Species and Beyond < CAT: 337948 ISBN: 9780367425371>

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What *Should* Species Be? Taxonomic Inflation and the Ethics of Splitting and Lumping

April 11, 2021

Abstract

In this essay, I first discuss debates regarding the species category. There are a variety of species concepts used by biologists which classify organisms into distinct species, and there is no consensus on which (if any) species concept is best. Second, I turn to debates over "conceptual engineering." Many philosophers argue that we should improve our concepts when they are found problematic. This would include our species concepts and their implications. Third, I consider the phenomenon of taxonomic inflation, which occurs when taxa classified as subspecies are elevated to new species. This often occurs when species classified using the Biological Species Concept are reanalyzed using the Phylogenetic Species Concept. However, this inflation raises complex ethical issues regarding conservation. Specifically, by taxonomic reanalysis, we often increase the number of endangered species that we must conserve and protect. I then evaluate arguments which say that we should not taxonomically inflate species because of these conservation implications. In the end, I claim that these arguments are unconvincing.

[1] I would like to thank Marc Ereshefsky, Ewan Kingston, and Frank E. Zachos for helpful comments on earlier drafts of the essay.

1 Biology's Currency and the Species Debate

Species are of the chief currency of biology. When we wonder how diverse life is on our planet, we learn there might be as many as 5 – 100 million species [Erwin, 1982; May, 1990; Stork, 1993; May, 2011; Mora et al., 2011]. When we ask what we are losing, we are told that the species extinction rate is 100 – 1,000 times that of the background extinction rate found in the fossil record [May et al., 1995]. When conservation biologists prioritize places conservation, they do so on the basis of species richness and evenness. When we think about conservation in the United States, one of its most important tools is the Endangered Species Act (ESA) [Rohlf, 1989; Czech et al., 2001; Burgess, 2003]. When we extol our successes, we talk of the recovery of species such as the brown pelican, the Stellar's sea lion, gray wolf, bald eagle, and so on. Our species concept is extraordinarily important for how we think about living things and their diversity.

Biologists are deeply divided over the species category [Ereshefsky, 1992b; Wheeler and Meier, 2000; Coyne and Orr, 2004; Wilkins, 2009]. There are a variety of legitimate species concepts with no clear frontrunner. Consider Ernst Mayr's famous biological species concept (BSC). He writes, "Species are groups of interbreeding natural populations that are reproductively isolated from other such groups" [Mayr, 1963, 89]. There are lots of worries about the BSC, but for our purposes, we need only note a few of them [Ehrlich and Raven, 1969; Sokal and Crovello, 1970; Van Valen, 1976; Wiley, 1978]. Asexual organisms do not interbreed. Thus, on the BSC, there are no species of asexual organisms. Many species exhibit some introgression, and thus are not obviously distinct species. Last, the BSC is extremely difficult to apply to the fossil record since sex organs do not normally fossilize, and thus reproductive behavior is difficult to corroborate.[2]

In light of the problems with the BSC (and for other reasons), biologists have put other species concepts on the taxonomic table. Here are the most prominent.[3]

[2] This is not to say that defenders to the BSC do not have responses to these criticisms. They do. My point here it is to note that many biologists are not convinced by those responses.

[3] Though I discuss three different species concepts, these concepts are placeholders for families of more fine-grained concepts.

Ecological Species Concept Species are lineages of organisms that occupy the same ecological niche [Van Valen, 1976].

Evolutionary Species Concept Species are a single lineage of ancestor–descendant populations which maintains its identity from other such lineages and which has its own evolutionary tendencies and historical fate [Wiley, 1978]

Phylogenetic Species Concept Species are the smallest diagnosable population of organisms that share a common ancestor [Cracraft, 1983]

Species pluralism is the claim that there is no single correct species concept that classifies organisms exactly the same; rather, there are several correct species concepts [Ereshefsky, 1992a]. That is, for groups of organisms, different species concepts will correctly place them in distinct species. *Species monism* is the claim that there is a single correct species concept. Some allege species pluralism is temporary because we will eventually find the single best concept [Hull, 1999]. Others argue it is a permanent state of affairs in taxonomy and systematics. From a practical point of view, we are all species pluralists for now.[4]

To see how this pluralism works, consider insects which live on the side of a mountain with three populations A, B, and C [Ereshefsky, 1992a]. Suppose that each population forms a single monophyletic group; B and C share an ecological niche with A having its own; A and B can interbreed but are isolated from C. Thus, the BSC classifies our species $(AB)C$, the ESC classifies our species $A(BC)$, and the PSC classifies our species A,B,C. We can depict the situation as follows.

[4] One might interpret this practical pluralism as meaning every biologist uses more than one species concept in their research. I mean something more modest; different groups of biologists use different species concepts. There may even be biologists who use none.

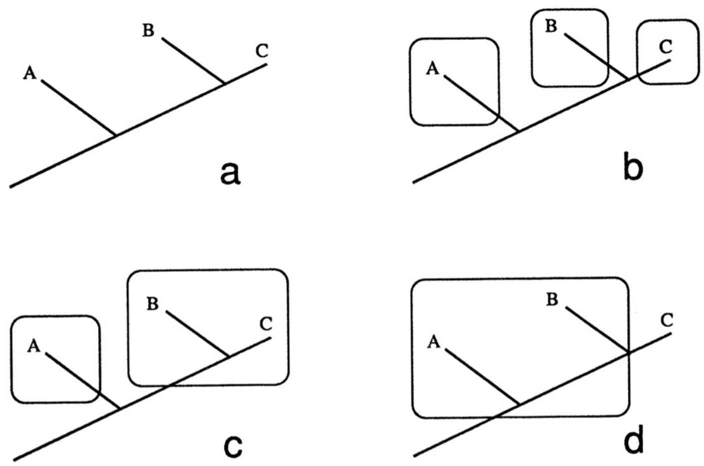

Figure 1: Species pluralism [Ereshefsky, 1992a, 675]

Figure 1a provides a phylogenetic tree of our taxa *A*, *B*, and *C*. Figure 1b provides the classification of species according to the PSC. Figure 1c provides the classification of species according to the ECS. Figure 1d provides the classification of species according to the BSC. One might wonder if this is just a conceptual possibility or an empirical reality, and it is an empirical reality [Ereshefsky, 1992a]. And, as we shall see, it is a worrisome reality too.

Regardless of whether species monism or species pluralism is correct, there are many species concepts that are used by biologists. As I said, we find ourselves with a "practical pluralism," and it is not disappearing anytime soon. In this essay, I explore what reasons we have for choosing the species concept or concepts that are best for the biological sciences. Our question is this: are *ethical* reasons relevant to the selection of species concepts?

2 Conceptual Engineering

Sometimes those in a conversation disagree over the meaning of terms or concepts.[5] In fact, the disagreement may reveal that those terms have many different meanings associated with them (see Reydon this volume). Participants in those discussions typically argue over what the *right* meaning of the term or concept is. Examples include marriage and person. Some people think that marriage can only occur between a man and woman "by definition." Same-sex marriage or polygamous marriages are a contradiction in terms. Others think that individuals of the same gender or groups of more than one individual can be married. Some people think that fetuses are persons, but others think they are not. The debates among the participants are not just about what the terms or concepts mean, but also what they *should* mean [Haslanger, 2000].

The study of how we evaluate and improve our concepts is *conceptual engineering* [Cappelen, 2018]. One approach to the topic is to claim for a term associated with a concept, the term has a fixed meaning, and linguists, philologists, and philosophers should attempt to discover what that meaning is. Thus, the best theory is the one that gets that meaning correct. A second approach is that for a term associated with a concept, it may have many meanings associated with it. The task is to determine, which of those meanings is best. Using the examples from the last paragraph, the questions should be, "What should 'marriage' mean? What should 'person' mean?" Conceptual engineers advocate for the second view. Their argument is roughly this. If a word has several possible meanings, we should pick the best meaning of those available. Many important terms have different meanings. Thus, we should pick the best meaning of those available. This selection of the best meaning just is conceptual engineering.[6]

Conceptual engineering might sound odd to some. There are several questions that come to mind: How can meanings be defective? If we change the

[5] Here I am distinguishing between words and concepts that are denoted by words. For example, the English term 'species' and the French term 'espèce' denote the same concept species.

[6] As a scientific example of conceptual engineering, Rudolf Carnap [1950] argued that our concept of probability was problematic. In order to explicate it, one had to make it more precise and useful for various scientific tasks. This would require that it be an improvement and thus different from our original concept.

meaning of terms, will we be able to consistently communicate? Are we able to change the meanings of words? Let's consider reasons why we would do so [Burgess and Plunkett, 2013]. One way in which a term might be defective is that its uses are *intrinsically bad*. The most obvious case here would be that of hate speech. If we use a term that derogates another, we have disrespected them. On some moral views, this is morally wrong by itself. Since this is not relevant to the purposes of this paper, I will leave this candidate behind. A different case would be that it is *instrumentally bad*.

If we use a term with a certain meaning, our utterances will have overall negative effects. These effects might be mostly ethical. But they need not be. For example, certain terms are excessively vague, which is problematic for scientific progress. Vagueness could be one reason to conceptually engineer our terms, but we might also think ethical consequences apply here too.

One might worry that if we change the meanings of terms, won't we simply misunderstand one another? After all, if we think we mean the same thing when we do not, we will simply be equivocating. Consider the topic of this paper; that of species. It is likely that the plurality of species concept caused confusion at various points in the history of biology. However, as more reflection and care was used, biologists became aware of the different concepts at work.[7] They became more explicit about how they were using the term 'species', and thus avoided some of the possible confusions. Additionally, one might argue that these communicative disruptions are productive. Miscommunication can show something is not working, and participants are giving reason to do the conceptual work needed. This has occurred in the biological sciences though it is interesting that no single species concept has been deemed best.

One crucial assumption of conceptual engineering is that we can purposively change the meanings of our terms. For if we cannot, then the recognition of conceptual confusion will not help us get clearer in our thinking. In this essay, I will assume conceptual engineering is possible. Moreover, I assume that it actually occurs in the sciences. To see how this is possible consider a simple theory of kind terms like 'species' [Putnam, 1975; Sterelny, 1983]. Philosophers of language and philosophers of science distinguish between *reference fixing* and

[7] Marc Ereshefsky [1992a] has even argued that we should drop the term 'species' in favor of specific terms like biospecies, ecospecies, and phylospecies to clearly indicate communicative intentions.

reference borrowing. We can imagine earlier speakers recognizing that organisms are not randomly associated; they form groups of similar organisms. They were probably mystified as to why such grouping occurred, but they recognized them. An early speaker might have said (in their language of course), "By 'species', I mean any organisms that form such a group." Subsequent speakers then deferred to such a speaker and ultimately borrowed their usage from this ur-speaker (or ur-speakers) by intending to do so. Thus, the reference of the term 'species' was fixed by these activities, and subsequent speakers meant what they did by a causal chain of intentions reaching back to that initial group. Now as new speakers appear, we can continuously reground (or refix) our terms.[8] We can thus purposively change the meaning of our terms. This most clearly happens in conceptual debates in the sciences. I take debates over species to be a case in point.

My essay in a sense is an examination of ethical conceptual engineering in the biological sciences. That is, when we have a term like 'species' being used in various ways, we might choose to revise it for a variety of reasons. Are we justified in doing so for ethical reasons? I now want to consider just such a case; that of taxonomic inflation.

3 Taxonomic Inflation

With the rise of molecular data and methods, the Phylogenetic Species Concept (PSC) has been used in biology with greater frequency. We can characterize the current PSC as follows: A species is a smallest group of organisms that share at least one uniquely derived character.[9] Agapow et al. [2004] examined 89 studies

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[8] One of the innovations of Sterelny [1983] is the recognition that we are continually refixing and regrounding natural kind terms. Their meaning is not permanently fixed by the ur-speaker(s). This particularly helps to address problems of reference change.

[9] A *homology* is a trait shared between species and their common ancestor whereas a *homoplasy* is a trait shared between species but not by a common ancestor. A *shared derived homology* is one that is found in the ancestor of a species and all their descendants whereas a *shared ancestral homology* is one had by the ancestor of a species and only some of their descendants. Shared derived traits, or synapomorphies, are special because only they indicate monophyletic groups. It is worth noting that on some versions of the PSC, the character may be plesiomorphic provided that it is diagnosable and is confined to this group.

in which groups were classified with both the BSC (or morphospecies concepts) and the PSC. There are three possibilities that can result from reanalysis. First, a BSC is broken into several PSCs; they are nested in a BSC. Second, populations in distinct BSCs are rearranged into distinct PSCs; they are non-nested. Third, distinct BSCs are placed in a single PSC; they are reverse-nested. Their analysis found that by and large distinct PSCs are nested in BSCs. Specifically, they found the studies which used the BSC had between 1,245 and 1,282 species which when reclassified with the PSC had between 1,912 and 2,112 species. This was a 48.7% increase. In fungi, there was a 300% increase; in lichens, there was a 259% increase; in reptiles, there was a 137% increase; in mammals, there was a 87% increase; in arthropods there was a 77% increase; in birds, there was a 88% increase. Put simply, the use of the PSC multiplied the number of species beyond that of the BSC. The question though is this: Does the PSC multiply the number of species beyond necessity? Taxonomic inflation occurs when existing populations or subspecies are raised to the species level. But why worry about this – after all, might there simply be more species than we thought?

4 Taxonomic Inflation and Conservation

Taxonomic inflation is considered problematic because it increases the number of endangered species. And, if we increase the number of endangered species, we make conservation that much harder [Agapow et al., 2004; Isaac et al., 2004; Zachos, 2013]. First, the number of species increases as we saw in the previous section. Second, the abundance of each species becomes smaller. This means that they are more vulnerable to demographic stochasticity, genetic stochasticity, inbreeding, and thus extinction. Third, the amount of money for inventory and recovery that must be spent increases as well. For example, under the ESA if it costs on average $2.76 million to completely recover an endangered species, then it would cost $4.6 billion to save all the currently endangered species. With the PSC, this would increase to $7.6 billion, which is the entire annual budget of the United States Fish and Wildlife Service [Agapow et al., 2004, 169].

We can summarize the argument as follows.[10] If taxonomy is inflated, then the number of endangered species will be increased. However, if the number of endangered species are increased, then this makes conservation goals harder to meet. We should not make conservation goals harder to meet. Therefore, we should not inflate taxonomy. We are engaged in an example of conceptual engineering. Let's work through the argument premise by premise labeling each section accordingly for ease of reading.

4.1 Premise 1: Taxonomic Inflation Increases the Number of Endangered Species

The first premise is supported by the above-mentioned empirical evidence. One might argue inflating taxonomy does not increase the number of endangered species because the PSC is not a legitimate species concept. For example, the PSC has difficulty with bacteria and horizontal gene transfer (though see Staley [2006]). But this is consistent with the PSC correct classifying *some* groups of organisms. One might also argue there are no species to begin with. There is more that could be said here about the reality of species, but we will leave these worries to the side [Coyne and Orr, 2004; Mishler, 1999; Slater, 2013]. Rejecting the species category as real would have even most drastic implications than anything I consider in this essay.

4.2 Premise 2: Increasing the Number of Endangered Species is Detrimental to Conservation

The second premise has been challenged by some biologists and philosophers. Here are two objections to it. First, it is not detrimental because species should not be the unit of conservation. Second, it is not detrimental because not all species are of value. Let's take each objection in turn.

Some suggest that instead of preserving species we should preserve phylogenetic or functional diversity [Agapow et al., 2004; Isaac et al., 2004]. Maybe so, but how do we conserve diversity and higher taxa and not conserve species? Consider one example of important functional diversity, pollinators [Nabhan and Buchmann, 1997]. Most flowers require pollinators for

[10] No biologist or philosopher has explicitly offered this argument. However, some have come close, and it is certainly an argument that is on the minds of biologists.

reproduction (of 240,000 plant 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 [Nabhan and Buchmann, 1997, 135]. There is then no easy way to preserve pollination without preserving the species that accomplish it. Thus, even if species are not the only unit of conservation, they are one of them and probably the most important legally. Since species are a unit of conservation, then increasing the number of endangered species is detrimental to conservation.

One might argue that not every species, much less endangered species, has final or instrumental value [Sandler, 2012]. Many ethicists talk of intrinsic value but this suggests that the value of something is determined by its intrinsic properties. Thus, some ethicists prefer to use the term 'final value' to avoid this suggestion. Something has final value if it is valuable independent of the value of other things. Here is how Ronald Sandler articulates objective final value.

> Something possesses *objective final value* (hereafter, just *objective value*) if its value is independent of any actual preferences, attitudes, judgments, emotions, or other evaluative states regarding it... If objective value exists, there are properties or sets of properties that, when they are instantiated in any entity, experience, act, or state of affairs, have (or confer) value. Moreover, valuers ought to recognize and respond to value. [Sandler, 2012, 18]

In environmental ethics, the most prominent way to understand species have objective final value involves the following considerations. If something exhibits goal-directed behavior, then it has interests. If something has interests (i.e., can be benefited or harmed), we should protect it. Species exhibit goal-directed behavior. So, species have interests. Therefore, we should conserve them. However, there are seriously problems with this argument. 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 the hatchlings receiving less and lower quality food (e.g., caterpillars). Heavier chicks have a greater probability of survival and reproduction. In experiments, it has been demonstrated that the optimal clutch size is approximately eight to nine eggs. Lack and others argued individual selection explained clutch size; group selection is not required. Most evolutionary biologists think group selection can occur under certain restrictive circumstances, and that it 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 *fleet deer*. Thus, we should be skeptical that species have objective final value.

A second way to understand final value is as subjective final value. Here is Ronald Sandler again.

> Something has *subjective final value* (hereafter, just *subjective value*) if its value is dependent upon valuers having some evaluative stance regarding it. Subjective value is created by valuers through their evaluative attitudes, judgments, and preferences. It does not exist prior to or independent from them. There are a wide variety of things that are valued noninstrumentally - for example, personal mementos, cultural and religious artifacts, ceremonies and rituals, accomplishments, performances, and historical sites. [Sandler, 2012, 19]

Put simply, something has subjective final value if it is valued for its own sake. It is surely true that there are species that we value for their own sake. However, it is also true that not every species is so valued. For example, only a fraction of the species that exist are known, and thus it is highly unlikely that anyone values those species. Likewise, there are species which are known but which we in fact disvalue – think of parasites and pests. So, it is highly unlikely that all species have this sort of inherent value.

However, critics also contend that not every species has instrumental value. Instrumental value is the value something has as a means to some other valuable end. Consider the most famous illustration of this point – *Percina tanasi* or the snail darter [Plater, 2013]. This is a species in the perch family which was discovered in East Tenneesse in 1973 and was listed as endangered under the U. S. Endangered Species Act of 1973 in 1975. Its listing led to the Supreme Court halting the completion of the Tellico Dam. This three-inch fish with camouflage dorsal patterns that feeds on insects in creeks and rivers doesn't seem to have much value aesthetically or commercially. But we should be careful not to overgeneralize. Species often have important instrumental values to human well-being [Daily et al., 1997; Tallis et al., 2011]. They provide food, fuel, fiber, and medicine. The flowering plant 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 just 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 specie 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.

As one more concrete example, let's consider the instrumental values of salmonid species. Salmon has enormous value for fishermen, processors, distributors, restaurants, suppliers, boat-builders, tour operators, fishing guides, and charter boat operators.[11] As of 1988 there were an estimated 62,750 salmon-dependent jobs in the 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 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-

[11] The 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].

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. It is unlikely that every species has instrumental value, but many do and thus increasing the number of endangered species would be detrimental.

To summarize my arguments, I agree that not every species has final value nor does every species have instrumental value. However, from the fact that not all species are of value it does not follow that no PSC is of value. So, these claims even if correct do not show taxonomic inflation is a problem.

4.3 Premise 3: We Should Not Make Conservation Goals Harder to Meet

The third premise, "We shouldn't do what is detrimental to conservation", seems uncontroversial, but in fact it raises two important worries. First, there is a more basic legal point. In the majority opinion made by Chief Justice Burger on June 15, 1978 he wrote,

> One would be hard pressed to find a statutory provision whose terms were any plainer than those in 7 of the Endangered Species Act. Its very words affirmatively command all federal agencies "to insure that actions authorized, funded, or carried out by them do not jeopardize the continued existence" of an endangered species or "result in the destruction or modification of habitat of such species..." 16 U.S.C. 1536 (1976 ed.). This language admits of no exceptions.

Justice Burger's point is that the Endangered Species Act (ESA) doesn't only protect those endangered species with final or instrumental value. It protects them period. The ESA would be revised in 1978 so that a group of seven senior officials could exempt a federal agency if (a) the federal project is of regional or national significance, (b) there is no "reasonable and prudent alternative," and (c) the project as proposed "clearly outweighs the alternatives."

Second, it is true that classifying more species makes the job of conservation biologists, policymakers, and environmentalists harder. But if many species are of great value, and in fact there are more of them than we thought, then our job *should* be that much harder. As Agapow et al. [2004, 170] note, "Rejecting the PSC solely because of (apparently) unpleasant biodiversity implications smacks of expedience". Consider an analogy. At various times in history legal rights were extended to marginalized groups. This increased the moral demands on those in their community and country. We could have made our moral lives easier by not extending those rights. This however would be the wrong response. Expediency often takes a second seat to morality [Hale, 2016].

5 Taxonomic Inflation and Triage

Thus, in light of the arguments I have surveyed, there are three options. First, we deny that what the PSC classifies are genuine species. In light of species pluralism, this seems problematic, but maybe it is correct. Second, we recognize that conservation becomes more difficult, but if species should be protected so it should be. Prima facie, we should increase the amount of money the federal government spends on protecting endangered and threatened species. Third, we question whether every species should be protected and have the difficult conversations concerning which species matter and why [Rolston, 1985; Russow, 1981; Sandler, 2012]. In this political climate, this third option though troubling, it is what honest conservation requires. I would argue we forcefully pursue the second option, but I also recognize the third option is important because triage is currently unavoidable.

Ecologist Leah Gerber [2016] has argued that we should employ decision theory to determine how we should allocate federal money to endangered species. Currently less than 25% of the $1.21 billion per year needed for implementing recovery plans for 1,125 species is actually allocated to recovery [Gerber, 2016, 3565]. She modeled what would happen if we moved funds from "overfunded" to "underfunded" species. Reallocation of surplus funding from these 50 overfunded recovery efforts would erase deficits in funding for up to 182 underfunded species [Gerber, 2016, 3566]. As one of Gerber's example, she considers the northern spotted owl (*Strix occidentalis caurina*). She calculated that between 1989–2011, $4.5 million was spent to recover the northern spotted owl, but it has been declining by approximately 4% per year. There are two assumptions Gerber makes that are worth challenging. First, she assumes that the federal budget for the ESA is constant. Second, the success of listing a species is solely a function of recovering that very species. The first claim is problematic largely because the Trump Administration was looking to cut billions of dollars from the Department of Interior [12] and of course the new Biden Administration

[12] See https://www.reuters.com/article/us-endangered-species-triage-idUSKBN19A1DK

might very well increase it. Additionally, given the value of species, we should be advocating for increasing federal spending on the ESA listings. Additionally, one can argue that even when a listed species is not recovered, this listing was successful insofar as other species were protected in its habitat. By protecting the northern spotted owl and the old-growth temperate rainforest it lives in, we also protect many other species like soil arthropods, spiders, insects, mites, millipedes, lichen, fungi, mosses, small mammals, and bats. Gerber defines success too narrowly, I think. Still given the problem of triage, taxonomic inflation makes it even harder.[13]

6 Conclusion

In this essay, I have considered species pluralism and the taxonomic inflation that results. We also considered conceptual engineering and how many philosophers think we should be improving our concepts when they are found problematic. Some might argue that because this inflation has serious and negative implications for conservation, we should not inflate the number of species. It would be morally wrong one might argue. That is, we should dismiss the PSC for ethical reasons. I evaluated a variety of arguments for this conclusion and find them all to be flawed. However, taxonomic inflation will make triage even worse. Thus, we should both be looking carefully at how to increase federal spending on endangered species but also how protect those most valuable taxa when we must selectively choose.

[13] One important recent approach to triaging species for their conservation value is the EDGE of Existence of program run by the Zoological Society of London. The EDGE program is based on giving priority to those species that are "Evolutionarily Distinct" and "Globally Endangered" [Isaac et al., 2007]. It couples information regarding a species' evolutionary distinctness with its IUCN threat category. The EDGE approach is especially interesting for philosophers because it appears to assume that each species has some value, and species with a higher EDGE score should be prioritized for conservation over those with lower EDGE scores. As we have seen, not every species may be valuable. Additionally, there are interesting questions as to why phylogenetic diversity matters when it does.

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