

Protecting Biodiversity and Moral Psychology; or Why Philosophers Are Asking the Wrong Questions^{*}

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1 Introduction

In this essay, I contend philosophers have been asking the wrong questions. By and large, they have concerned themselves with the intrinsic value of non-human organisms, species, ecosystems, and biodiversity more generally. First, I consider the most important argument ("the Argument from Teleology") for claiming they have intrinsic value. I argue it that it fails. Second, I argue that work done in psychology challenges these claims will motivate pro-environmental behavior regarding biodiversity. This is so even if the Argument from Teleology succeeded. Third, I argue that focusing on ecosystem services that biodiversity provides has a better chance of doing so.

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2 Environmental Philosophy and the Argument from Teleology

For the purposes of this essay, think of BIODIVERSITY as genes, species, and ecosystems along with their variation. This definition is too inclusive and imprecise. But nothing here hangs on getting such an account exactly correct. Protecting the biodiversity of some such group consists in protecting the group and its variation. For example, the biodiversity of group of species would be the species and the variation in their properties. But, *why* should we protect species and their intraspecific and interspecific variation?

The most straightforward answer is this. Biodiversity is necessary for present and future human's well-being. We should conserve whatever is necessary for present and future human's well-being. Therefore, we should conserve biodiversity (Norton, 1987).¹ Additionally, we should not cause unnecessary suffering to sentient, non-human animals (Singer, 1995; Regan, 1985). If this is correct and reducing biodiversity will cause unnecessary suffering to them, then we have an additional reason beyond human well-being for conserving biodiversity (Jamieson, 1998).

In general, these arguments have left environmental philosophers unsatisfied. First, many philosophers have claimed that non-sentient organisms deserve direct moral consideration. Second, several philosophers have claimed that collectives such as populations, metapopulations, species, communities, and ecosystems deserve it as well (Callicott, 1987; Johnson, 1993; Leopold, 1989; Rolston, 2012).² Thus, environmental philosophy has concerned whether and to what extent this motley crew, and by extension, biodiversity, have *intrinsic value*. Until recently, this has been the *sine qua non* of environmental philosophy.

'Intrinsic value' is a notoriously unclear term especially as used by environmentalists. We can distinguish between several senses (O'Neill, 1992). First, something has intrinsic value just in case its value depends solely on its intrinsic

¹I have formulated this argument to avoid Derek Parfit's (1984) "repopulation paradox." We are not asking of some particular group of future people, will *they* be better or worse off; rather, we are asking of *whomever* exists in the future, will those under one policy be better off than those under another policy.

²This might sound odd. Are not species *just* their organisms? Not quite, since the difference between a species and a set of organisms are the intraspecific relationships between them. Thus, the well-being of species, if it has such a thing, consists in the constituent organisms and their intraspecific relationships. The same point applies to the other types of collectives.

insic properties. An intrinsic property is one that an object has independently of context. Suppose that the rarity of a species with n members is characterized by $\frac{1}{n}$. If species have intrinsic value in virtue of their intrinsic properties, then rarity is such a property (Sarkar, 2005, 57). Second, something has intrinsic value just in case it is valuable for its own sake. As Aristotle pointed out, if everything is only instrumentally valuable, then we have either an infinite regress or a tight circle. Given the unacceptability of either, something is valuable for its own sake. Maybe organisms, species, etc. are valuable as ends and not merely as means. Third, something has intrinsic value just in case its value does not depend on human valuers. Suppose California coastal redwood trees (*Sequoia sempervirens*) have value even if there were no humans. Then this value would be mind-independent or "inherent."³

Though there is a plethora of INTRINSIC VALUE concepts, there are fewer types of arguments for intrinsic value. Aristotle's argument at best shows that there is something intrinsically valuable but is silent as to what it is. One of the first arguments that some such non-human, non-sentient entities have intrinsic value, is owed to Richard Routley (later Sylvan) (1973). Routley argued western ethics was beholden to a principle of "basic human chauvinism"; namely, something is permissible insofar as it harms no one irreparably (Routley, 1973, 207). He then has us consider the *last person example*:

The last man (or person) surviving the collapse of the world system lays about him, eliminating, as far as he can, every living thing, animal or plant (but painlessly if you like, as at the best abattoirs). What he does is quite permissible according to basic chauvinism, but on environmental grounds what he does is wrong. (Routley, 1973, 207)

Routley's argument is this. If the principle of basic human chauvinism is correct, then a human is morally permitted to act how they choose provided he does not harm any human irreparably. However, what the last person does is not morally permissible though it harms no human irreparably. Therefore, the principle of basic human chauvinism is false.

³Many take mind-independent value to suggest a form of moral realism. Expressivism can make sense of mind-independence too. If I say, "Coastal redwoods are valuable" nothing I in what I say is contingent on my or anyone else approving of them. That is, my, or anyone's approving of them, is not part of the content of what I have expressed (see Blackburn 1984 and Carter 2004 for a discussion). The question becomes what kind of mind-independence is relevant to issues of value.

There argument is contentious. First, not everyone shares Routley's "bio-centric" convictions. If you do not, then you will reject his second premise. Second, even if you do, it says nothing about *why* it would be morally wrong to do this. Third, one might prefer that the non-human world continue to exist, but deny it is a moral matter. For example, one might prefer the non-human world to continue for aesthetic reasons (Elliott, 1997; Sagoff, 1974).

Routley's argument was supposed to show the limitations of traditional normative ethics and thereby herald a distinctive *environmental* ethic. Some date environmental ethic's beginning to Kenneth Goodpaster's (1978) essay on morally considerability. In effect, he is answering the question of why we should accept Routley's second premise. He argues that living things matter because they have *interests*. That is, we can act in such a way as to harm or benefit them. But, if we can harm or benefit something, it is because they have interests and whatever has interests has intrinsic value. Therefore, non-human living things have intrinsic value. For reasons that will become clear, I will call it the *Argument from Teleology*.

1. Living things have interests.
2. If something has interests, then it has intrinsic value.
3. ∴ Living things have intrinsic value.

Of course, if something has intrinsic value, we must determine what the appropriate response to such value is. For example, should it be promoted, honored, respected, etc. (Anderson, 1995)? The Master Argument has been articulated in varying terms by many different philosophers including Nicholas Agar (2001), Lawrence Johnson (1993), Holmes Rolston III (2012), Paul Taylor (2011), and Gary Varner (1998). In what follows I consider the argument and why it fails.

Goodpaster articulated this position with regard to living individuals and not non-living collectives, as have other philosophers. For example, Paul Taylor in his *Respect for Nature* argues along very similar lines. According to Taylor, something has a good just in case it can be benefited or harmed without reference to another entity⁴. For Taylor, something's have a good is grounded in their being a "teleological center of life." He writes,

To say it is a teleological center of life is to say that its internal functioning as well as its external activities are all goal-oriented,

⁴Having a good is in effect the same thing as having interests.

having the constant tendency to maintain the organism's existence through time and to enable it successfully to perform those biological operations whereby it reproduces its kind and continually adapts to changing environmental events and conditions. It is the coherence and unity of these functions of an organism, all directed toward the realization of its good, that make it one teleological center of activity. (Taylor, 2011, 121-2)

Taylor's theory is an elegant and powerful.⁵ The philosophers mentioned above have added added details to the biocentrism staked out by Goodpaster and Taylor. Still, the core Argument from Teleology has remained the same.

We have discussed the Argument from Teleology. However, I now want to consider two challenges to it. The first objection is that it is incorrect to move from teleological claims to ones about intrinsic value. The second objection is that even if the first inference was sound, this approach cannot be extended to biodiversity. I will take these objections in turn.

2.1 Interests and Intrinsic Value

Philosophers of science find teleological claims about biological systems perplexing. If biological systems are not Designed, then what makes functional claims true? In the twentieth century, the most important attempt to understand these claims is Larry Wright (1973; 1976). On his account, the function of x is to z means x is there because it z s, and z is a consequence of x 's being there. For example, the function of the human heart is to circulate blood means the heart is there because it circulates blood, and circulating blood is a consequence of human hearts being there. This account is subject to counterexamples such as the following (Boorse, 1976). Suppose there is a gas leak in a scientist's lab, which renders them unconscious. It is there because it renders them unconscious and their being unconscious is a consequence of the leak. But, no one says a function of the leak is to render the scientist unconscious.

⁵I cannot do justice to his theory here. The attitude of Respect for Nature involves regarding wild living things as having inherent worth. We do this when we accept that they have a good, and whatever is so regarded should be preserved or preserved for its own sake. He argues that this attitude best fits a worldview called the Biocentric Outlook. Accepting the attitude and outlook, thus invokes acceptance of duties, priorities and virtues. As Dale Jamieson has noted, it seems that this attitude of Respect for nature is an "invitation" rather than a requirement (Taylor, 2011, x)

Many philosophers think we avoid counterexamples by invoking evolution by natural selection. Suppose the function of a trait is that for which the trait evolved by natural selection in the recent past. A trait evolves by natural selection just in case that trait is heritable, trait-bearers have greater reproductive success compared to alternatives, and the trait exhibits variation. Thus, the human heart has the function of circulating blood just in case having said heart is heritable, humans with such a heart have greater expected reproductive success, and having said heart is heritable. We can say that a trait evolves by natural selection just in case it exhibits heritable variation in fitness. This is the selected effects account of function (Millikan, 1984; Godfrey-Smith, 1994).

On this account of function, if a trait has the function to F , then it is supposed to F . It is malfunctioning if it does not F . Some have claimed the selected approach allows us to reduce norms to facts. If you think that normative claims are teleological in nature and teleology just is what evolution by natural selection designed traits to do, then normative claims are species of factual ones. Moreover, if ethical claims are a type of normative claim, then ethical claims too are just factual ones (Casebeer, 2003; Foot, 2001; Post, 2006). We have solved the "is-ought" problem.

Frankly, I reject this reduction (Odenbaugh, 2015). Here is an example to make this point. Consider lions (*Panthera leo*) that live in the Serengeti National Park in Tanzania. Prides contain between three to twelve adult females and one to six adult males. Females are all related to one another reproducing between four to eighteen years old. Males leave their pride around age three, and eventually attempt to take over the prides of others. Even if successful, they themselves will be removed in a few years. Bertram (1975) noticed two interesting phenomena. First, females have a synchronized oestrus cycle. Second, when a new male takes over a pride, they often kill the cubs. The proposed explanation of this is that it increases the expected reproductive success of males since it returns females to oestrus more quickly. If the cubs are not killed, it can twenty-five months for females to come into oestrus. By killing the cubs, they shorten that period to nine months. However, even if the behavior of killing cubs when entering a new pride has this selected effects function, we do not think this of moral value. Even if young males are "supposed" to do this, the Serengeti is better in some morally for it. We cannot reduce moral norms to selected functions.

Let me describe my argument more carefully. Premise (2) of the Argument from Teleology claims that if something has interests, it has intrinsic value. Suppose from the claim that male lions are "teleological centers of life," they

have interests. For example, they have interests in killing cubs as they enter a new pride; frustrating those interests lowers their fitness. Premise (2) implies that since male lions have interests then they have intrinsic value. Surely insofar as something has intrinsic value we should promote that value. But next to none of us think we have an obligation or duty of helping males kill cubs. Thus, since we do not have this obligation and we would if they have intrinsic value, premise (2) of the Argument from Teleology should be rejected.

One response is that promotion is not the only fitting attitude to take towards intrinsic value; e.g. sometimes it is honor or respect. So, by creating a national park in Tanzania for lions and other living things, we are expressing our respect for them. But, nature is red in tooth and claw and it is questionable whether this carnage deserves honor or respect morally construed.⁶ If there is no non-ad hoc way to settle this question, then we are back where we started.

Here is another objection to premise (2). Consider artifacts such as automobiles, cell phones, and thermostats. These objects are designed to perform certain tasks. As such, they have interests. Moreover, if whatever has interests has intrinsic value, then they have intrinsic value. But there is nothing wrong with me destroying my iPhone per se. Thus, we have a counterexample to (2) as well. Hence, their interests do not "create" intrinsic value.

You might be thinking artifacts only have interests insofar as we design them. As Taylor puts it, their interests occur only in reference to something besides themselves. However, on the selected effects account of functions, the function of some entity is always in reference to a reproductive community and an environment. Consider domesticated animals and plants. We have designed them at least in part to have features we desire. It would also follow that our pets for example would have no more value than the pieces of technology we use. Insofar as there is nothing wrong with destroying my iPhone, similarly I could treat my dog Charlie as I wish. But this is unacceptable too. Thus, premise (2) should be rejected. The Argument from Teleology fails.

2.2 Interests and Biodiversity

Even if the Argument from Teleology was sound, there would still be a deep problem. The Argument from Teleology does not apply to collectives, which is required if we are to claim that biodiversity has intrinsic value. First, popula-

⁶I can respect the male's ability without thinking that the world is better for it. This respect is not moral, but a type of fear.

tions, species and ecosystems are not alive. But, some environmentalists believe that they have intrinsic value. Thus, they have revised (1) thusly,

(1*) Anything that exhibits teleological behavior or functions has interests.⁷

I will argue that our (1*) does not apply to species or ecosystems. As such, the Master Argument cannot be used to undergird our obligations to biodiversity.

Population biologists have long recognized that birds often have fewer viable offspring than they can. Wouldn't evolution by natural selection select for the greatest number of offspring? One hypothesis is that birds forgo having more offspring for the good of the group to avoid overshooting the carrying capacity of the environment (Wynne-Edwards, 1962). Thus, individual sacrifice was in the interest of the species. Clutch size evolved by group, or species, selection.

Since 1947, the great tit (*Parus major*) has been studied in Wytham Woods around Oxford, UK, initially by David Lack (1954). Most of the breeding pairs have eight to nine offspring. However, if more eggs are added they can incubate them with success. Still as the number of hatchlings in the brood increases, then average weight decreases. This is due to them receiving less and lower quality food (e.g. caterpillars). Heavier chicks have a greater probability of survival and reproduction. In experiments, it was been demonstrated that the optimal clutch size is approximately eight to nine eggs.⁸ Lack and others argued individual selection explained clutch size; group selection was simply not needed.

Most evolutionary biologists think group selection can occur under certain restrictive circumstances, and has occurred in the history of life occasionally. However, it is a general consensus that it occurs rarely (though see Sober and Wilson 1999). If this is correct, then species rarely exhibit teleological behavior of their own. At best, any teleological behavior exhibited is a by-product of that of its constituent organisms. As evolutionary biologist George Williams (2008) pointed out, there is a big difference between a *fleet herd* of deer and a herd of

⁷We might add the proviso that these interests occur without reference to any other entity. However, as we found above, this restriction is problematic.

⁸Interestingly, it turns out the actual clutch size measured is slightly less than the optimal one predicted by theory. The best explanation for this result is that there is a trade off between maximizing the number of surviving young per brood and maximizing lifetime reproductive success (Visser and Lessells, 2001).

fleet deer (see Cahen 1988). The upshot then is that species do not have interests and thus they do not have intrinsic value. Thus, the Master Argument simply does not apply to an ethic of conserving biodiversity.⁹

Let me now extend this argument to ecosystems. Philosopher Lawrence Johnson writes,

Just as we may think of an individual organism as an ongoing life process, manifested in a continually changing combination of material elements, and a species as an ongoing process progressively embodied in different individuals, so may we think of an ecosystem as an ongoing process taking place through a complex system of interrelationships between organisms, and between organisms and their nonliving environment... Normally, an ecosystem maintains its stability through an intricately complex feedback system... However, an ecosystem can suffer stress and be impaired... In short, an ecosystem has well-being interests and therefore has moral significance. (Johnson, 1993, 217)

Johnson is correct that ecosystem ecologists make functional claims. Nitrogen, and nitrogen containing compounds, move through our biosphere. In our atmosphere, we have a reserve of nitrogen in gaseous form (N₂). N₂ is converted to ammonia or nitrate through nitrogen fixation. One type of nitrogen fixation occurs through organisms like Rhizobium bacteria in the root structures of plants, and from there nitrogen can be assimilated into the plant. Ecosystem ecologists claim that Rhizobia function to fix nitrogen contributing to the nitrogen cycle. If Rhizobia have the function of fixing nitrogen, then (a) fixing nitrogen is a heritable trait amongst Rhizobia, (b) fixing nitrogen contributed to the reproductive success of Rhizobia relative to alternative traits in the recent past, and (c) there was variation in fixing nitrogen amongst Rhizobia. *Maybe* Rhizobia might have these selected effects functions. However, 10% of nitrogen fixation occurs through abiotic components. As examples, lightning and volcanoes can fix nitrogen too. Thus, an ecosystem ecologist might claim that volcanoes have the function of fixing nitrogen thereby contributing to the nitrogen cycle. But, lightning and volcanoes do not exhibit heritable variation in fitness. Thus, ecosystems do not have selected effects functions and hence

⁹The Argument from Teleology might very well apply to genes and genetic diversity however. Genes are selected for and as such we could talk of their interests. But, here again, I think few of us would accept we have obligations to gene replication as such.

do not have interests (though see Swenson et al. 2000). As such, they do not have intrinsic value. If we think we ought to conserve ecosystems and their variation, the Argument from Teleology does not help.

The critic might retort that other accounts of functions. Specifically, Robert Cummins (1975) offered the systemic capacity account of functions. Suppose we have a system with some disposition. Moreover, suppose a part of that system has a disposition, which contributes to the disposition of the system. Using the example above, Rhizobia has a disposition to fix nitrogen, which contributes to the ecosystem's contribution to the nitrogen cycle. Cummins claims that when the sub-disposition of the part contributes to the disposition of the whole, then the part has a function of contributing to the whole. Thus, Rhizobia have a function of fixing nitrogen because it contributes to the ecosystem's contribution to the nitrogen cycle. And, more significantly, we can make the same claim of lightning and volcanoes. Cummins' account applies to functional claims made on behalf of ecosystems.

There is a rub. On the selected effects account, one can argue that the functional claims are normative. The reason being that selected effects functions provide us with "norms of performance." If the human heart has the function of circulating blood since past ones that did this had greater reproductive success, then ones that do not are malfunctioning. They are not doing what they are "supposed to." However, on the systemic capacity account, there is no normativity (Davies, 2001). A part simply no longer has or executes a sub-disposition. Thus, even if ecosystems exhibit teleology, then do not have interests and thus do not have intrinsic value. The Argument from Teleology simply does not apply to biodiversity.

Thus, the Argument from Teleology is unconvincing. Moreover, I do not know of any other plausible argument for the intrinsic value of living things, species, and ecosystems; i.e. biodiversity.¹⁰ *However*, suppose that the above arguments were sound. Even still, these arguments ignore a crucial issue. We can see this by outlining the following questions.

¹⁰I do think talk of intrinsic value and our environment can be made intelligible. However, my approach to metaethics and normative ethics would be radically different from the above. First, we humans care about much the same things given what sorts of beings we are. Second, given the importance of coordinating our actions in situations of moderate scarcity and limited benevolence, intrapersonal and interpersonal consistency is something we attempt to achieve. Thus, we try to accommodate those who have biocentric sentiments and can even come to share them (Blackburn, 1993; Gibbard, 1992; Lenman, 2007). Moral psychology and sentimentalism of the next sections combines easily with this approach.

1. What are the values of organisms and collectives of them?
2. What reasons are there for accepting they have these values?
3. What reasons will motivate people to protect them?

Even if organisms and collectives of them have intrinsic value and there are warranted reasons for accepting this, evidence suggests most people's motivations lie elsewhere. Environmental philosophers have been largely concerned with (1) and (2). If environmental ethics is to be a *practical* discipline - an area of *applied* ethics - then (3) matters. I have argued Argument from Teleology fails and have suggested there are no other good arguments for the intrinsic value of biodiversity. What then motivates people and gives them reasons to care about biodiversity? It is to these issues that I know turn.

3 Moral Psychology, Sentimentalism, and Cognitive Biases

Humans care about the natural world for a variety of reasons. Stephen Kellert (1997) has articulated the types of values that Americans associate with the natural world. The table below describes these types of value, their definition, and the roles they play in our lives.

Value	Definition	Function
Utilitarian	Practical and material exploitation of nature	Physical sustenance/security
Naturalistic	Direct experience and exploration of nature	Curiosity, discovery, recreation
Ecologist-Scientific	Systematic study of structure, function	Knowledge, understanding, observational skills
Aesthetic	Physical appeal and beauty of nature	Inspiration, harmony, security
Symbolic	Use of nature for language and thought	Communication, mental development
Humanistic	Strong emotional attachment and "love"	Bonding, sharing, cooperation, companionship
Moralistic	Spiritual reverence and ethical concern for nature	Order, meaning, kinship, altruism
Dominionistic	Mastery, physical control, dominance of nature	Mechanical skills, physical prowess, ability to subdue,
Negativistic	Fear, aversion, alienation from nature	Security, protection, safety, awe

Table 1: Survey of American Values Regarding the Natural World

Kellert also documented the overall ranking of values and their importance to Americans as represented below.

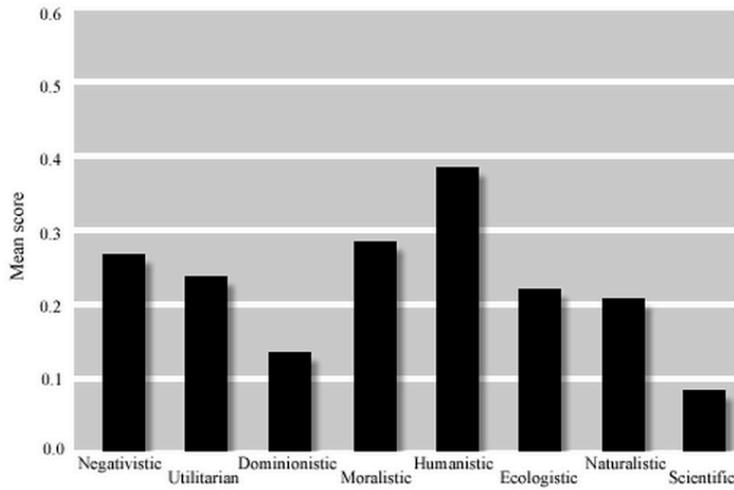


Figure 1: Survey of American Attitudes to the Natural World

From his findings, we recognize that Americans firstly have a strong emotional attachment to the natural world. In this, they find companionship and cooperation. We can even speak of their "love" of place and the natural flora and fauna therein. Second, the natural world has spiritual associations and generates ethical concerns. It provides meaning and offers opportunities to be better people (Norton, 1987). This category is not restricted to those who care about the natural world for its own sake. Thirdly, the natural world provides occasions of "fear and trembling"; it is something from which we need security and protection.

In 2002, the public opinion firm Belden Russonello and Stewart conducted a national poll on American attitudes towards biodiversity for the Biodiversity Project (Belden et al., 2002). Approximately four in ten Americans recognize the term 'biodiversity' and can characterize it. 55% of the total surveyed maintained that biodiversity was important to them and its loss was ranked as the most important environmental problem. 69% claimed that we have a personal obligation to protect biodiversity, and 65% said it was a moral responsibility. Participants were asked, "Which is the most important reason for you personally to care about protecting the environment?" and here are their responses.

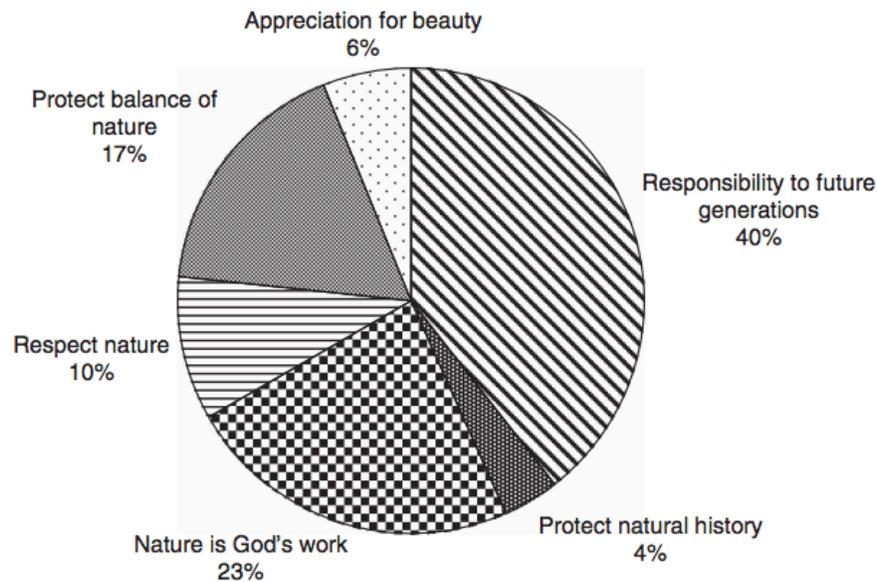


Figure 2: Most Important Reasons for American's Protecting the Environment

What is striking is that the most important reasons are responsibilities to future generations (40%), nature is product of God's creation (23%), and protecting the "balance of nature" (17%). The notion of "respect for nature" as environmental ethicists like Taylor have urged as paramount is suggested as fundamental by only 10% of Americans. Thus, Americans are concerned about the natural world, and biodiversity specifically, largely because of future generations and as stewards of God's creation.

Leiserowitz et al. (2005) reported on a 2002 survey that seems to challenge the above; namely, it claims Americans "strongly agreed that nature has intrinsic value" (Leiserowitz et al., 2005, 25). They report that over 75% of Americans accept humans have moral duties and obligations to other animals, plants, and non-living nature. In fact, more than 75% of Americans agreed that "Nature has value within itself regardless of any value humans place on it" (Leiserowitz et al., 2005, 28). The first claims of course are consistent with an anthropocentric approach. The second claim seems to crucial to Lesierowitz's contention but it is problematically ambiguous. One way to understand it is that nature has intrinsic value. A second way is that nature's value, be it intrinsic or instrumental, is not due to our *placing* value on it. Thus, given this ambiguity, the

Leiserowitz et al. (2005) is inconclusive.

Recently, Vucetich et al. (2015) have challenged the claim that "nature's intrinsic value cannot be used to justify conservation because nature's intrinsic value is not widely believed" (Vucetich et al., 2015, 5). They rightfully note that previous studies (Steel et al., 1994; Vaske and Donnelly, 1999; Kaltenborn and Bjerke, 2002), which tried to determine whether and to what extent people are nonanthropocentrists, are flawed. The questions these researchers asked participants are confounded since anthropocentrists and nonanthropocentrists could answer "yes" to them. Consider these statements,

Forests give us a sense of peace and well-being.
Forests rejuvenate the human spirit.
Forests let us feel close to nature.
I need time in nature to be happy. (Vucetich et al., 2015, 6)

One could value forests instrumentally or intrinsically and agree with them. Vucetich et. al. surveyed a sample of Ohioans regarding their views on the value of wildlife. Specifically, they provided two statements and determined whether they agreed or not.

1. Wildlife have inherent value, above and beyond their utility to people.
2. Wildlife are only valuable if people get to utilize them in some way. (Vucetich et al., 2015, 10)

They found that 82% of >2700 households accepted (1); namely, wildlife has inherent value. In fact, there was little difference between those that hunt, fish, trap, view wildlife, and those that don't regarding their acceptance of (1). From this study and one other national survey, they write, "This suggests that conservationists who reject nature's intrinsic value are out of the mainstream of their peers."¹¹ Vucetich et.al.'s study is flawed however. For Americans, especially ones that hunt, fish, trap, etc., 'wildlife' typically is associated with deer, bears, birds, etc. A majority of Americans think that such animals matter morally for their own sake. But, this is consistent with the view that animals that can suffer deserve moral consideration, and does not extend moral consideration

¹¹<https://theconversation.com/does-nature-have-value-beyond-what-it-provides-humans-47825>

to non-sentient organisms (e.g. plants and microbes) and collectives (e.g. populations and species). Thus, their empirical study provides weak support that many accept "nature's intrinsic value."

At this point you might be restless. Who cares why Americans say they should protect the natural world? What are *good* reasons for so doing? First, as we saw above, there are straightforward good reasons for protecting biodiversity ("the environment") and they concern future generations of humans and sentient living things. Second, warranted reasons only matter for the practical decision-making if they motivate decision-makers. The Argument from Teleology did not provide such warrant. But even if it did, it is not on the list of primary motivations of Americans. Third, from the data described, we see reasons regarding emotional attachments, our legacy, and religious injunctions are paramount in people's minds. Insofar as these considerations motivate their pro-environmental behavior, we should strategically focus on them.¹²

3.1 Moral Psychology and Sentimentalism

In moral psychology, there is a debate regarding the nature of moral judgment. Sentimentalists claim that moral judgments involve emotions. That is, they are necessarily affective. Rationalists deny this. If this view is correct, then it has important implications for what motivates conservation of biodiversity. Let's first examine the case for a sentimentalist moral psychology.

There is a great deal of evidence that emotions occur when we offer moral judgments. First, neuroimaging studies show that the areas of the brain associated with emotion are active during moral judgment (Greene and Haidt, 2002; Heekeren et al., 2003; Sanfey et al., 2003; Moll et al., 2003; Singer et al., 2006). When subjects were asked to consider moral sentences versus neutral sentences; were offered inequitable versus equitable payoffs in the ultimatum games; or violations of social rules like spitting food at dinner as opposed to spitting due to choking; the parts of subject's brains associated with emotion were far more active than in the non-moral cases. Greene et. al. (2001) showed using fMRI that emotions were involved in "trolley cases." Consider the following two cases.

¹²I hypothesize that there are a variety of values associated with the natural world many of which warrant pro-environmental behavior. However, I also hypothesize not all of them motivate such behavior. Thus, we should focus on them if we hope to achieve progressive change. This is not a plea for dishonest advocacy, or whatever "works."

Switch problem: A runaway trolley is headed for five people who will be killed if it continues on its present course. However, you can hit a switch, which turns the trolley to a different track killing one bystander. Should you hit the switch?

Footbridge problem: A trolley threatens to kill 5 people. You are standing next to a very large stranger on a footbridge above the track. However, the only way to save the five is to push the one onto the track. Should you push them?

Most people say "Yes" and "No" respectively. Why? The usual answer is that in the former involves letting someone die and the latter involves killing them. And, killing someone is worse than letting them die. Greene et al.'s hypothesis regarding our conviction is that in switch problems we are merely impersonally hitting a switch, in footbridge problems we are personally pushing a person, and the latter elicits emotions far more than the former (Greene et al., 2001, 2106). Those areas of the brain associated with emotion were significantly more active in "moral-personal" than in "moral-impersonal" cases. Thus, Greene et al. conclude,

How do people manage to conclude that it is acceptable to sacrifice one for the sake of five in one case but not in the other? We maintain that emotional response is likely to be the crucial difference between these two cases. (Greene et al., 2001, 2107)

Second, when subject's disgust is aroused, they judge actions as morally worse. The disgust aroused is independent of the actions evaluated and can even be aroused unconsciously (Schnall et al., 2008). Schnall et al. asked subjects to morally evaluate stories while sitting at a desk which was clean or very dirty (e.g. has an old pizza box, chewed pencils, and a dirty cup). Subjects' moral judgments are much more severe at the dirty desk compared to the tidy one. As another example, Wheatley and Haidt (2005) hypnotized subjects to feel disgust whenever the words 'take' or 'often' were heard. If one said that a congressperson "takes bribes" or "is often bribed" they would judge them far more harshly.

Third, some argue psychopaths cannot distinguish between moral and conventional violations due to emotional deficits (Blair, 1995). Moral norms are ones that are authority independent, general, and serious and conventional

norms are authority, dependent, specific and are not particularly bad to violate (Turiel, 1983). Blair showed that psychopaths have extreme difficulty determining whether a norm is moral or conventional. Psychopaths suffer deficiencies in affect. Thus, Blair and others have hypothesized that the best explanation of psychopath's failure to pass the moral/conventional task is that they lack certain emotions. As such, they lack the ability to make moral judgments (though see Aharoni et al. 2012; Kennett 2006).

Fourth, when morally dumbfounded, we do not change our opinions (Haidt, 2003). Consider Haidt's cannibal story,

Jennifer works in a medical school pathology lab as a research assistant. The lab prepares human cadavers that are used to teach medical students about anatomy. The cadavers come from people who had donated their body to science for research. One night Jennifer is leaving the lab when she sees a body that is going to be discarded the next day. Jennifer was a vegetarian, for moral reasons. She thought it was wrong to kill animals for food. But then, when she saw a body about to be cremated, she thought it was irrational to waste perfectly edible meat. So she cut off a piece of flesh, and took it home and cooked it. The person had died recently of a heart attack, and she cooked the meat thoroughly, so there was no risk of disease. Is there anything wrong with what she did?

Subjects claimed eating the cadaver was morally wrong. However, when asked why, subjects gave reasons inconsistent with the case. Nevertheless they refused to give up their moral judgment. They were morally dumbfounded. Moral judgments are more a product of emotion than reason.

One of the major debates in metaethics concerns the role of motivation and moral judgment (Björnsson et al., 2015; Smith, 1994). Externalists claim that one can judge an action is wrong and be completely unmotivated to avoid it. For example, one could judge that, "Anthropogenic species extinction is morally wrong" and care not one whit about. Internalists claim that necessarily when one sincerely makes a moral judgment one is motivated accordingly. You cannot genuinely judge something is wrong and not be motivated somewhat. The evidence above suggests that internalism is correct. Moreover, if moral judgment involves affect and thus motivation, then non-motivating judgments are simply not moral judgments. It is thus even more crucial for environmental ethicists to concern themselves with the considerations that actually motivate

people to pro-environmental behavior. Otherwise, they will be insincere, as well as ineffective.

3.2 Cognitive Biases

Beginning with Herbert Simon and his work on bounded rationality, and then especially through that of Daniel Kahneman and Amos Tversky, psychologists have documented how in a blooming, buzzing, and confusing world, we use heuristics to make decisions. However, they are subject to cognitive biases, and they can be very relevant to our environmental decision-making. Here I want to mention some of the biases that are relevant.

The *availability heuristic* concerns our tendency to consider only those alternatives, which easily come to mind (Tversky and Kahneman, 1974; Greenberg et al., 1989; Gardner and Stern, 2002). For example, if we consider species extinction, it is easier to imagine the loss of charismatic megafauna like polar bears rather than say disruptions to a trophic cascade. Our consideration of environmental risks can thus be unrepresentative. The *anchor and adjustment heuristic* concerns how we anchor alternatives with an example and then rank the other alternatives in relation to it (Tversky and Kahneman, 1974). For example, if we anchor protection of wolves with a complete ban on takings, then protecting wolves will seem extreme. Thus, allowing for the killing of wolves that threaten livestock will seem moderate. The extremity or moderateness of an action is dependent on our anchoring. The *loss aversion heuristic* concerns the fact that for some good or service, we are more strongly averse to losing it as opposed to gaining it (Kahneman and Tversky, 1979). This is closely related to the *the framing effect heuristic* in which the same information can be associated with aversion or preference depending on how it is framed (Tversky and Kahneman, 1981). The *temporal discounting heuristic* concerns our tendency to prefer rewards that occur sooner than later (Hendrickx and Nicolaij, 2004).

There are many different cognitive heuristics and biases that are relevant to conserving biodiversity. Our pro-environmental behaviors are dependent on the alternatives we consider and how they are anchored, whether we consider the effects as losses or gains, and how temporally close or remote their effects are (Andreou, 2007). Many philosophers assume that our failure to come to terms with ethical issues is due to an absence of information. If we improve the public's understanding of the relevant science for example, they will make reasonable decisions. However, the cognitive heuristic and biases go deep and we do not make poor decisions simply because of the absence of information

(Nisbet and Mooney, 2009).

Our best account of moral psychology suggests several things. First, in order to motivate individuals to pro-environmental behavior, we must present considerations connected to what people care about. If we do not, then they will not be motivated by these considerations. As we have seen, the primary reasons people care about biodiversity are the impacts on future generations and religious commitments. Respect for nature per se appears to be a minority concern. Second, we must be vigilant with regard to cognitive biases. Whatever reasons are offered for caring about biodiversity, they should relate to what moves us in the short run, concern losses as opposed to gains, should be anchored in non-extreme ways, and should be framed appropriately. In the next section, I present reasons for preserving biodiversity which fit this bill.

4 Ecosystem Services and Biodiversity

We have considered the Argument from Teleology as offered by philosophers and we have found it wanting. Likewise, I have argued that given a sentimentalist account of moral judgment is best supported by our current evidence. Coupled with an account of our cognitive biases given by cognitive psychologists, then we should look for ethical reasons that are motivationally effective and less subject to our biases. One such class of reasons concern the *ecosystem services* biodiversity provides. We will first consider a more general discussion of ecosystems services and then consider a concrete example.

Biodiversity, including genes, species, ecosystems, and their variety, provides food, fuel, fiber, and medicine.¹³ As one famous example, the rosy periwinkle (*Catharanthus roseus*) has been used for treating diseases including diabetes, malaria, and Hodgkin's lymphoma. The annual world fish catch is about 100 million metric tons valued between \$50 and \$100 billion and the commercial harvest of freshwater fish in 1990 was 14 million tons valued at \$8.2 billion. We use about 7,000 plant species for food but about 70,000 plants species are known to be edible. Of the top 150 prescription drugs used in the US, 118 are based on natural sources. Pharmaceuticals in the developed world are valued at \$40 billion per year. The natural world sustains us.

Biodiversity also sustains us indirectly: purification of air and water, mitigation of floods and droughts, detoxification and decomposition of wastes, regen-

¹³The information discussed here about ecosystem services is taken from (Daily et al., 1997; Daily, 1997)

eration and renewal of soil and soil fertility, pollination of crops and natural vegetation, control of the vast majority of potential agricultural pests, dispersal of seeds and translocation of nutrients, moderation of temperature, extremes and the force of winds and waves, and aesthetic experiences and intellectual stimulation. Consider three examples: soil, pollinators, and pests.

Soil shelters and supports seeds as they grow, retains and delivers nutrients to plants, and plays a central role in the decomposition of organic matter and wastes. It is crucial for regulating the Earth's carbon, nitrogen, and sulfur cycles. Soil degradation caused by humans affects nearly 20% of the Earth's vegetated surface. Most flowers require pollinators for reproduction (of 240,000 plants species, 200,000 require an animal pollinator). This includes 70% of the crop species that feed the world. Over 100,000 species of bats, bees, beetles, birds, butterflies and flies provide these services. Approximately 1/3 of our food is derived from plants pollinated by wild pollinators. Pests, our competitors, include insects, rodents, fungi, snails, nematodes, and viruses. They destroy between 25 - 50% of the world's crops and especially important given how harmful pesticides can be. 99% of pests are controlled by natural enemies like birds, spiders, wasps, ladybugs.

Some think of ecosystem services as narrowly "utilitarian" and "economic" (Daniel et al., 2012). This is not so. Ecosystems sustain us culturally too through recreation, appreciation of natural beauty, ecotourism, health, historical monuments, and spiritual experiences. In 2012, the U. S. National Park System by itself has over 282 million recreational visits ¹⁴ These benefits are not just found just in "wild" areas accessible only to REI members, but includes urban green spaces too. For example, children with ADHD do better after physical activities outside than with activities indoors (Taylor et al., 2001).

To make this discussion concrete, let's consider the ecosystem services that salmon provides.

4.1 Ecosystem Services and Salmon

Salmon has enormous value for fishermen, processors, distributors, restaurants, suppliers, boat-builders, tour operators, fishing guides, and charter boat operators.¹⁵ As of 1988 there were an estimated 62,750 salmon-dependent jobs in the

¹⁴<http://enviroatlas.epa.gov/enviroatlas/Ecosystems/recreation.html>.

¹⁵The information on salmon and their life history along with the ecosystem services they provide are taken from (Gende et al., 2002; Quinn, 2011; Trout, 2001; Woody et al., 2003).

Pacific Northwest, which generated about \$1.25 billion to the regional economy. In the 1990s, the actual economic value of Columbia-based salmon fisheries dropped as low as \$2 million. Salmon encourages recreation and tourism to the Pacific Northwest in the United States and Alaska. Additionally, they are important to sport fishing and angling. Salmon serve as a regional symbol and are found represented in art and souvenirs. They also serve as a flagship species for other species in the region. Salmon are incredibly important to Native American life and their ceremonial rituals. Additionally, young salmon are a rich source of food for fish and birds given their lipid content. Adults provide carbon, phosphorus, and nitrogen from the ocean to nutrient-poor lakes and streams. Their carcasses provide food for invertebrates like algae, fungi, and bacteria, and for vertebrates like bears, foxes, wolves, ravens, and eagles. In order to flesh out this ecosystem services argument applied to salmon, let's consider one very specific service; their contribution to ecosystem productivity.

Spawning salmon serve as a food resource for other species, and when they die after spawning, their carcasses provide nutrients such as carbon, nitrogen, and phosphorus to freshwater systems. Recently, scientists have documented that these "salmon-derived nutrient" subsidies may have significant impacts on both freshwater and riparian communities. Adults return to freshwater late summer and fall where they cease feeding, spawn, and die. After some months, young emerge from gravel in early spring and spend up to 2 years in freshwater habitat before migrating. The fish remain at sea for 1-7 years, gaining over 90% of their biomass before returning. The nutrient flux of salmon biomass into a freshwater can be massive; 20 million sockeye can yield 5.4×10^1 kilograms (kg) of biomass which equates to 2.4×10^4 kg of phosphorus, 1.8×10^5 kg of nitrogen, and 2.7×10^5 kg of carbon. Stream systems serve as "conduits" for input of ocean-derived material into freshwater and terrestrial systems. Bears move carcasses into riparian forest where they are partially consumed. Many stream insects have an aerial phase in which they fly far from streams. Avian scavengers remove chunks of salmon and sometime leave them on land. Increased lake productivity is caused by salmon-nutrient inputs which increase phytoplankton and zooplankton. Salmon carcasses increase population size and growth rates of invertebrates, juvenile salmonids may grow faster feeding on the vertebrates which feed on the carcasses. Invertebrate scavengers increase in abundance due to salmon. Insectivorous riparian birds are found in greater numbers around salmon streams than non-salmon streams suggesting that they are responding to the salmon "pulse". Bear populations are up to 80% larger in coastal areas where salmon are abundant rather than in interior areas. The fit-

ness (growth rates, litter sizes, and reproductive success) of salmon consumers (birds, bears, etc.) are directly related to salmon availability. There is evidence that riparian shrubs and trees are positively affected by salmon. Finally, we also can provide an argument for the protection of *wild* salmon as opposed to just *hatchery* salmon. The diversity of salmon stocks also causes greater resilience by "spreading the risk" in the face of environmental fluctuations affecting their life history strategies. Hence, we should preserve not only hatchery salmon, but wild salmon stocks.

Ecosystems sustain us directly and indirectly. As one example, I considered salmon in the Pacific Northwest. Those in the region love their forests and rivers. Salmon are key to love of place. Before we conclude, I would like to consider two objections raised to the ecosystem services argument I have just provided.

4.2 Two Objections to the Ecosystem Services Argument

In this section, I consider two objections to the ecosystem services argument. First, consider a worry raised by environmental philosopher Eric Katz (1979) following (Krieger, 1973). He writes,

Humanity could enjoy an artificial, plasticized world which produces more social utility than a world filled with natural objects and resources. As our space program has demonstrated, humans can even survive in an artificial environment. The simple fact of the matter is that the interests of humanity are not necessarily connected with the preservation of the natural environment. Any ethical theory which places its emphasis on the satisfaction of human needs can support a policy of preservation only on a contingent basis. Obligations to preserve natural objects and resources are overridden whenever a greater amount of human satisfaction can be attained by non-preservation. (Katz, 1979, 362)

Katz claims the benefits provided by biodiversity justify protection only if artificial systems do not provide the same benefits. However, artificial systems can provide those benefits. Therefore, the benefits provided by biodiversity justify protection of biodiversity.

However, consider one of the most adventurous attempts to replace those services, Biosphere II in Arizona (Cohen and Tilman, 1996). It was considered a

complete disaster. Oxygen concentrations fell from 21% to 14%; nitrous oxide was very high which can cause brain damage; 19 of 25 species went extinct; and all the pollinators went extinct; and in the ocean, there were excessive nutrients creating algal mats. As David Tilman and Joel Cohen write,

The major retrospective conclusion that can be drawn is simple. At present there is no demonstrated alternative to maintaining the viability of Earth. No one yet knows how to engineer systems that provide humans with the life-supporting services that natural ecosystems produce for free. (Cohen and Tilman, 1996, 1151)

We cannot replace the ecosystems that sustain us.

A second argument comes from Katie McShane (2007). She argues that anthropocentrism makes unavailable love, respect, and awe with respect to nature. Love is an "other-centered" emotion; to love another is believe their value concerns something more than your own interests. Respect for another another requires belief that their interests are of equal importance your own. Awe for something requires that you believe that their greatness goes "beyond your needs, interests, or attitudes" (176). She writes,

If to love something is to think of it as having a kind of value that doesn't depend on us and our interests, then according to anthropocentrism, to love the natural world is to make a mistake about its value. (McShane, 2007, 177)

McShane recognizes emotions are important in moral judgment, and is friendly to the sentimentalism discussed above. However, McShane assumes love requires the beloved has a value going beyond us. She raises deep issues I can only scratch here. Still, this seems incorrect.

I love Wayne Shorter's music. I love *Speak No Evil*, his work with Weather Report, his recent *Without a Net*, and the albums in between. I am partial to jazz and electronica, but people say they love music of all kinds. Nick Hornby eloquently writes about his favorite music,

And mostly all I have to say about these songs is that I love them, and want to sing along to them, and force other people to listen to them, and get cross when these other people don't like them as much as I do. (Hornby, 2003, 6)

The love of music is hard to make sense of as valuable outside of our experience of it. Music's value seems connected to our needs, interests, and attitudes. With regard to awe, is this not but a certain kind of perceptual-affective experience? In light of this, if one can adopt attitudes of love, respect, and awe to music, then one can do with regard to the natural world.

5 Conclusion

Ideally in environmental philosophy, we determine what the values of organisms and collectives are, articulate warranted reasons for those claims, and finally provide the reasons that motivate pro-environmental behavior. Environmental philosophers have spent much of their time asking whether organisms, species, and ecosystems have intrinsic value. I have claimed that this is the wrong question to be asking; more cautiously, it is not the *only* question we should be asking. First, the Argument from Teleology fails, and there is no other good argument to that conclusion. Second, data from the social sciences suggest that this claim is not something that most Americans take to be a reason to protect biodiversity. Third, given a sentimentalist moral psychology, if a consideration is not motivating, then a moral judgment regarding it is not in the offing. Fourth, given this psychology and our understanding of cognitive biases, I have provided what I take to be a more powerful argument for protecting biodiversity; namely the ecosystem services it provides. Thus, we return to a very simple, pragmatic thought articulated by Aldo Leopold, "To keep every cog and wheel is the first precaution of intelligent tinkering" (Leopold, 1989, 190).

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