not more options are better.

In sum, no avenue for improving Faith's initial suggestion to define “option value” informally is evident. Because essentially every thing has option value in plausible versions of it, a prescription to retain every thing with option value (in this sense) amounts to a prescription to retain everything *tout court*. This hoarder's credo is a

singularly unattractive normative principle. Overall, the normative relevance of option value to environmental goods is therefore caught between this under-demandingness of Faith's kind of informal notion and the over-demandingness of formal econometric notions touched upon at the beginning of this section.

Because Faith's discussion of option value is not always ideally clear, one may be tempted to finger its vagueness as a central reason for why it does not hold up under scrutiny. I believe that this is an incorrect diagnosis. When expressed in clear and concise language (as this essay tries to do) and despite attempts to address deficiencies (as this essay also tries to do), Faith's ideas fall short, essentially because, alongside a slip in temporal logic, they run afoul of their own epistemic requirements. Nevertheless, I suspect that Faith's less than ideally crisp expression of his ideas has encouraged less than ideally crisp thinking about what they truly amount to. That may explain the vulnerability of Faith's ideas to misrepresentation as something they are not—as expected net benefits or, as I discuss next, as a precautionary principle.

One may think: surely there must be bet-hedging arguments *not* based on option value and therefore not vulnerable to the sorts of problems that this essay identifies in Faith's ideas. In fact, there are: Precautionary arguments, too, try to justify bet-hedging actions and they, too, try to do this under stipulated conditions of ignorance—not only of the likelihoods of certain outcomes, but also of what spectrum of outcomes is even possible. These epistemic conditions are reminiscent of those that Faith imposes on his conception of option value, which suggests the possibility that Faith might, in fact, had some precautionary principle in mind. However, Faith's option value lacks formulations for all the very-tricky-to-formulate requisite elements (such as those described by Manson 2002 and Maier 2012, §6.3) that compose any plausible precautionary principle. Therefore, Faith's ideas cannot be defended as a precautionary argument.

Finally, discussion of option value should not lose contact with broader issues. While it is important to address the question of option value's normative relevance, any answer is unlikely to provide guidance regarding related, but possibly much more important, normative questions. These include: Why, exactly, should a variety of features in the world be a matter of central importance? If feature variety is preeminently important, does this entail that organisms are only or mainly valuable as feature-bearing vessels for humankind's benefit and only insofar as their features are distinctive? Why should an organism's mattering hinge so critically on phylogenetic happenstance? And what should be said about those diversity-contributing features that might wreak havoc on humankind?

ECONOMIC PRINCIPLES IN PRACTICE: THE WBCSD, IPBES, AND THE NATURAL CAPITAL PROJECT

Basic moral theory provides a basis for seriously questioning the normative warrant that economic valuations provide for pursuing conservation projects. However, it is no less important to understand the likely consequences of consistent application of economic valuations in conservation *practice*. “Consistent” means “nonselective, non-ad hoc, or principled.” This qualification calls for highlighting because those who profess concern for biodiversity and ecosystems and who argue for their conservation principally or entirely based on their value as capital goods or service providers, almost always do so in a notably *selective*, ad hoc way. They point to circumstances in which elements of biodiversity or ecosystems (viewed as bio-parts) may command high market values or (to preview some later points) possibly conduce to what they call the “well-being” of people or a “good quality of life” for them. But they neglect mention of the prevalence of circumstances where their market value is low, zero, or (highly) negative, where their destruction and replacement with human-engineered systems would increase capital and provide higher levels of service, or where they subvert human well-being or quality of life. I return to this point later.

The task of determining the likely consequences of consistently applying econometric principles to biodiversity and nature is facilitated by the facts that (i) one prominent business organization—the World Business Counsel for Sustainable Development (WBCSD) and many of its members do precisely that, (ii) these principles essentially concord with those promoted as the basis of conservation by two prominent conservation organizations—the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES) and the Natural Capital Project (NatCap), and (iii) this striking concordance is explained, and further confirmed, by a history of mutual influence and aggrandizement.

I begin with a few words about the IPBES. Sponsored by the United Nations Environment Programme (UNEP), the IPBES portrays its role in relation to biodiversity as roughly equivalent to the role of the better known, UNEP-co-sponsored Intergovernmental Panel on Climate Change (IPCC) in relation to climate. The IPBES is a large project: At this writing, its website (http://www.ipbes.net/sites/default/files/downloads/ldr_primer_en.pdf) reports that over one thousand scientists from 127 countries are actively involved in promoting three central, distinctly econometric goals. The first (concerning biodiversity) and the third (concerning ecosystem services) may be read off its name:

- (1) Conserving biodiversity, which IPBES' mission statement (<https://www.ipbes.net/about>) states, matters by virtue of its *use*.
- (2) Promoting sustainable development, also part of the mission statement, which expresses the idea that certain kinds of development are integral to conservation.
- (3) Assessing ecosystem services and biodiversity's usefulness in helping to render these services. Ecosystem services is the primary topic of the IPBES' large and growing Catalogue of Assessments on Biodiversity and Ecosystem Services (<http://catalog.ipbes.net/assessments/>), the primary focus of its reported 2019 goal to release a successor to the 2005 Millennium Ecosystem Assessment, and the main subject or prominent element in numerous meeting documents (<https://www.ipbes.net/document-library-categories/meeting-documents>).

Before remarking on how the principles underlying these goals relate to NatCap and what their adoption by the WBCSD tells us about their practical implications, it is important to quash a mistaken impression that may arise from several other elements, mentioned in the IPBES' framework (Díaz et al. 2015a, b), that may appear to escape from econometric boilerplate of “sustainable use of biodiversity,” “ecosystem services,” and “sustainable development.” One such element is existence value, which nonetheless is quite unequivocally a category of economic value: Like all economic values, it is grounded in persons' actual desires for a thing—albeit (like bequest value and option value) not for the thing's immediate consumption, but rather for its continued, or coming into, existence. An open pit mine may have existence value when wealthy persons desire its continued existence.

A second element is the framework's reference to “human well-being,” which it discusses in terms familiar from the Millennium Ecosystem Assessment (2005).⁵ The IPBES framework utilizes the phrase “good quality of life” in a similar vein. However, no comprehensive or compelling ideas about what it means for a person to live well accompany these phrases. Instead, the framework suggests that whatever well-being may be, it is reflected in *economic* measures such as the GDP (a measure of the size of an

economy), wealth indexes (economic measures of households in terms of their assets), and happiness indexes. The latter, like economic indexes, reflect only certain actual reported psychological states of persons. But while economic theory at least compares desires based on willingness to pay in order to satisfy them, there is no credible theory for how to compare reported levels of happiness or for how to account for great variability in the happiness transducing capabilities of persons who report different levels of happiness in essentially identical circumstances.

These (and a few other, similar) elements of the IPBES framework gesture at some view of goodness that transcends the view of nature's goodness as consisting in its economic advantages or the narrowly conceived utility of carefully selected elements. But while some of these gestures may be aspirational, the IPBES' discussion of them betrays their emptiness. The ideas that genuinely animate the IPBES are apparent from how it has spent the bulk of its energy amassing its large library of biodiversity-ecosystem services assessments: These assessments are firmly grounded in the ideas that well-being (or a good quality of life) consists in the possession of assets or access to services, and that nature is good insofar as it supplies these things. Of course, some assets and services that nature supplies *are* undeniably good or even essential in a good human life. The IPBES framework does not neglect to mention food and water. However, it does neglect mention of the fact that most of biodiversity and most of nature make contributions that are either meager or stand in the way of development projects that far surpass its abilities to offer human-benefiting assets or services.

The principles that animate the IPBES can be more fully understood by reference to NatCap and the WBCSD. Those familiar with NatCap will immediately recognize its signature econometric themes in the IPBES framework: well-being and prosperity (from NatCap's slogan, “Prosperity springs from Nature”) via (in utilize NatCap's own econometric language) building “portfolios” of “investments in nature” considered as capital asset and service provider.

Additionally, the concordance of the IPBES framework with these ideas is what one would expect from the fact that the selfsame persons have played founding and other key roles in both the IPBES and NatCap. Hal Mooney, for example, is a “strategic advisor” for NatCap, while also an editor of the IBES's global assessment of biodiversity and ecosystem services. Connected with Mooney's organization-spanning roles is Anne Larigauderie's role as Executive Secretary of the IPBES. She is Mooney's collaborator on multiple papers promulgating NatCap principles. Among them is Larigauderie and Mooney (2010), which lobbied for the IPBES's establishment. On its creation in 2012, the IPBES installed Larigauderie as head officer to

⁵ This connection may be partly explained by the facts that the Chief Scientist of the World Bank, an embodiment of economic development, co-chaired the Millennium Ecosystem Assessment, and that Hal Mooney co-chaired the Millennium Ecosystem Assessment (MA) Panel, was part of the core writing team for the MA *Synthesis*, and was centrally involved in the IPBES' establishment (see main text below and Note 6).

further promulgate NatCap's ideas under the auspices of UNEP.⁶

The WBCSD completes this circle of entanglement and shared econometric understanding of nature's value. Until 2016, the IPBES (2015b) dedicated an entire web page to tout its alliance with the WBCSD as its preeminent "private sector stakeholder" (the IPBES' own designation). The page displayed verbatim a section entitled "IPBES and Business: mutual benefits in the future" from a paper penned by the WBCSD and IUCN (2011), which alongside NatCap, lobbied for the IPBES' formation. This WBCSD-IUCN declaration exhorted the IPBES "to respond to the needs of the wide range of decision-makers and practitioners contributing to biodiversity, ecosystem services, and human well-being, including those in the business sector." It is not difficult to resolve the implicit reference to business. WBCSD's influence on the IPBES is made additionally clear by the presence of WBCSD's idea of sustainable development in the IPBES' mission statement and IPBES' explication of this concept in language that is instantly recognizable from WBCSD publications. IPBES working papers also explicitly cite WBCSD publications, including for example, IPBES (2015a), which refers to the WBCSD's *Guide to Corporate Ecosystem Evaluation* (WBCSD 2011) as a key evaluative tool.

Finally, to close this tight circle of principled alliances, WBCSD's principles of doing business also hook directly into NatCap. The WBCSD have become expert in consistently⁷ generating profits from business plans that explicitly embed NatCap's econometric principles of nature's value. In fact, the WBCSD now utilize NatCap's protocol (<http://www.wbcsd.org/Clusters/Natural-Capital-and-Ecosystems/Natural-Capital-Protocol>). And it is a member of the National Capital Coalition (<http://naturalcapitalcoalition.org/who/coalition-organizations/>) along with some of its members individually—for example, du Pont and Dow Chemical (the environmental track record of which I shall remark upon shortly). Finally, and crucially for understanding the implications of utilizing these principles in the practice of conservation, these principles are ones that WBCSD members regularly cite as justification for their practices.

⁶ Mooney is not alone in promoting natural capitalist ideas through multiple organizational roles. Among others is Heather Tallis, a co-author of the IBES framework papers, a "strategic advisor" of the Natural Capital Project, and the Lead Scientist of The Nature Conservancy.

⁷ The WBCSD's consistent track record of profitability contrasts with, and far surpasses, scattered and recalcitrant experiments (such as Rickett's bees, section "How economic valuations are inapt for environmental goods") in fulfilling Gretchen Daily's *Quest to Make Conservation Profitable*.

I now turn a spotlight on the WBCSD (<http://www.wbcsd.org/home.aspx>), which supplies the key to unlocking the implications of consistently applying the principles they share with the IPBES and NatCap. The WBCSD is a confederation of approximately 200 of the world's largest corporations that promote their business practices under the rubric of "Sustainable Development" as per their name. With commendable directness, attention to detail, and with the authority of its members' sustained record of profitability, WBCSD publications both describe and prescribe how to formulate business plans incorporating practices that apply the market-based principles that it shares with the IPBES and NatCap to biodiversity and nature viewed as natural capital, and to ecosystems viewed as service providers—all as means for increasing profits in what they call "sustainable development." Because business plans incorporating these practices have for some time guided the actual *modus operandi* of WBCSD members, the record of these operations paints a highly credible picture of what continued or intensified adoption of their practices entails for environmental goods.

Saliently, the WBCSD's thoroughly economic understanding of services underpins their liberal utilization of the Service Level Principle of Permissibility (Section "How economic valuations are inapt for environmental goods"): If an otherwise economically fruitful action or project X does not reduce some service, then X is permissible. With this principle in mind, it is important to note that service levels commonly are largely indifferent to biodiversity and not unlikely, causally unrelated to it. For example, Baccini et al. (2017) provide strong evidence that tropical forests have become carbon sources rather than sinks. In service terms, growth in these forests is insufficient to provide an atmospheric carbon dioxide-removal service. In fact, these forests are responsible for exacting the toll of carbon dioxide-removal *disservices*. The Service Level Principle of Permissibility therefore permits or arguably even obligates replacing these counterproductive forests with fast-growing plants to provide the desired services. Palm trees might serve well, as well as yielding handsome profits from their oil. The logic behind this idea is too compelling to be denied even by Gretchen Daily, who ruefully suggested (Marris 2011) the similar idea of "[planting] fast-growing eucalyptus all over the planet" for carbon sequestration services.

The WBCSD combines the Service Level Principle of Permissibility with the Zsa Zsa Gabor Principle (Section "How economic valuations are inapt for environmental goods") to shape how (abiding by principles shared with the IPBES and NatCap) it employs the term "sustainable development" for conservation purposes. Rooted in the fundamental economic gold standard of Pareto improvement (Section "Why economic valuations are

normatively unimportant”), the Zsa Zsa Gabor Principle applies quite generally to economic valuations. It is central to the concept of “biodiversity offsets,” which is elaborated in publications of the WBCSD’s sponsored partner (http://bbop.forest-trends.org/events/no-net-loss/partners_and_sponsors), the Biodiversity Offsets Programme (BBOP). In fact, the BBOP’s essential mission is to promote application of the Zsa Zsa Gabor Principle to biodiversity, which they express in the motto, “no net [biodiversity or ecosystem service] loss.” The WBCSD give this motto its straightforward econometric interpretation, which gives permission to destroy any ecosystem and its inhabitants, so long as some other ecosystem is (as they say) “enhanced” to provide a counterbalancing improvement of its service-providing capability or prospects for its inhabitants. WBCSD members take this economic rationale to give them permission to avoid foregoing profitable operations that obliterate ecosystems and their denizens simply by offering low-cost “enhancements” to services or biodiversity elsewhere.

This destructive way of realizing Pareto improvements via biodiversity offsets is but one part of what the WBCSD (and the IPBES) *mean* by “sustainable development,” A second part, according to the WBCSD (2010b) and BBOP (2009), and sanctioned by a more general application of the Pareto gold standard, entails that even if some development project were to decimate biodiversity and (unlike the planting of palm to replace underperforming tropical forests) concomitantly negatively affect an ecosystem’s services, even if this deficit were to severely harm many persons, and even if comparable services were *not* instituted elsewhere, it may *still* be permissible. Permission, in this case, may be purchased for the price of compensating (or possibly merely *offering* to compensate) those who suffer harms consequent on deprivation of the services. In this way, the concept of “biodiversity offset” rationalizes the practice of the world’s wealthiest and most powerful “stakeholding” corporations offering (as WBCSD publications recommend) the smallest compensation that garners acceptance of those other “stakeholders.” The latter stakeholders are persons who are often among the world’s most poor and powerless. They typically lack crucial information regarding expected consequences of and viable alternatives to accepting this compensation for the burdens of living in a place that is ripped apart, poisoned, or otherwise made less habitable. And of course, when biodiversity or ecosystems neither provide tangible goods nor are causally responsible for services, the Service Level Principle of Permissibility unconditionally removes any compensatory burden for maintaining them.

As I earlier suggested, the actual track record of WBCSD members removes a need to merely speculate about what practices rooted in these principles entail for the

environment. Members include corporations whose business centers on production of fossil fuels (Royal Dutch Shell, BP, Chevron Corporation, Suncor Energy). The business of the mining giant Vale S.A. centers on extracting ores, as unconstrained as possible by effects on air, water, and people. Syngenta, the maker of atrazine, the amphibian-poisoning pesticide, is also on the roster, as is Bayer, maker of neonicotinoid pesticides that may be devastating populations of bees. WBCSD members account for (PERI 2016a, b) five of the top twenty most toxic air-polluting corporations in the U.S. (E.I. du Pont de Nemours, Bayer, BASF, Dow Chemical, and Eastman Chemical) and three of the top fifteen most toxic water polluting corporations (Dow, Eastman, and BASF). Members that bankroll these operations, such as Bank of America, should not be overlooked. The WBCSD also is amply represented on Global Exchange’s (2016, 2017a, b) short list of current and alumnus violators of human rights and destroyers of the environment (Monsanto, PepsiCo, Bank of America, Chevron, Coca-Cola, Dow Chemical, the Ford Motor Company, Nestlé, Royal Dutch Shell, Suez Environment, and Syngenta).

Myriad examples of projects pursued by these corporations could be cited. One is Vale S.A.’s to “sustainably develop” the ferric riches of the Serra do Gandarela with an open pit mine. This exemplar of sustainable development would intrude on a UNESCO Biosphere Reserve and jeopardize a critical source of local water (AguasDoGandarela.org 2012; Rojas and Pereira 2015). Yet acceptance of compensation offered to those who must drink the water would make it a Pareto improvement. A similar story (Fagin 2016) involves a bid by Grupo México (Mexico’s largest mining corporation and the world’s third largest copper producer) to reopen metal mining operations within the Monarch Butterfly Biosphere Reserve. Recognizing that this project comports with the Service Level Principle of Permissibility, the World Wildlife Fund (which the section “[Conclusion: The tragic irony](#),” observes, links directly into the IPBES-NatCap-WBCSD circle) declined to challenge it.

A project pursued by Rio Tinto (see also the section “[How economic valuations are inapt for environmental goods](#)”) also connects with the WBCSD. The name of that mining giant—the 14th most toxic water-polluting company in the U.S. (PERI 2016b)—comes from its mining operations on the eponymous river in southern Spain, which contributed the preponderance of heavy metals that produce the river’s striking coloration and pH ~ 2. As recently as 2015 according to the WBCSD’s website (2015), Rio Tinto nonetheless operated as a member of the WBCSD’s Water Leadership Group along with Dow and BASF. To evaluate a proposal to raze a section of the Malagasy forest, Rio Tinto collaborated with the WBCSD in utilizing the WBCSD’s

Corporate Ecosystem Valuation (CEV) guidelines (WBCSD 2010a, 2011)—the same guidelines that are cited in IPBES documents (see above). Rio Tinto utilized the CEV to (in the words of their report) “arrive at appropriate levels of compensation” to locals for the deforestation that permitted their efficient extraction of the ilmenite (natural capital) without significantly affecting profits.

All of this should retrench doubt about implications of the adoption, by the IPBES and NatCap, of WBCSD principles as principles of conservation. There is little reason to suppose that future practices rationalized by these principles won’t be as destructive the WBCSD’s have been and currently are. And there is ample reason to believe that promotion of these practices by self-identified conservation organizations will only encourage these destructive practices and amplify the ambit and magnitude of consequent destruction.

Relevantly similar cases continually emerge on a frequent basis. Coral are sacrificed on the altar of greater economic efficiency realized by use of gargantuan freighters: sediment from dredging the Port of Miami-Dade to accommodate them buried and suffocated nearby coral (Alvarez 2016). The economic value of salmon may not match the economic benefit that Pacific NorthWest LNG can realize from expanding facilities to export liquid natural gas from British Columbia’s Skeena River estuary to China (Moore et al. 2016). Salmon also cannot match what PacRim Coal can realize by strip-mining coal in Alaska’s Chitna watershed with concomitant infusion of coal particulates, iron, aluminum, and zinc (Chitna Citizens Coalition 2016). Nor do British Columbia’s mountain caribou adequately compensate for lost economic gains that can otherwise be had from removing the old growth cedars that harbor the arboreal lichens to which their diet is adapted (Moskowitz 2016). And we should not forget that it is the preeminent economic value of such bio-parts as ray wings, shark fins, bear bladders, tiger bones, elephant tusks, and rhinoceros horns that makes their value—multiple billions of dollars of natural capital annually—greater than the creatures from which they are torn. Intact, these creatures fail to earn their keep, as do the coral, the salmon, the butterflies, and the Malagasy forest.

CONCLUSION: THE TRAGIC IRONY

I have sought to explain why economic valuations are normatively unimportant in general: why they are antithetical to, or subversive of, environmental values in particular; and why option value—formally or informally conceived—holds little normative promise. I have also explained why the track record of WBCSD members reveals what we should expect when econometric principles are promoted as a salient basis of conservation.

All told, these considerations suggest that the single biggest threat to the environment and to nature may be a continued or increasing dominance of these principles and practices based on them. Yet they are promoted by the world’s most powerful and entrenched organizations as the WBCSD, alongside such self-identified conservation organizations as the IPBES, NatCap, and the world’s largest self-identified conservation NGOs (greater than \$1.5 billion combined annual revenues)—The Nature Conservancy, the World Wildlife Fund, and Conservation International. These organizations are yet other links in the tight circle described by the WBCSD, IPBES, and NatCap. TNC and WWF are partners with NatCap; the Chief Scientists of both these NGOs sit on the governing board of NatCap alongside (among others) Gretchen Daily (<https://www.naturalcapitalproject.org/people/>).

These institutions and their *non*-corporate supporters embody a tragic irony: While they regard and promote themselves as devoted to conservation of biodiversity, ecosystems, and nature, these organizations hew to principles that may ensure their destruction.

No such incongruence afflicts corporate sponsors of these principles and practices. These business entities evidently appreciate that their most destructive practices may be rationalized as adhering to them. This explains the otherwise mysterious phenomena of the WBCSD’s strong endorsement of the Natural Capital Projects’ protocol and their eager solicitation and securing of a privileged role in setting the agenda of such conservation organizations as the IPBES, which co-sponsor their *modus operandi*.

There is one bright patch in this bleak picture: We have very deep and very strong moral reasons to reject the view that econometric principles are normatively important in general, and yet stronger reasons to reject their application to biodiversity, nature, and other environmental goods. This essay has sought to articulate these reasons—reasons why biodiversity and nature should *not* have to earn their keep.

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