

**NOTE: MODERNIZING CONSERVATIONISM:  
RENEWABLE ENERGY’S SPECIES-  
PRESERVING EFFECT AND THE  
ENDANGERED SPECIES ACT**

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ABSTRACT

*Environmental policymakers face a dilemma, for the construction and operation of renewable energy facilities mitigates ecologically destructive climate change in the long term but often adversely affects species in the short term. This paper provides empirical, legal, and normative resources for analyzing what I call “species clash.” In most cases, renewable energy is much more helpful than harmful when it comes to preventing species extinctions, but the Endangered Species Act paradoxically poses a barrier to such species-preserving projects. Framing the benefits of renewable energy in terms of species conservation may not only help secure speedy and cost-efficient compliance with the Act, but also foster a more rational conservationism fit for an era of climate change.*

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## INTRODUCTION

What if future ecologists look back and find that the deadliest animal in the history of the world was not an apex predator, like the wolf or lion, but the innocent, unhurried, and herbivorous Mojave desert tortoise? In 2011, the construction and operation of the world’s largest solar thermal plant<sup>1</sup> came to a screeching halt for over three months as experts vigorously debated how to build in the Mojave desert without displacing more than thirty-eight of the charming reptiles in accordance with a permit granted under the Endangered Species Act (“ESA”).<sup>2</sup> To comply with the law protecting the endangered tortoise, the final Ivanpah solar energy project was delayed and then scaled back by 12%.<sup>3</sup> Renewable energy projects like Ivanpah are crucial for replacing fossil fuel energy sources that will cause ecologically-destructive climate change.<sup>4</sup> On plausible assumptions, scientific models can be extended to estimate that the

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\* I thank and credit Professor Michael Livermore for the idea that motivated this Note. *See* Michael A. Livermore, *Climate Change and Endangered Species* (lecture at Duke University School of Law, Oct. 16, 2019) (presentation on file with author). I received helpful comments from many, including Professors Michael Livermore, Rebecca Rich, and Jonathan Wiener. I also thank the many people who make it possible to dedicate one’s time to writing a law review article. All errors are my own.

1. Katherine Tweed, *World’s Largest Solar Thermal Plant Syncs to the Grid*, IEEE SPECTRUM (Sept. 26, 2013, 3:06 PM),

<https://spectrum.ieee.org/energywise/energy/renewables/worlds-largest-solar-thermal-plant-syncs-to-the-grid>. Solar thermal plants use mirrors or lenses to concentrate sunlight and convert it into electricity. Ivanpah remains the second largest such facility; in 2018 it was eclipsed by the Noor/Ouarzazate Solar Power Station in Morocco.

2. The Ivanpah solar facility was granted an Incidental Take Permit (ITP) under the ESA for up to thirty-eight tortoises. *See infra* Section II for a discussion of ITPs. After an environmental review of the project, the Fish and Wildlife Service found this was likely an underestimate, with about eighty tortoises likely to be affected. CTR. FOR BIOLOGICAL DIVERSITY, QUESTIONS AND ANSWERS RELATED TO THE SETTLEMENT AGREEMENT BETWEEN THE CTR. FOR BIOLOGICAL DIVERSITY AND BRIGHTSOURCE ENERGY, INC. REGARDING THE IVANPAH SOLAR ELECTRIC GENERATING SYSTEM PROJECT IN THE MOJAVE DESERT 3 (2011).

3. Todd Woody, *BrightSource Alters Solar Plant Plan to Address Concerns Over Desert Tortoise*, N.Y. TIMES GREEN BLOG (Feb. 2, 2011, 12:20 PM), <https://green.blogs.nytimes.com/2010/02/11/brightsource-alters-solar-plant-plan-to-address-concerns-over-desert-tortoise/>.

4. *See generally infra* Section I.

delays and downsizing of the Ivanpah solar energy project to protect the desert tortoise will cause the extinction of more than 350 species due to environmental destruction from climate change.<sup>5</sup> It is hard to imagine any other animal capable of killing so many species.<sup>6</sup>

Of course, the real culprits here are not the tortoises but climate change and its contributors—us. It is widely accepted that the United States, along with the rest of the world, must shift away from fossil fuel energy sources to prevent or mitigate considerable global harms from greenhouse-gas-caused climate change.<sup>7</sup> The Biden administration is pushing for the U.S. to become carbon-neutral by 2035<sup>8</sup> and this shift will require the rapid development of renewable, low-carbon energy sources.<sup>9</sup> However, such projects must be built and operated in compliance with the well-intentioned ESA, which prohibits harming listed species.<sup>10</sup> The ESA helpfully prevents the wanton destruction of endangered species, but it also poses barriers to renewable energy projects that would help keep species from becoming endangered and going extinct due to climate change.

Discussion of the ESA and renewable energy projects reveals a so-called “green clash” between two environmentally-friendly objectives:

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5. Under the original 440 megawatt (MW) solar facility plan the three-month delay represents a 110 MW loss; further, the cutback to a 392 MW facility returns 48 MW less for each year of the facility’s anticipated 50-year lifespan. Woody, *supra* note 3. Using well-regarded methods, climate science can estimate that every additional 7 MW coal installed to meet those energy demands can be expected to result in the extinction of a species due to climate change. *See infra* Section I. Estimating Renewable Energy’s Species-Preserving Effect.  $(110 \text{ MW} + 48 \text{ MW} * 50 \text{ years}) / 7 \text{ MW per species extinct} = 358.57 \text{ species extinct}$ .

6. Contending with the tortoise for Most Dangerous Animal is the domestic cat, which kills more than 12 billion birds, reptiles, and rodents a year. Scott Loss et al., *The Impact of Free-Ranging Domestic Cats on Wildlife of the United States*, 4 NATURE COMM. 1396 (2013), <https://doi.org/10.1038/ncomms2380>. Even with these numbers, the cat is known to have contributed to the extinction of only 33 species, about seven percent of what we can expect the tortoise to have caused in the Ivanpah incident alone. *See* Nogales et al., *Feral Cats and Biodiversity Conservation: The Urgent Prioritization of Island Management*, 63 BIOSCIENCE 804, 805 (2013) (detailing cat-related extinctions).

7. *See generally infra* Section I.

8. WHITE HOUSE, FACT SHEET: PRESIDENT BIDEN SETS 2030 GREENHOUSE GAS POLLUTION REDUCTION TARGET AIMED AT CREATING GOOD-PAYING UNION JOBS AND SECURING U.S. LEADERSHIP ON CLEAN ENERGY TECHNOLOGIES (2021), <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/>.

9. *U.S. Can Cut Greenhouse Gas Emissions 80 Percent by 2050, Study Says*, YALE ENV’T 360 (Nov. 21, 2014), [https://e360.yale.edu/digest/us\\_can\\_cut\\_greenhouse\\_gas\\_emissions\\_80\\_percent\\_by\\_2050\\_study\\_says](https://e360.yale.edu/digest/us_can_cut_greenhouse_gas_emissions_80_percent_by_2050_study_says).

10. Endangered Species Act, 16 U.S.C. § 1531 et seq. (2018).

protecting endangered species and protecting the world from climate change.<sup>11</sup> The exact reason the clash is “green,” however, is usually assumed or only vaguely described, resulting in a mismatch of “green” goals. The ESA is “green” because it aims to protect endangered species.<sup>12</sup> Renewable energy is “green” because it helps protect the world from climate change, and most legal scholars fixate on the harms of climate change to humanity, not animals.<sup>13</sup> Therefore the clash between the ESA and renewable energy is typically assumed to involve a tradeoff between human and animal interests, and the ESA almost never permits the sacrifice of endangered species for humanity’s sake.<sup>14</sup> But climate change threatens all of us, including animal species.<sup>15</sup> To move beyond the vaguely “green” ethos of renewable energy, both the ESA and renewable energy should be framed in terms of species preservation—a “species clash.” This framing makes renewable energy and species conservation commensurable and is therefore the most promising route to facilitating ESA compliance using “green” justifications.<sup>16</sup> But it can also be normatively disorienting for environmentalists who must now choose between two outcomes that will each result in the loss of something they value.<sup>17</sup>

This paper makes empirical, legal, and normative arguments. The empirical claim, made in Section I for the first time with detail in legal literature, is that renewable energy projects have a “species-preserving effect”—projects that harm some members of endangered species in the short term will nevertheless save many more entire species from future extinction driven by climate change.<sup>18</sup> The legal argument, made

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11. See Blair Warner, *Overhauling ESA Private Land Provisions in Light of the Renewable Energy Boom on Federal Public Lands*, 89 NOTRE DAME L. REV. 1875, 1884 (2014) (describing the competing policy goals of endangered species protection and renewable energy development as a “green clash”).

12. See *infra* Section Giving Renewable Energy a Pass Through the ESA (describing the ESA’s purpose).

13. See, e.g., Daniel Bertsch, *When Good Intentions Collide: Seeking a Solution to Disputes Between Alternative Energy Development and the Endangered Species Act*, 14 SUSTAINABLE DEV. L.J. 74 (2011) (arguing that renewable energy is good for a variety of reasons, including fighting climate change, but not mentioning the benefits to animal species from such efforts).

14. See *generally infra* Section II.

15. See *generally infra* Section I.

16. See *generally infra* Section III.

17. See *generally infra* Section IV.

18. Legal scholars have not attempted this task in detail. See, e.g., Kalyani Robbins, *The Biodiversity Paradigm Shift: Adapting the Endangered Species Act to Climate Change*, 27 FORDHAM ENV’T REV. 57, 63–73 (2015) (discussing various mechanisms of ecological destruction via climate change, but not attempting to quantify them in terms of the relative costs and benefits of renewable energy projects); J.B. Ruhl, *Harmonizing Commercial Wind Power and the*

in Sections II and III, is that the ESA currently acts as a substantial barrier to beneficial renewable energy development (Section II), but there is room under the statute to lessen that barrier in ways that do not simultaneously apply to oil, gas, and coal projects that produce more GHGs than they save (Section III).<sup>19</sup> The normative argument, made in Section IV and relatively unexplored in the literature, is that it is preferable to save as many species as possible from climate change-driven extinctions, even where it requires knowingly interfering with an endangered species today.<sup>20</sup>

In whole, this paper aims to provide resources for analyzing the tension between renewable energy and endangered species. “Species clash” is an example of a risk-risk tradeoff.<sup>21</sup> Policymakers tend to focus on singular target risks<sup>22</sup>—for example, the ESA agencies tend to focus on the present risk to listed species. But the real world is multi-risk, so reducing a target risk may incur countervailing risks or yield co-benefits.<sup>23</sup> Policymakers should confront the multiple risks and potential tradeoffs, weigh them, and select the policy option that will reduce overall risk.<sup>24</sup> Acting under the ESA to reduce the target risk of

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*Endangered Species Act Through Administrative Reform*, 65 VAND. L. REV. 1769, 1789 (2012) (assuming for the sake of argument that the overall species-preserving effect of renewable energy, which he calls the “wind power effect,” is positive but suggesting it is impossible to conclusively support this claim).

19. Note that my claim is just that species-saving projects can bypass some hurdles set by the ESA—not that the ESA can be used proactively as a general ecosystem management statute. For criticism of the broader approach, see Ruhl, *supra* note 18, at 1792 (arguing that the ESA has an “emergency room” posture that makes it inappropriate for general ecosystem management).

20. The normative dimension of a species clash is largely neglected in ESA scholarship. Four authors mention the issue, each arriving at different conclusions. See Ruhl, *supra* note 18, at 1793 (suggesting that neither the ESA nor the ethics of intergenerational policy choices are well-equipped for handling a species clash); John Nagle, *Green Harms of Green Projects*, 27 NOTRE DAME J.L. ETHICS & PUB. POL’Y 59, 88–92 (2013) (suggesting that a pass for renewables under the ESA would be bad for policy reasons); Robbins, *supra* note 18, at 103 (2015) (suggesting that we must be willing consider species trade-offs as a result of anthropogenic changes in the environment); Gregg Badichuk, *Resolving Conflicts Between Endangered Species Conservation and Renewable Energy Siting: Wiggle Room for Renewables?*, 14 CONSILIENCE 1, 2 (2016) (explicitly assuming without argument that we should be willing to sacrifice some species for the sake of many). Other authors who discuss the ESA and species clash focus on human interests. See, e.g., Rachael Salcido, *Rationing Environmental Law in a Time of Climate Change*, 46 LOY. U. CHI. L.J. 617, 643–44 (2015) (arguing the need for human survival makes it necessary to sacrifice endangered species for renewable energy development).

21. See JOHN D. GRAHAM AND JONATHAN B. WIENER, *RISK VERSUS RISK: TRADEOFFS IN PROTECTING HEALTH AND THE ENVIRONMENT* (1995) (discussing risk-risk tradeoffs in detail).

22. *Id.*

23. *Id.*

24. *Id.* See also Jonathan B. Wiener, *Learning to Manage the Multirisk World*, 40 RISK ANALYSIS 2137 (2020) (offering guidance on moving from single to multiple risks in analysis,

one species loss due to renewable energy projects may incur the countervailing risk of future species loss due to the added climate change from forestalling the renewable projects and extending the use of fossil fuels.<sup>25</sup> Environmental policymakers have a responsibility to carefully consider *all* of an action's foreseeable consequences, not just the ones that are most obvious or intuitive.

Beyond the details, the broader point is that the effects of climate change are so magnitudinous that the benefits of mitigation efforts will often exceed the costs, even where those costs are immediate or otherwise bear on our consciences. The two spiritual goals of this paper are therefore to motivate efforts to effectively fight climate change and develop a more sensible and less self-defeating approach to conservation policy.

### I. ESTIMATING RENEWABLE ENERGY'S SPECIES-PRESERVING EFFECT

Greenhouse gas ("GHG") emissions are the principal source of anthropogenic climate change.<sup>26</sup> Fossil fuel combustion for energy is responsible for 75% of total anthropogenic U.S. GHG emissions,<sup>27</sup> so the most promising route to fighting climate change is the development of renewable energy.<sup>28</sup> Unfortunately, utility-scale renewable energy facilities can harm endangered species and adversely modify their habitats.<sup>29</sup> This section considers the factual clash between renewable energy and endangered species, concluding that the effect of renewable energy on non-human species is overwhelmingly positive, even considering the incidental harms to species from renewable energy project development.

There are unfortunate, but well-understood, conflicts between renewable energy development and endangered species. Together, renewable energy makes up about 20% of energy generated in the

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management, impacts, and decisions).

25. See *infra* Section I.

26. *Sources of Greenhouse Gas Emissions*, ENV'T PROTECTION AGENCY, <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions> (last updated Sept. 13, 2019).

27. *Energy and the Environment Explained*, U.S. ENERGY INFO. ADMIN., <https://www.eia.gov/energyexplained/energy-and-the-environment/where-greenhouse-gases-come-from.php> (last visited Jan. 16, 2021).

28. *Id.*

29. For a discussion of the impacts of distributed energy rather than utility-scale facilities, see generally J.B. Ruhl, *Harmonizing Distributed Energy and the Endangered Species Act*, 4 SAN DIEGO J. CLIMATE & ENERGY L. 121 (2013).

United States.<sup>30</sup> Hydropower dams, the oldest and most heavily used source of renewable energy, represent about 20% of the world's total power generation<sup>31</sup> and approximately 7% of that in the United States.<sup>32</sup> Unfortunately, endangered fish and marine mammals have no way to migrate around dams and are frequently killed in the turbines.<sup>33</sup> Mitigation efforts have proven ineffective;<sup>34</sup> still, there is an urgent need to expand hydropower capacity.<sup>35</sup> For solar power, deserts are the sunniest, best places for facilities but are also sensitive ecosystems.<sup>36</sup> Solar power facility construction and operation risk the lives of endangered species like tortoises and interfere with their habitats.<sup>37</sup> Meanwhile, the Fish and Wildlife Service (“FWS”) estimates that wind turbines kill 440,000 birds annually,<sup>38</sup> including a number of endangered bats.<sup>39</sup> Unfortunately, the best areas for wind farms also tend to be the areas in which birds fly—as one FWS official pointed out, “basically you can overlay the strongest, best areas for wind turbine development with the [endangered] whooping crane migrations corridor.”<sup>40</sup>

Despite its vices, renewable energy has the crucial virtue of reducing deadly GHG emissions in contrast to oil, gas, and coal. GHG-

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30. *What is U.S. Electricity Generation by Energy Source?*, U.S. ENERGY INFO. ADMIN., <https://www.eia.gov/tools/faqs/faq.php?id=427&t=3> (last updated Mar. 5, 2021).

31. Anne-Marie Corley, *The Future of Hydropower*, IEEE SPECTRUM (June 1, 2010, 5:07 PM), <http://spectrum.ieee.org/energy/renewables/future-of-hydropower>.

32. *Hydropower Explained*, U.S. ENERGY INFO. ADMIN., [http://www.eia.gov/energy\\_in\\_brief/article/hydropower.cfm](http://www.eia.gov/energy_in_brief/article/hydropower.cfm) (last updated Mar. 30, 2020).

33. Kalyani Robbins, *Responsible, Renewable, and Redesigned: How the Renewable Energy Movement Can Make Peace with the Endangered Species Act*, 15 MINN. J.L. SCI. & TECH. 555, 565 (2014).

34. *Id.*

35. INTERNATIONAL HYDROPOWER ASSOCIATION, 2020 HYDROPOWER STATUS REPORT 12 (2020) (noting that, in order to limit global temperature rise, “global hydropower capacity would need to increase by 25 percent by 2030, and by 60 percent by 2050”).

36. See Matthew Mason, *Deserts as Ecosystems*, ENVIRONMENTALSCIENCE.ORG, <https://www.environmentalscience.org/deserts-ecosystems> (last visited Jan. 16, 2021) (reviewing the usefulness of deserts for understanding climate change because of their sensitivity).

37. See *infra* Section II (discussing the Ivanpah facility and the desert tortoise).

38. BUREAU OF LAND MGMT., FINAL PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT ON WIND ENERGY DEVELOPMENT ON BLM-ADMINISTERED LANDS IN THE WESTERN UNITED STATES 59–60 (2005).

39. U.S. FISH & WILDLIFE SERV., INDIANA BAT (MYOTIS SODALIS), ENDANGERED SPECIES, <http://www.fws.gov/midwest/endangered/mammals/inba/inbafctsht.html> (last updated Aug. 5, 2019); Brian Handwerk, *Wind Turbines Give Bats the “Bends,” Study Finds*, NAT'L GEOGRAPHIC NEWS (Aug. 25, 2008), <http://news.nationalgeographic.com/news/2008/08/080825-batbends.html>.

40. ROBERT RIGHTER, WINDFALL: WIND ENERGY IN AMERICA TODAY 108 (2011) (quoting Tohm Stehn, FWS whooping crane coordinator).

caused climate change is the single greatest cause of species extinctions—it causes oceans to deoxygenate<sup>41</sup> and acidify,<sup>42</sup> ice to melt,<sup>43</sup> seasons to change,<sup>44</sup> and a variety of other cascading effects that displace, disrupt, and threaten ecosystems.<sup>45</sup> Already, one species of mammal is known to have been driven extinct due to climate change,<sup>46</sup> and many more extinctions loom imminently.<sup>47</sup> Further, extinctions will dramatically accelerate as ecosystems lose crucial links that preserve longstanding, delicate balances.<sup>48</sup> Because renewable energy must expand dramatically in order to combat this trend,<sup>49</sup> and because it has both positive and negative effects, renewable energy's benefits and costs to species should be compared.

One scholar suggests that it is impossible to conclusively determine whether renewable energy helps or hurts species.<sup>50</sup>

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41. Craig Welch, *Oceans Are Losing Oxygen-and Becoming More Hostile to Life*, NAT'L GEOGRAPHIC (Mar. 13, 2015), <http://news.nationalgeographic.com/2015/03/150313-oceans-marine-life-climatechange-acidification-oxygen-fish/>.

42. Cheryl Logan, *A Review of Ocean Acidification and America's Response*, 60 BIOSCIENCE 819 (2010).

43. U.S. CLIMATE CHANGE SCI. PROGRAM, SYNTHESIS & ASSESSMENT PRODUCT 4.2: THRESHOLDS OF CLIMATE CHANGE IN ECOSYSTEMS 2 (2009).

44. U.S. GLOBAL CHANGE RESEARCH PROGRAM, GLOBAL CLIMATE CHANGE IMPACTS IN THE UNITED STATES 80 (Thomas Karl et al. eds., 2009).

45. See, e.g., Hinzman et al., *Evidence and Implications of Recent Climate Change in Northern Alaska and Other Arctic Regions*, 72 CLIMATIC CHANGE 251, 251 (2005).

46. The Bramble Cay melomys, a rodent that lived on a Great Barrier Reef island, was declared extinct in 2016 due to rising sea levels. *Barrier Reef Rodent is First Mammal Declared Extinct due to Climate Change*, UNIV. OF QUEENSL. NEWS (June 14, 2016), <https://www.uq.edu.au/news/article/2016/06/barrier-reef-rodent-first-mammal-declared-extinct-due-climate-change>.

47. See Ed Yong, *The Bleak Future of Australian Wildlife*, THE ATLANTIC (Jan. 14, 2020), <https://www.theatlantic.com/science/archive/2020/01/australias-fires-have-been-devastating-for-wildlife/604837/> (describing numerous species on the brink of extinction due to climate change); John McLaughlin et al., *Climate Change Hastens Population Extinctions*, 99 PROC. NAT'L ACAD. SCI. U.S. 6070 (2002) (examining losses in two butterfly species and predicting extinctions driven by climate change).

48. Gerardo Ceballos et al., *Vertebrates on the Brink as Indicators of Biological Annihilation and the Sixth Mass Extinction*, 117 PROC. NAT'L ACAD. SCI. U.S. 13596, 13596 (2020) (“[S]pecies are links in ecosystems, and, as they fall out, the species they interact with are likely to go also.”).

49. Simon Evans, *'Exceptional new normal': IEA raises growth forecast for wind and solar by another 25%*, CARBONBRIEF (May 11, 2021), <https://www.carbonbrief.org/exceptional-new-normal-iea-raises-growth-forecast-for-wind-and-solar-by-another-25>.

50. See J.B. Ruhl, *supra* note 18, at 1789 (“First, it would be necessary for the FWS to quantify the impact of installed [renewable] power capacity on climate change. . . . Second, it would be necessary for the FWS to be able to evaluate the impacts of [reducing climate change] on wildlife and habitat in general. . . . [a]nd from there, it would be necessary for the FWS to be able to conclude that the net impact [] on species balanced against the overall harms to species posed by [renewable] power infrastructure comes out on the positive side for species overall. . . . [It would be] preposterous [] to suggest that under current climate and species modeling capacity

However, some back-of-the-napkin math drawn from climate models reveals that the benefits dramatically exceed the costs. While it is impossible to be exact, we can use a number of simplifying assumptions to get a very rough—but illustrative—estimate of what I call the “species-preserving effect” of renewable energy. Confidence in the particular numbers should be low because large-scale projections into the future involve a tremendous amount of uncertainty, but using the best data available at present produces such striking findings that we can be confident that the overall species-preserving effect of renewable energy is overwhelmingly positive.

To start, we can estimate the number of species that will go extinct due to climate change in various scenarios. One authoritative study found that, for currently-predicted climate-warming scenarios for 2050, 15–37% of species will be “committed to extinction.”<sup>51</sup> This figure is based on the carbon dioxide already released into the atmosphere as well as low, medium, and high-range estimates of carbon projected to be released. Once carbon is released, it is virtually impossible to remove it from the atmosphere—its future effect on global warming is locked in.<sup>52</sup> Since species will be driven extinct by rising temperatures and the corresponding ecological changes, we can use this data to predict about how many species will inevitably be killed due to carbon emitted up to 2050.<sup>53</sup> Because there are approximately 8.7 million species on Earth,<sup>54</sup> we can estimate that even low-end warming scenarios will result in approximately 1.3 million species extinctions.<sup>55</sup>

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the FWS or any other entity could conclusively support such a finding[.]”).

51. Thomas et al., *Extinction Risk from Climate Change*, 427 NATURE 145, 145 (2004). I describe this study as “authoritative” because it has nineteen expert authors, is widely cited with approval, and is published in the world’s most respected scientific journal. See Clarivate Analytics, “Nature,” 2018 Journal Impact Factor, J. CITATION REPS. (2020) (noting that Nature was the world’s most cited scientific journal in 2018 and has an impact rating ranking above the 99th percentile for all academic journals). The study has also been able to withstand various criticisms. See Thomas et al., *Uncertainty in Predictions of Extinction Risk/Effects of Changes in Climate and Land Use/Climate Change and Extinction Risk (reply)*, 430 NATURE 34, 35 (2004) (concluding that further investigation “is unlikely to result in substantially reduced estimates of extinction”).

52. This figure incorporates the most likely mitigation efforts in its overall calculation, lending further support to the idea of the carbon as being locked in. *Id.*

53. It is worth noting that many of the extinctions will not occur until after 2050—to say that species will be “committed to extinction” is to say that the carbon emissions up to 2050 will set into motion a chain of events that will inevitably cause these extinctions. *UN Report: Nature’s Dangerous Decline ‘Unprecedented’; Species Extinction Rates ‘Accelerating,’* UNITED NATIONS (May 6, 2019), <https://www.un.org/sustainabledevelopment/blog/2019/05/nature-decline-unprecedented-report/>.

54. Mora et al., *How Many Species Are There on Earth and in the Ocean?*, 9 PLOS BIOLOGY 1, 2 (2011).

55. 8.7 million species \* 15% extinct = 1.305 million species extinctions. This result is not far

From these numbers, we can roughly calculate the impact of each unit of energy produced by fossil fuels instead of renewable energy. The low-end climate scenario used in the above calculations used a maximum mean increase in global temperature of 1.7°C. Since a 1.7°C increase in temperature amounts to about 1.3 million extinctions, we will see on the margin approximately one species extinction for every .0000013°C increase in global temperature. The EPA estimates that for every 1,500 megawatts (“MW”) of electric generating units (“EGU”) from a typical coal-fired power plant, we can expect a .00028°C global temperature increase.<sup>56</sup> Thus, for every 1,500 MW of EGU using coal, we can expect about 215 species extinctions in the future.<sup>57</sup> If that is true, then approximately every 7 MW of coal installed to meet energy demands can be expected to cause, over its lifetime and on the margin, one species extinction.<sup>58</sup>

This result is itself revealing—the operation of a typical coal plant over its lifetime commits hundreds of species to extinction.<sup>59</sup> Turning back to renewable energy, the analysis up to now suggests that every 7 MW of energy that could have been provided by renewable energy but is instead provided by coal amounts to one species extinction in the future due to climate change. For perspective, the U.S.’s three main sources of renewable energy currently produce megawatts exceeding 39,400 times 7.<sup>60</sup> In other words, assuming renewable energy displaces

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from the UN’s own prediction that human activity is conservatively projected to cause over one million species extinctions. *See* INTERGOVERNMENTAL SCIENCE-POLICY PLATFORM ON BIODIVERSITY & ECOSYSTEM SERVICES, GLOBAL ASSESSMENT REPORT SUMMARY FOR POLICYMAKERS 11–12 (2019).

56. Letter from Robert Meyers, Principal Deputy Assistant Adm’r, Office of Air & Radiation, EPA, to H. Dale Hall, Dir., U.S. Fish and Wildlife Serv., and James Lecky, Dir. of Protected Res., Nat’l Marine Fisheries Serv., on “Endangered Species Act and GHG Emitting Activities” 5–6 (Oct. 3, 2008). The EPA’s estimate was calculated using emissions numbers that were 20 percent greater than those from their considered model facility. *Id.* n.4 Accordingly, I have adjusted their reported maximum global mean temperature increase (.00035°C) downward by 20 percent.

57.  $.00028^{\circ}\text{C} / .0000013^{\circ}\text{C} =$  approximately 215.

58.  $1,500 \text{ MW} / 215 \text{ species extinctions} = 6.97 \text{ MW per species extinction.}$

59. This finding is in contrast to the EPA’s own opinion that a .00022°C–.00035°C increase in temperature would be “extremely small” and therefore unlikely to impact any species. *See supra* note 56 at 8 (“Given the very small global mean climate change magnitudes projected based on the emissions of [a singular coal plant], we believe the outputs of such single-source impact analysis for other species in other locations would also be of an extremely small magnitude that is too small to physically measure or detect.”).

60. *See* INT’L ENERGY AGENCY, 2015 KEY WORLD ENERGY STATISTICS 19 (2016) (reporting that the U.S. has a hydropower installed capacity of 102,000 MW); American Wind Energy Association, *Wind Facts at a Glance*, <https://www.awea.org/wind-101/basics-of-wind-energy/wind-facts-at-a-glance> (last visited Jan. 16, 2021) (reporting that the U.S. has a wind

coal usage,<sup>61</sup> the operation of renewable facilities in the U.S. currently prevents the future extinction of about 39,400 species<sup>62</sup>—and there is room to grow dramatically.<sup>63</sup> Meanwhile, the ESA lists (protects) 2,216 endangered and threatened plant and animal species globally, and only 58 species have ever been delisted due to recovery.<sup>64</sup> The difference in magnitude is illustrative—the entire ESA *applies* to fewer species than we can expect a single large hydroelectric station to *actually save* from extinction.<sup>65</sup>

Some clarifications about these data are important. This approach has involved extrapolating a linear model based on available data and assuming marginal effects along the curve.<sup>66</sup> Such a model does not tell

operating capacity of 111,808 MW); OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, SOLAR ENERGY IN THE UNITED STATES, <https://www.energy.gov/eere/solarpoweringamerica/solar-energy-united-states> (last visited May 1, 2020) (reporting that the U.S. has a solar operating capacity of 62,500 MW).  $(102,000 \text{ MW} + 111,808 \text{ MW} + 62,500 \text{ MW}) / 7 = 39,472$ .

61. The actual mechanisms of fossil fuel displacement are influenced by structural, institutional, and behavioral factors. Richard York, *Do alternative energy sources displace fossil fuels?* 2 NATURE CLIMATE CHANGE 441, 441 (2012); Andrew Jorgenson, *Analysing fossil-fuel displacement*, 2 NATURE CLIMATE CHANGE 398, 398 (2012). I assume barriers to displacement can be overcome with sufficient public will. My analysis revolves around coal because not only is it among the most polluting fuels and therefore a priority for phasing out as alternative energy expands, but it also appears to be the most prone to displacement. See Jackson et al., *Global energy growth is outpacing decarbonization*, 13 ENVTL. RES. LETTERS 120401, 3 (2018) (noting the elasticity of coal use).

62. This assumes for simplicity that these renewable energy sources have about zero additional carbon costs that are not shared by fossil fuel energy sources. It is uncertain whether there may be hidden and unique sources of GHGs in renewable energy sources, but if there are, they appear to be relatively negligible. See generally *supra* note 56 (comparing energy sources and carbon emissions).

63. See INT'L RENEWABLE ENERGY AGENCY, RENEWABLE ENERGY PROSPECTS: UNITED STATES OF AMERICA, REMAP 2030 ANALYSIS 1 (2015) (noting that the U.S.'s renewable energy share in total final energy consumption could cost-efficiently be scaled up from 7.5% to 27% by 2030 with current technologies).

64. U.S. FISH & WILDLIFE SERV., DELISTED SPECIES, <https://ecos.fws.gov/ecp/report/species-delisted> (last visited May 1, 2020).

65. The hydroelectric dam I have in mind for this comparison is the Three Gorges Dam. The largest hydroelectric facility in the world, it has an installed capacity of 22,500 MW which is more than 3,200 times 7—though its actual energy output on any given day may be lower. See generally UNITED STATES GEOLOGICAL SURVEY, THREE GORGES DAM: THE WORLD'S LARGEST HYDROELECTRIC PLANT, [https://www.usgs.gov/special-topic/water-science-school/science/three-gorges-dam-worlds-largest-hydroelectric-plant?qt-science\\_center\\_objects=0#qt-science\\_center\\_objects](https://www.usgs.gov/special-topic/water-science-school/science/three-gorges-dam-worlds-largest-hydroelectric-plant?qt-science_center_objects=0#qt-science_center_objects) (last visited Jan. 16, 2021). Of course, while not all facilities can produce nearly as much power as the Three Gorges Dam, the comparison is still illustrative; in any case, larger, more productive facilities may yet be developed with improving technologies and strengthened public will.

66. For further insight into the capabilities of these kinds of models, see Yi Yang, *Two sides of the same coin: consequential life cycle assessment based on the attributional framework*, 127 J. OF CLEANER PRODUCTION 274 (2016) (identifying

us where the trigger points actually lie—in other words, we cannot be sure that any particular 7 MW of coal will *actually* cause a species to go extinct. In reality there are likely some discontinuities along the curve of the model's line.<sup>67</sup> Similarly, given that there are a very large number of species spread around the world, we cannot tell which would be the next ones to be committed to extinction for any particular temperature increase. This is why even minuscule temperature changes will be responsible for extinctions—we are talking about the marginal effects of changes in cumulative global emissions. For example, perhaps there is a species that retreats up mountaintops to get away from warmer weather; eventually they will hit the top where there is nowhere else to go and then even a tiny change will wipe some out. Elsewhere and at a different temperature point perhaps a river will dry up just a bit too much or a tidal pool ecosystem will finally succumb to gradual erosion. The causes of extinction may be difficult to ascertain directly, even among observed species.<sup>68</sup> In fact, most extinctions will go totally unobserved by humanity.<sup>69</sup> Still, extinctions are just as bad whether they occur where we can see them or in nature's many deep recesses.<sup>70</sup>

In sum, based on current models representing the best science available, the impacts of climate change will cause historic levels of species extinctions. While efforts to quantify these losses in terms of individual energy facilities are imprecise and use some simplifying assumptions,<sup>71</sup> they show that extinctions driven by climate change will

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67. It appears that most extinctions will be clustered near the top of the curve, since the rate of extinction will accelerate as more ecosystems begin to collapse. Earlier renewable energy projects may therefore have the most positive impact. *See generally* Ceballos, *supra* note 48.

68. *See, e.g.,* Barry Sinervo et al., *Erosion of Lizard Diversity by Climate Change and Altered Thermal Niches*, 328 *SCIENCE* 894 (2010) (demonstrating that extinctions of lizards are at odds with direct observations but well-explained by data revealing drops in genetic diversity due to climate change).

69. Extinctions will go unobserved whenever they occur among the millions of undiscovered species. *See* Tracy Watson, *86 Percent of Earth's Species Still Unknown?*, *NAT'L GEOGRAPHIC NEWS* (Aug. 25, 2011), <https://www.nationalgeographic.com/science/article/110824-earths-species-8-7-million-biology-planet-animals-science> (discussing undiscovered species).

70. In fact, the extinction of rare, difficult-to-see species may be particularly pernicious. Laura Dee et al., *When Do Ecosystem Services Depend on Rare Species?*, 34 *TRENDS IN ECOSYSTEM & ECOLOGY* 746 (2019).

71. My approach has been to accept the EPA's own estimates about temperature changes from a representative coal plant. A more thorough empirical analysis, perhaps for use in litigation, could start with the transient climate response to cumulative emissions. *See generally* Damon Matthews et al., *Focus on Cumulative Emissions, Global Carbon Budgets and the Implications for Climate Mitigation Targets*, 13 *ENV'L RESEARCH LETTERS* 1 (2018). Then the analysis could turn to evaluating various representative fossil fuel and renewable facilities to determine a range of likely impacts to global temperatures, sensitive to lifetime operation expectancies. Finally, the analysis could more closely track species extinctions due to climate change for each marginal

vastly outnumber species saved by the ESA, leading to a species clash. When the ESA causes renewable energy facilities to be delayed, downscaled, or outright prevented to help protect a species, the result is the inevitable destruction of many more species. Does the ESA really force such apparently self-defeating results? If it does, should it? The rest of this paper explores the legal and normative dimensions of a species clash under the ESA.

## *II. THE ENDANGERED SPECIES ACT AND RENEWABLE ENERGY*

This Section describes the ESA, explains the scope of its restrictions, details the impact on renewable energy projects, notes possible exemptions, and describes caselaw that reveals an intractable priority given to endangered species over most human interests.

The ESA, signed into law by President Nixon in 1973, imposes two major restrictions—there may be no private or public takes of endangered or threatened species, and federal agencies must consult the FWS or NMFS to determine whether an action might jeopardize a listed species or adversely modify their critical habitats.<sup>72</sup> While these restrictions often overlap, the two sections codifying them involved different processes and exemptions, visualized in Figure 1.

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increase in various regional surface and ocean temperatures.

72. 16 U.S.C. § 1531 et seq. (2018).

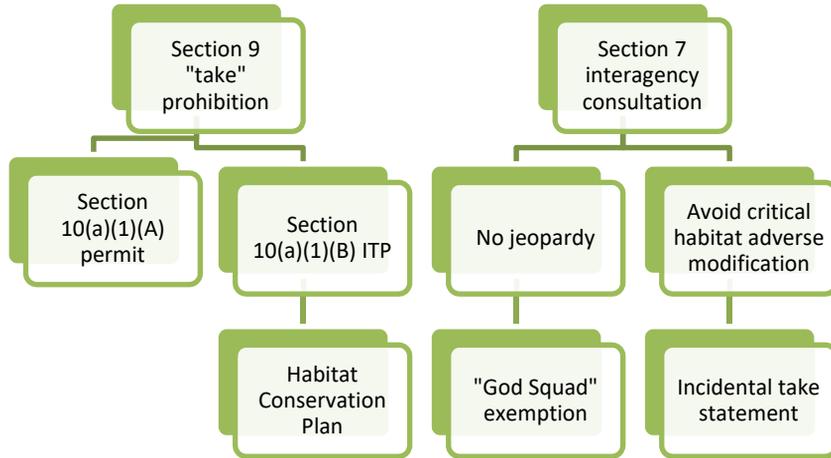


Figure 1.

### A. Section 9 “Take” Prohibition

Section 9 prohibits public and private actors alike from “taking” species listed as endangered or threatened by the FWS or NMFS.<sup>73</sup> To “take” is defined in the statute as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect[.]”<sup>74</sup> Agency regulation, upheld by the Supreme Court, has interpreted “harm” broadly to include indirect damage to species through significant environmental degradation.<sup>75</sup> Habitat destruction that could drive endangered species to extinction constitutes “harm” and therefore “taking” under the ESA.<sup>76</sup>

Section 9 has no *de minimis* exception—a take of even one individual of a listed species is illegal.<sup>77</sup> Instead, the ESA contemplates a number of possible exemptions. Section 10(a)(1)(A) gives the FWS

73. *Id.* § 1358.

74. *Id.* § 1532.

75. *See* *Babbitt v. Sweet Home Chapter of Cmty. for a Great Ore.*, 515 U.S. 687 (1995) (interpreting the word “harm” broadly in the ESA).

76. *See* *Palila v. Hawai’i*, 852 F.2d 1106, 1108 (9th Cir. 1988) (holding that “take” was meant to be defined in the broadest possible manner, including habitat modification); *see also* *Env’t. Prot. Info. Ctr. v. Simpson Timber Co.*, 255 F.3d 1073, 1075 (9th Cir. 2001) (holding that eliminating habitat of species can constitute “taking” that species).

77. *See* *Ruhl*, *supra* note 18, at 1793 (“[T]ake is determined at the lowest scale, on the basis of impacts to individual species members, and once take is determined to be present it is illegal to carry out the action without approval through incidental take authorization.”).

discretion to permit exceptions to Section 9 restrictions “for scientific purposes or to enhance the propagation or survival of the affected species[.]” More frequently invoked is Section 10(a)(1)(B), under which a private actor may take a small and defined number of protected animals with an incidental take permit (“ITP”). Incidental take “results in, but is not the purpose of, carrying out an otherwise lawful activity.”<sup>78</sup> Applying for an ITP triggers a rigorous approval process requiring the submission of a habitat conservation plan (“HCP”), a document that outlines impacts that will likely result from the taking, what the applicant will do to minimize and mitigate such impacts, adequate funding for mitigation measures, and alternatives considered but not adopted.<sup>79</sup>

According to the FWS, “[t]he goal of an HCP is to fully offset the impacts of take, and every HCP must minimize and mitigate the impacts of take to the maximum extent practicable.”<sup>80</sup> The FWS will approve an HCP if the taking will be incidental, funding for the plan is ensured, and the taking will not appreciably reduce the likelihood of the survival and recovery of the species. Since granting an ITP is a federal action, it implicates other federal environmental laws, like the National Environmental Policy Act (“NEPA”), and may require the submission of an environmental impact statement.

Unfortunately, the HCP process and its requisite mitigation measures can be extremely costly and cause substantial delays that frustrate project development. For example, the Ivanpah solar facility referenced in this paper’s introduction was delayed, significantly downsized, and forced to pay millions of dollars towards conservation efforts in order to receive an ITP—and even then, construction was completely halted when it had encountered 49 tortoises instead of 38, the number specified in the ITP.<sup>81</sup> Litigation from conservation groups ensued.<sup>82</sup> The desert tortoise also struck back against the Calico Solar Project, which was completely cancelled after litigation asserted that it

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78. *Glossary*, U.S. FISH AND WILDLIFE SERV., <http://www.fws.gov/midwest/endangered/glossary/index.html> (last updated Apr. 14, 2015).

79. 16 U.S.C. § 1539 (2018).

80. *See generally* FISH & WILDLIFE SERV., CHAPTER 9: HCP CONSERVATION STRATEGY, HCP HANDBOOK, [https://www.fws.gov/endangered/esa-library/pdf/HCP\\_Handbook-Ch9.pdf](https://www.fws.gov/endangered/esa-library/pdf/HCP_Handbook-Ch9.pdf) (last visited May 1, 2020).

81. U.S. FISH & WILDLIFE SERV., U.S. DEP’T OF THE INTERIOR, BIOLOGICAL OPINION ON BRIGHTSOURCE ENERGY’S IVANPAH SOLAR ELECTRIC GENERATING SYSTEM PROJECT (2011).

82. *See generally* *W. Watersheds Project v. Salazar*, No. CV 11-00492, 2012 U.S. Dist. LEXIS 169097 (C.D. Cal. Nov. 5, 2012).

would destroy 4,000 acres of tortoise habitat.<sup>83</sup> The project's primary conservation strategy had been to relocate the animals, but conservation groups argued that the tortoise survival rate was too low.<sup>84</sup> The solar company was eventually driven into bankruptcy.<sup>85</sup>

### B. Section 7 Interagency Consultation Requirement

Section 7 imposes an additional requirement on federal agencies to consult with the FWS using “the best scientific and commercial data available” to ensure that they do not “jeopardize” the continued existence of listed species or “adverse[ly] modi[fy]” a species’ “critical habitat,”<sup>86</sup> defined as specific areas essential for the conservation of the species.<sup>87</sup> Beyond the “no jeopardy” requirement aimed at species survival, protection of critical habitat is designed to carve out territory necessary for species recovery and eventual delisting.<sup>88</sup>

The consultation requirement kicks in automatically for actions that could affect any listed species or critical habitat, such as renewable energy projects involving public lands occupied by an endangered species. If the action is likely to have an adverse effect, a formal consultation is required, resulting in a “biological opinion” that determines whether the action will jeopardize the species. If an adverse modification of a habitat would not jeopardize the species but still might result in incidental harm, the FWS issues an incidental take statement establishing the terms and conditions under which take may occur.

Even where a “no jeopardy” determination is issued, the Section 7 process can be burdensome enough to make projects cost prohibitive. In fact, one empirical study suggests that the consultation process disproportionately restricts renewable energy projects as compared to oil, gas, and coal projects.<sup>89</sup> Adding to the difficulty is the fact that the

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83. Complaint for Declaratory and Injunctive Relief 1, 1, Nat. Res. Def. Council v. Abbey, No. 2:2012cv02586 (C.D. Cal. Mar. 26, 2012).

84. *Id.*

85. James Montgomery, *K Road Gives Up on Calico Solar Project*, RENEWABLE ENERGY WORLD (July 1, 2013), <https://www.renewableenergyworld.com/2013/07/01/k-road-gives-up-on-calico-solar-project/>.

86. 16 U.S.C. § 1536(a)(2) (2018).

87. *Id.* § 1532(5)(a).

88. See Gifford Pinchot Task Force v. U.S. Fish & Wildlife Serv., 378 F.3d 1059, 1069–72 (9th Cir. 2004) (distinguishing the goals of survival and recovery).

89. Melinda Taylor et al., *Protecting Species or Hindering Energy Development? How the Endangered Species Act Impacts Energy Projects on Western Public Lands*, 46 ELR 10924 (“When it applies, the [Section 7] consultation process appears to go quickly and smoothly for the vast majority of oil and gas projects, for a variety of reasons. On the other hand, consultation on solar

only exemption to Section 7 requires authorization from the Endangered Species Committee, scarcely used but infamously known as the “God Squad” for its power to permit action jeopardizing the existence of a species.<sup>90</sup> The Committee may grant an exemption only if it finds, among other things, that the agency action has no reasonable or prudent alternative, has benefits that clearly outweigh the benefits of alternatives consistent with the rest of the ESA, and is of regional or national significance.<sup>91</sup> The bar for exemption is notoriously high.<sup>92</sup>

### C. Single-Minded Focus on Species’ Interests

Not long after the ESA’s passage, the Supreme Court made clear that the ESA does not weigh human interests in determining whether a violation has occurred. In *Tennessee Valley Authority v. Hill*,<sup>93</sup> the Court enjoined construction and operation of a dam that was virtually complete when an endangered species of snail darter fish was discovered in nearby waters. Despite the fact that the dam would provide electricity to at least 20,000 homes and Congress had continued to fund the dam’s construction after passing the ESA and discovering the snail darter, the Court reluctantly<sup>94</sup> held “beyond doubt that Congress intended endangered species to be afforded the highest of priorities[,] . . . whatever the cost[.]”<sup>95</sup> Without a permit or “God Squad” exemption, no amount of potential gains to humans enables bypassing the ESA—the statute simply does not comprehend arguments made in those terms.<sup>96</sup> This fierce defense of species’

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energy and wind energy projects tends to be lengthy and complicated. . . . This process has, on occasion, led to substantial delays and/or major changes to [renewable energy] project location[s] and footprint[s].”)

90. The Committee, created by amendment in 1978, has only rendered two final decisions: one exemption for Grayrocks Dam in Wyoming, designed to provide power to eight states but interfering with the whooping crane’s migration path, and one decision that was eventually overturned. *Portland Audubon Soc’y v. Endangered Species Comm.*, 984 F.2d 1534 (9th Cir. 1993).

91. 16 U.S.C § 1536(e)–(n).

92. See Jared des Rosiers, *The Exemption Process Under the Endangered Species Act: How the “God Squad” Works and Why*, 66 NOTRE DAME L. REV. 825, 858 (1991) (noting that the “God Squad” exemption process is burdensome precisely because the bar for jeopardizing species must be high to promote the ESA’s conservation efforts).

93. 437 U.S. 153 (1978).

94. See *id.* at 172 (“It may seem curious to some that the survival of a relatively small number of three-inch fish among all the countless millions of species extant would require the permanent halting of a virtually completed dam for which Congress has expended more than \$100 million. . . . We conclude, however, that the explicit provisions of the Endangered Species Act require precisely that result.”).

95. *Id.* at 174.

96. At the time *Tennessee Valley Authority* was decided, the “God Squad” exemption did

interests has led to the ESA being known as the “pit bull” of environmental laws—unyielding to the point of sometimes being overbearing.<sup>97</sup>

What is less clear is whether the ESA permits any weighing of non-human species’ interests. Currently, in almost all cases, the ESA is enforced absolutely in “green” contexts as well.<sup>98</sup> There may be room for some exceptions, however, in the case of a genuine “species clash.”<sup>99</sup> The next Section of this paper argues that the ESA can and should be interpreted to allow sacrifices of members of endangered species in order to protect and conserve many more species from going extinct from climate change.

### III. *HELPING RENEWABLE ENERGY PASS THROUGH THE ESA*

This Section considers what room there may be for renewable energy projects to leverage their species-preserving benefits to secure compliance with the ESA, whether through fast-tracking an ITP, lowering an HCP’s mitigation requirements, or modifying the “take” and “no jeopardy” prohibitions in some contexts. In other words, there may be a “species pass” under the ESA that puts a thumb on the scale in favor of renewable energy. First, this Section discusses the purpose and policy of the ESA, especially as it applies to climate change; second, it considers the ESA’s approach to harming members of endangered species in order to protect that species; finally, it considers inter-species tradeoffs. I conclude at each stage that renewable energy projects may be legally favored under the ESA.

#### A. Spirit of the Law

The ESA expresses the “policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species,”<sup>100</sup> and was enacted “to provide a means whereby the ecosystems upon which endangered species and

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not yet exist—the 1978 amendment creating the exemption was a direct response by Congress to this ruling. *See des Rosiers, supra* note 92, at 826 (“[A] subsequent United States Supreme Court decision in *TVA v. Hill* prompted Congress to add the process in 1978 and 1979 amendments to section 7 [of the ESA].”).

97. Steven Quarles, *The Pit Bull Goes to School*, ENV’T. F., Sept.–Oct. 1998, at 55.

98. *See Nagle, supra* note 20, at 98 (“[One approach] is that green harms should be prevented even at the cost of foregoing a green benefit. The [ESA] is the most prominent example of this approach.”).

99. *See infra* Section III (for further discussion of this clash).

100. 16 U.S.C. § 1531(c)(1) (2018).

threatened species depend may be conserved.”<sup>101</sup> Conservation is defined in the statute as “the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary[.]” followed by a long list of example procedures including, “in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, . . . regulated taking.”<sup>102</sup> The spirit of the statute was important enough that Congress twice explicitly provided that all federal agencies must conform their actions to these purposes.<sup>103</sup>

One scholar suggests that “the ultimate measure of success or failure of [the ESA] is whether the species that are the objects of the act’s concern face a more or less secure future.”<sup>104</sup> Because this approach would artificially impose a binary between success and failure, another scholar helpfully clarifies that “the more appropriate measure is *the number* of species whose condition has stabilized or improved as a result of ESA protection.”<sup>105</sup> This is the simplest and most compelling metric for the ESA because it gives appropriate weight to the importance of biodiversity.<sup>106</sup> Driven by testimony emphasizing “the biological problem of extinction[.]”<sup>107</sup> Congress declared that “species of fish, wildlife, and plants are of esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people[.]”<sup>108</sup> Maintaining diversity among species

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101. *Id.* § 1531(b).

102. *Id.* § 1532(3).

103. *See id.* § 1531(c)(1) (“It is further declared to be the policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act.”); *id.* § 1536(a)(1) (“All other Federal agencies shall . . . utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species[.]”).

104. Michael Bean, *Looking Back Over the First Fifteen Years*, in *BALANCING ON THE BRINK OF EXTINCTION: THE ENDANGERED SPECIES ACT AND LESSONS FOR THE FUTURE* 38 (Kathryn A. Kohm ed., 1991).

105. William Irvin, *The Endangered Species Act: Prospects for Reauthorization*, in *TRANSACTIONS OF THE FIFTY-SEVENTH NORTH AMERICAN WILDLIFE AND NATURAL RESOURCES CONFERENCE* 644 (McCabe ed., 1992) (emphasis added). Note that under this view, tradeoffs among endangered species would be not just permitted but required as a method for maximizing the number of species whose condition would improve in the face of climate change-driven pressures.

106. *See des Rosiers*, *supra* note 92, at 827–34 (detailing the direct, indirect, aesthetic, and moral benefits of biodiversity that drive the ESA).

107. Coggins, *Conserving Wildlife Resources: An Overview of the Endangered Species Act of 1973*, 51 N.D.L. REV. 315, 321 (1974) (citing the legislative record, H.R. REP. NO. 93-412, 93d Cong., 1st Sess. (1973); S. REP. NO. 93-307, 93d Cong., 1st Sess. (1973)).

108. 16 U.S.C § 1531(a)(3).

has numerous benefits, not just to humans<sup>109</sup> but also (and especially) within ecosystems—even rare species often play important roles in maintaining complex and essential functionalities.<sup>110</sup> Because the delicate interactions between species are poorly understood,<sup>111</sup> the ESA is meant to offer protection that conserves species where possible.

As discussed at length above, climate change threatens species conservation.<sup>112</sup> Unfortunately, it does not seem that the federal government in 1973 contemplated the eventual necessity of renewable energy or the dangers of climate change.<sup>113</sup> A search through the legislative history of the Act reveals no mention of climate change;<sup>114</sup> furthermore, many of the U.S.’s largest infrastructural projects had already been put into place by the time the ESA was passed.<sup>115</sup> It makes sense that the statute would largely overlook how to resolve species conflicts on such a large scale. As lawmakers began to realize the far-reaching effects of climate change, the listing provision under the ESA was broadly construed to include species that will be endangered or extinct due to climate change in the foreseeable future.<sup>116</sup> In fact, some courts have demanded that wildlife agencies consider the impacts of climate change in their ESA decision-making.<sup>117</sup> In 2019 the FWS under President Trump promulgated a regulation that appears to give government officials more leeway in dismissing the impacts of climate change on species as being outside of the “foreseeable future” for listing purposes.<sup>118</sup> Extinction from climate change is not an immediate event but a process where a species moves from healthy to threatened, to endangered, and finally to extinct. The fact that extinction is a sequential process suggests that when Congress passed the ESA it

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109. See generally TEEB, *THE ECONOMICS OF ECOSYSTEMS AND DIVERSITY* (2010); see also Damian Carrington, *What is Biodiversity and Why Does It Matter to Us?*, *THE GUARDIAN* (Mar. 12, 2018), <https://www.theguardian.com/news/2018/mar/12/what-is-biodiversity-and-why-does-it-matter-to-us>.

110. Dee et al., *supra* note 70.

111. *Id.*

112. See *supra* Section I.

113. Robbins, *supra* note 33, at 560–61 (“Climate change mitigation and adaptation were not foremost in the minds of the legislators who drafted the statute.”).

114. *Id.* at 584 n.19.

115. Ruhl, *supra* note 18, at 1774.

116. See *Alaska Oil & Gas v. Pritzker*, 840 F.3d 671 (9th Cir. 2016) (declining to invalidate an NMFS listing of the bearded seal as threatened due to climate destruction that is expected to occur in 2095).

117. See *Nat. Res. Def. Council v. Kempthorne*, 506 F. Supp. 2d 322 (E.D. Cal. 2007) (rejecting a biological opinion for failing to consider the impact of climate change on the delta smelt).

118. 84 Fed. Reg. 45020, 45021–22 (2019).

would have wanted to protect species from climate change. In any case—setting aside listing concerns—the crucial question for this paper is whether the statute permits harm to some endangered animals in order to protect other endangered animals from going extinct from climate change. The next two subsections consider this question.

### B. Permits for Takes or Mitigation Measures That Help a Species

The ESA can permit the infliction of harm to members of an endangered species in order to promote that species' survival. Section 10(a)(1)(A) gives the FWS discretion to permit exceptions to Section 9 restrictions “to enhance the propagation or survival of the affected species[.]”<sup>119</sup> For example, while the ESA normally prohibits the importation of trophies from the endangered black rhino, the FWS sometimes permits trophy imports because a limited annual Namibian-government-sponsored hunt of male rhinos improves the overall viability of the species.<sup>120</sup>

The ITP exception in Section 10(a)(1)(B) is also sometimes granted in the spirit of enhancing a species' survival. In 2002, a Sacramento company sought permission to develop a commercial resort on nearly 2,000 acres of agricultural land where members of 14 listed species resided.<sup>121</sup> As part of its HCP, the company agreed to purchase mitigation land off-site for a conservancy that would provide a habitat that is better overall for the species.<sup>122</sup> Even after accounting for the members of the species that would be killed or displaced during the commercial development, the FWS determined that the mitigation measure would promote the species' survival and therefore granted an ITP, a decision that withstood scrutiny in federal court.<sup>123</sup>

The result is notable for renewable energy. The FWS or NMFS may allow companies to interfere with individual members of a listed species if either the harm itself or the subsequent mitigation measures will ensure or promote that species' survival.<sup>124</sup> This presents an opportunity to leverage the species-preserving effect of renewable

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119. *Id.*

120. *See* FISH & WILDLIFE SERV., BLACK RHINO IMPORT PERMITS FROM NAMIBIA, <https://www.fws.gov/international/permits/black-rhino-import-permit.html> (detailing the FWS's rhino permits under the ESA) (last visited May 1, 2020).

121. *Nat'l Wildlife Fed'n v. Norton*, 306 F. Supp. 2d 920, 929 (E.D. Cal. 2004).

122. *Id.*

123. *Id.*

124. *See id.* at 926 (noting that “a habitat conservation plan need not demonstrate the survival of individual members of a covered species. Rather, the successful plan must ensure the continued viability of covered species, and the Service concluded that the [company's plan] does just that.”).

energy. If a species is threatened by climate change, then a renewable energy project that reduces GHG emissions and therefore contributes to the species' survival may be framed in terms that the ESA recognizes.

There are two upshots. First, in cases where the development of a renewable energy project interferes with a listed species that is also threatened by climate change, the FWS or NMFS may permit take either with an ITP that gives weight to the facility's reduction in GHG emissions or under Section 10(a)(1)(A), which does not require the lengthy and costly ITP application process.<sup>125</sup> Second, the FWS and NMFS may also consider offering a new mitigation measure to other projects that interfere with species threatened by climate change—investment in renewable energy. Rather than asking companies to buy mitigation land in their HCP, the FWS might consider offering “species-preservation credits” proportionate to one's contribution to renewable energy projects. The details of these regimes, e.g., whether the credits should be tradable or under what circumstances a company should be granted a 10(a)(1)(A) permit rather than an ITP, should be explored further in the future.

This is a result we should expect and hope for. The ESA's protection of a species is counterproductive if it indirectly causes that species to go extinct. The exceptions discussed in this subsection, however, only apply to tradeoffs within a species. Many other renewable energy projects may interfere with listed species that are not themselves threatened by climate change. The next subsection therefore considers the law surrounding inter-species tradeoffs to determine whether renewable energy projects may harm members of one species in order to save others from extinction.

### C. Inter-Species Tradeoffs

A handful of cases in environmental law have considered animal species interactions. Most involve managing one non-threatened

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125. It is possible that in rare cases a species may be so threatened by removals today that they will not survive long enough to reap the benefits of reduced GHGs over the coming decades. In such cases, it may also be true that the species' position is so delicate that they are unlikely to survive without significant GHG reductions. If so, then the harm resulting from adverse but GHG-reducing activities today is unfortunately moot. In any case, the most plausible result from the analysis thus far would be that agencies are permitted to use their discretion in either direction: they may permissibly allow the GHG-reducing activity that harms the species in the present, or they may seek alternative avenues to protect the species. But in the coming sections, I argue that even a harm that causes a species to go extinct is permissible and even obligatory under both law (Section III(0)) and morality (Section IV) if it prevents the extinctions of many more species.

species to protect a threatened one.<sup>126</sup> The Ninth Circuit has held that maintenance of animals (e.g., grazing sheep) in the critical habitat of endangered species constitutes a “taking” under the ESA if those animals pose a threat to endangered species by their destruction of natural habitat.<sup>127</sup> Courts even permit killing members of one species in order to protect another species. For example, the FWS kills common barred owls to reduce ecological competition for the endangered spotted owl, a practice upheld by the Ninth Circuit.<sup>128</sup> Thus, among non-endangered species, or between non-endangered species and endangered ones, tradeoffs are permitted, widely accepted, and sometimes even required.

Only one case appears to directly consider tradeoffs between two endangered species.<sup>129</sup> In the Everglades of southern Florida, the Army Corps of Engineers developed a series of levees, dams, and gates to influence the water’s level and flow.<sup>130</sup> Unfortunately, two types of endangered birds living in the area each prefer different water levels, forcing a difficult choice that will inevitably harm one or the other.<sup>131</sup> In response to an ESA challenge that the chosen water level would harm one of the endangered birds, the Eleventh Circuit deferred to the FWS’s biological opinion that the choice was a temporary measure to prioritize the more sensitive species while pursuing a plan that would eventually benefit both.<sup>132</sup> The FWS was therefore permitted to harm one endangered species to protect another without falling afoul of the ESA’s take prohibition and “no jeopardy” requirement.<sup>133</sup>

The caselaw considered in this section can be synthesized into a single broad guiding principle: minimize species’ extinctions. A narrower framing would suggest the principle that the needs of the

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126. See FISH & WILDLIFE SERV., EXPERIMENTAL REMOVAL OF BARRED OWLS TO BENEFIT THREATENED NORTHERN SPOTTED OWLS, FINAL ENVIRONMENTAL IMPACT STATEMENT 461 (2013) (“It is not uncommon to manage one species to protect another species, particularly when the species managed is common and the focus species is rare or endangered.”).

127. *Palila v. Hawaii Dep’t of Land & Natural Resources*, 639 F.2d 495, 497 (9th Cir. 1981) (“The defendants’ action in maintaining feral sheep and goats in the critical habitat is a violation of the Act since it was shown that the Palila was endangered by the activity.”).

128. See generally *Friends of Animals v. U.S. Fish & Wildlife Serv.*, 879 F.3d 1000 (9th Cir. 2018).

129. See generally *Miccosukee Tribe of Indians v. United States*, 566 F.3d 1257 (11th Cir. 2009).

130. *Id.* at 1261.

131. *Id.* at 1263.

132. *Id.* at 1271.

133. *Id.* at 1275 (noting that the incidental take statement was sent back to the FWS for revision for being too vague regarding the conditions triggering re-consultation).

most sensitive species must come before the needs of the more resilient, even where both are endangered. Renewable energy's species-preserving effect is consistent with both of these principles—harming members of some endangered species may be a necessary incidental harm to protect many other species sensitive to extinction from climate change.

A “minimize extinctions” approach to the ESA reflects our evolving understanding of ecology and the law. In 1992, the FWS, contemplating how to manage endangered species tradeoffs, directed each region “to use a multi-species, ecosystem approach to their listing responsibilities under the ESA” to be more sensitive to species interactions.<sup>134</sup> In 1995, the National Resource Council expanded on the FWS's approach and released a report detailing conservation conflicts between endangered species.<sup>135</sup> It suggested two ecological principles for evaluating such conflicts: first, “organisms are components of networks in which they interact[;]” second, “species are parts of spatial and temporal mosaics.”<sup>136</sup> The “most important” lesson is that “the resources, interactions, and constraints of endangered species can originate in the mosaic in components other than the current location of the listed entity.”<sup>137</sup> Species conservation efforts that view “each species as an entity by itself, with little or no attention to the network of interactions,” are likely to fail.<sup>138</sup> We should therefore not simply consider direct or obvious interactions between species, like those where one endangered species preys on another. We must instead broaden our approach to species conservation to incorporate systematic and potentially unobvious threats.

The development of climate change science in the 25 years since that report represents an extraordinary deepening of our knowledge of the “network of interactions” between species consistent with the FWS's multi-species, ecosystem approach. The causes and effects of climate change may occur well outside the current location or time of some species, but sensible ecological management demands consideration of such “outside” influences. Thus, when considering how to manage conservation of, e.g., the desert tortoise, the FWS must

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134. Settlement Agreement, *The Fund for Animals v. Lujan*, Civ. No. 92-800 (December 15, 1992).

135. NAT'L RESEARCH COUNCIL COMM. ON SCIENTIFIC ISSUES IN THE ENDANGERED SPECIES ACT, SCIENCE AND THE ENDANGERED SPECIES ACT CHAPTER 6, CONSERVATION CONFLICTS BETWEEN SPECIES (1995).

136. *Id.* at 111.

137. *Id.* at 112.

138. *Id.*

be sensitive to the way its decisions affect other, potentially distant (in space or in time) species, like those threatened by climate change.

The ESA has been criticized for approaching conservation in a rigid, species-centric manner that is inconsistent with a modern, network-based understanding of ecology.<sup>139</sup> However, the text of the ESA does not demand such an antiquated species-specific implementation. Its language is, at worst, ambiguous and, at best, demanding of a multi-species, ecosystem approach. The reason we see a species-centric implementation is not the statute itself but the perspectives of those responsible for its implementation.<sup>140</sup>

Professor J.B. Ruhl, the only author who has directly considered the issue of species tradeoffs under the text of the ESA, asserts that the ESA's language requires species-specific analyses.<sup>141</sup> He notes, adding emphasis to certain words, that the Section 7 consultation requirement states that agencies must determine whether an action is "likely to jeopardize the continued existence of *any* endangered species or threatened species or result in the destruction or adverse modification of [critical] habitat of *such species*."<sup>142</sup> The phrase "such species" refers to "any endangered species or threatened species," which could either mean the one species whose existence appears to be currently jeopardized by the agency's action (Professor Ruhl's interpretation) or, more simply, any endangered or threatened species (a multi-species interpretation). Under the latter interpretation, an agency action that may harm the desert tortoise (for example) demands a consultation that is not limited to considering the effect of the action on the desert tortoise but also on other endangered or threatened species. This interpretation not only benefits from textual validity by giving meaning to the phrases in question, but it also has the unique advantage of simplicity by refusing to read additional words into the phrase that would limit its scope.

Beyond textual arguments, the single-species ESA interpretation

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139. See Gary Roemer & Robert Wayne, *Conservation in Conflict: The Tale of Two Endangered Species*, 17 CONSERVATION BIOLOGY 1251 (2003) (criticizing the ESA's species-centric implementation and calling for a move from single-species management to a proactive ecosystem approach).

140. See generally TIM CLARK ET AL., ENDANGERED SPECIES RECOVERY: FINDING THE LESSONS, IMPROVING THE PROCESS (1994) (arguing that many problems with the ESA come from the perspectives of those responsible for implementing and administering it).

141. Ruhl, *supra* note 18.

142. *Id.* at 1790 n.106 (emphasis in original). The Section 9 "take" prohibition uses similar language, prohibiting the take of "any endangered [or threatened] species listed pursuant to [S]ection 4." 16 U.S.C. § 1538 (2018).

collapses when facing endangered species tradeoffs, as seen in the case of the Everglades.<sup>143</sup> If the FWS had considered lowering the water level, the single-species interpretation would only demand evaluating the impact on the endangered bird that prefers high water. What about the endangered bird that prefers the low water level? The single-species approach struggles to explain why and how the agency should consider both birds.

One might respond that in this case the ESA demands total inaction—changing the water level will harm one bird or the other, each of which would violate the law. This approach quickly becomes unworkable. Imagine a situation where a flood raises the water level to be *too* high, even for the endangered bird that typically prefers high water. Reducing the water level would be better for both species, but to different degrees—the high-water-preferring bird benefits less from each unit of water reduction compared to the low-water-preferring bird. To what level should the water be reduced? The multi-species approach readily supplies a framework for discovering an answer—reduce the water to the level that balances the needs of both species, attempting where possible to avoid jeopardizing either's extinction. The single-species approach, however, flounders. As soon as any decrease in water level harms the high-water-preferring bird—even to a miniscule degree—the FWS must stop, regardless of the potentially extraordinary countervailing benefits that would accrue to the low-water-preferring bird. In fact, if the two birds ecologically compete (e.g., over the same food source), then *any* change in water from the flood-state would harm the high-water-preferring bird by disproportionately helping its competitor.<sup>144</sup>

In cases like this, the single-species interpretation of the ESA harms both endangered species, contradicting the statute's very purpose. Besides, determinations of conservation policy should not be held hostage by contingent circumstances like water levels. From the point of view of species, it does not matter whether the cause of extinction is natural or anthropogenic, and neither should it matter whether circumstances, like water levels, are brought on by natural flooding or environmental managers. Only the multi-species interpretation of the ESA makes sense of this intuition by allowing

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143. See generally *Friends of Animals v. U.S. Fish & Wildlife Serv.*, 879 F.3d 1000 (9th Cir. 2018).

144. Perhaps the high-water-preferring bird dislikes the flood-state but can barely survive, while the low-water-preferring bird will be driven extinct. In this case, the high-water-preferring bird wants its competitor to die so that it may ultimately have more access to food.

environmental managers to make decisions that are best for as many species as possible.

In addition to the proposed interpretation of the ESA, there is also room to consider the species-preserving effect under the “God Squad” exemption to the Section 7 “no jeopardy” requirement.<sup>145</sup> The Endangered Species Committee must consider whether the agency action has no reasonable or prudent alternative, has benefits that clearly outweigh the benefits of alternatives consistent with the rest of the ESA, and is of regional or national significance.<sup>146</sup> While the bar is high, renewable energy and its species-preserving effect have benefits that sometimes clearly outweigh the benefits of alternatives, and are of national—indeed, global—significance. The only time the Committee issued a valid exemption was to permit construction of a hydropower dam that interfered with an endangered bird. The Committee may have been further persuaded in that case, and in potential future cases, by considering the benefits that would likely accrue to endangered species.

In sum, contrary to the common assumption that the ESA permits no weighing among “green” interests, the ESA’s Section 7 and 9 requirements may permit weighing among the interests of various endangered species. A multi-species interpretation is consistent with the ESA’s text and purpose, the FWS’s species-management practices, caselaw, and the principles of modern ecology.<sup>147</sup> There is also room for the “God Squad” to weigh the benefits of renewable energy for endangered species. The result for renewable energy is hopeful: if a renewable energy project can demonstrate that its compliance with the ESA with regard to one endangered species would actually endanger and eliminate many other species due to climate change, then the ESA gives the FWS deference to weigh those tradeoffs by loosening its restrictions. The only remaining question is whether environmental agencies *should* loosen restrictions for species preserving renewable projects.<sup>148</sup> This is the topic of the next section.

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145. See *supra* note 90 (describing the exemption).

146. 16 U.S.C § 1536(e)–(n).

147. One limitation in the caselaw is that harming one species for the sake of another has not yet seriously risked the harmed species’ extinction, and courts have not yet had to explicitly consider an ultimatum where one species must go extinct in order to protect other species from similar fates. Such conflicts “likely will increase, however, as more species are listed and as species and their networks become better understood.” NAT’L RESEARCH COUNCIL, *supra* note 135.

148. See *supra* Section I. Of course, besides from normative considerations, the EPA is also tasked with using “the best scientific and commercial data available.” It must therefore at least recognize such tradeoffs where they occur.

#### IV. *NORMATIVE DIMENSIONS OF A SPECIES CLASH*

The ESA is widely considered the prime example of a statute that does not permit potential benefits to be weighed against known costs.<sup>149</sup> It reflects some people's intuitions that it would be wrong to knowingly kill endangered species, no matter the potential gain. For example, one commentator maintains that "[t]here are some environmental harms that we do not—and should not—tolerate, even at the cost of gaining a substantial environmental benefit."<sup>150</sup> Indeed, if one cares about animal interests at all, it is difficult to stomach the thought of individual tortoises being displaced from their homes or killed by human activity.<sup>151</sup> At the same time, however, it is also difficult to rationally accept the thought of animals being displaced and killed on a mass scale because of climate change that could have been avoided or mitigated. This poses a normative dilemma that I have called a "species clash": when in conflict, should renewable energy projects that substantially reduce GHGs be allowed to harm (or risk harming) endangered species, on the grounds that such projects will likely save many more species from extinction later? The answer to this question is yes, even without accounting for the danger climate change poses to humanity. Analyzing the normative dimension of the species clash is crucial for well-intentioned environmentalists who have mixed feelings about the permissibility of harming the desert tortoise. It will also be useful for preparing oneself to advocate for renewable energy, whether when litigating, policymaking, or generating public support.

##### A. Ethics

By knowingly inflicting harm on some members of endangered species, the hope is that more species will be saved from extinction due to climate change. The first issue implicated by the species clash, then, is whether to prioritize the one or the many. The second issue is how to weigh harms inflicted to species in the present versus harms in the future.

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149. Nagle, *supra* note 20, at 98.

150. *Id.*

151. Of course, some readers may not care about animal interests at all. That belief would make this paper's overall argument easier: if you do not care about animals, you should be in favor of policies that allow us to harm animals in order to combat climate change that will significantly harm humans. If, on the other hand, you do care about animals, this Section argues that you should still be in favor of policies that allow us to harm some animals in order to combat climate change that will harm many more animals.

The first issue is a debate heavily recited, with consequentialists on the one hand who believe that sacrificing a few to save many is not just morally permitted, but morally obligatory,<sup>152</sup> and deontologists on the other who believe that valuable things should never be treated as a mere means to an end but should instead always be respected as ends-in-themselves.<sup>153</sup> The conflict between the ESA and renewable energy is very much like the classic trolley problem.<sup>154</sup> A deadly force—here, climate change—is hurtling towards billions of beings; the dilemma is whether it is permissible to redirect the harm away from them and towards a few—here, by building renewable energy facilities that may harm some endangered species.

Even in the relatively modest five-to-one trolley problem setup involving humans, the philosophical community widely accepts the permissibility of sacrificing the few to save the many.<sup>155</sup> This makes sense: when harm is inevitable, it is generally better to minimize it.<sup>156</sup> Yet the species clash differs from the trolley problem in three important ways that push even further in favor of the consequentialist position. First, moving the discussion from humans to animals and plants makes tradeoffs more morally palatable. Most deontological theories assert not only that people are intrinsically valuable, but also that our intrinsic value is based on traits that are widely-regarded to be unique to humans, like practical rationality, emotional sophistication,

152. See, e.g., AVENGERS: INFINITY WAR (Marvel Studios 2018) (“Thanos threatens half the universe; one life cannot stand in the way of defeating him.”) (quoting the character Vision).

153. See, e.g., *id.* (“We don’t trade lives[.]”) (quoting the character Captain America). Note, however, that Captain America, living with regret, may have later renounced his deontological commitments. See AVENGERS: ENDGAME (Marvel Studios 2019) (“This is the fight of our lives, and we are going to win—whatever it takes.”).

154. See generally Judith Thomson, *The Trolley Problem*, 94 YALE L. J. 1395 (1985). The trolley problem is a popular thought experiment in which a runaway trolley is hurtling towards five innocent people, and the only way to save them would be to pull a lever switching the trolley onto a track with one innocent person. See also Phillipa Foot, *The Problem of Abortion and the Doctrine of the Double Effect*, in VIRTUES AND VICES (1978) (providing one of the earliest framings of the trolley problem).

155. See *The PhilPapers Surveys*, <https://philpapers.org/surveys/results.pl> (last visited May 1, 2020) (reporting that 66.1% of philosophy faculty and PhDs believe we ought to switch a runaway deadly trolley away from five people towards one person and only 7.2% accept or lean towards not switching). This survey demonstrates a rare degree of consensus for philosophers—out of 30 queried topics, the only things they are more likely to agree on are that things exist (non-skeptical realism about the external world: 76.1%), God does not exist (atheism: 69.7%), science can be a source of knowledge (scientific realism: 70.1%), and all bachelors are *definitely* unmarried (*a priori* knowledge: 78.7%). *Id.*

156. See David Cummiskey, *Kantian Consequentialism*, 100 ETHICS 586, 602 (“[P]ersons [] have a fundamental equality which dictates that some must sometimes give way for the sake of others.”).

or moral personhood.<sup>157</sup> In order to object to sacrificing some animals or plants to save more animals or plants, one would need to believe not only that animals and plants are intrinsically (not just instrumentally) valuable, but also that their intrinsic value supports a deontological (not consequentialist) approach to environmental ethics.<sup>158</sup> These are controversial commitments that further weaken an already tenuous deontological approach to the present problem.<sup>159</sup>

Second, by raising the stakes from a few individuals to hundreds of thousands of species, each containing some large numbers of individual animals or plants, the odds of sacrifice being morally permissible soars. Absolutism is increasingly giving way to a more moderate position where deontological commitments may be permissibly violated when doing so prevents the occurrence of sufficiently bad consequences.<sup>160</sup> Even renowned deontologist Robert Nozick's commitments begin to waiver in the face of "catastrophic moral horror"—an apt characterization of climate change by those who value animal and plant interests.<sup>161</sup>

Third, the fact that climate change is anthropogenic supports the consequentialist approach to environmental ethics. Anthropogenic climate change collapses any morally relevant distinction between acts and omissions in environmental policymaking—whereas an observer's decision declining to switch a trolley track might, to some deontologists, be considered a morally blameless omission,<sup>162</sup> our decision declining to mitigate climate change is not. Humanity set this

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157. See, e.g., IMMANUAL KANT, *THE CRITIQUE OF PRACTICAL REASON* (1788) (generally arguing that deontological ethical commitments follow from humanity's unique capacity for practical reasoning). See also Lori Gruen, *The Moral Status of Animals*, STAN. ENCYCLOPEDIA OF PHIL. Sections 1–2 (Fall 2017) (exploring grounds for the moral consideration of animals and their significance on animals' moral claims).

158. See John Nolt, *Nonanthropogenic Climate Ethics*, 2 WIREs CLIMATE CHANGE 701, 703 (noting that policy recommendations rely both on value theories and ethical theories). For an example of a popular and influential consequentialist position, see PETER SINGER, *ANIMAL LIBERATION* (1975).

159. See Andrew Brennan & Yeuk-Sze Lo, *Environmental Ethics*, STAN. ENCYCLOPEDIA OF PHIL. Section 4 (Winter 2020) (summarizing contentious debates about environmental ethics, including various weaknesses in environmental deontology).

160. See Tyler Cook, *Deontologists Can Be Moderate*, 52 J. VALUE INQUIRY 199, 199 (2017) (stating that moderate or "threshold" deontology has become a popular alternative the traditional hardline stance).

161. ROBERT NOZICK, *ANARCHY, STATE, AND UTOPIA* 30 (1974) ("The question of whether these side constraints are absolute, or whether they may be violated in order to avoid catastrophic moral horror, and if the latter, what the resulting structure might look like, is one I hope largely to avoid.").

162. See Fiona Woolard & Frances Howard-Snyder, *Doing vs. Allowing Harm*, STAN. ENCYCLOPEDIA OF PHIL. (2016) (exploring the moral relevance of acts and omissions).

trolley in motion and caused its breaks to fail, so we cannot be blameless by doing nothing at this juncture—we will be responsible either for harming individuals like the desert tortoise today or for the deaths thousands of species in the future. In other words, the relevant question now is not *whether* to knowingly inflict harm on members of species, but *how* to act given that we will knowingly harm species no matter what. The appropriate answer is to act in a way that minimizes harm done to species.

The second issue is how to consider tradeoffs made across potentially large spans of time.<sup>163</sup> The dominant view in philosophy is that future interests ought to be weighed equally to present ones.<sup>164</sup> The consensus is even stronger among those contemplating the interests of non-human species,<sup>165</sup> despite what one legal scholar assumes.<sup>166</sup> While it is true that economists use discount rates to weigh monetary costs and benefits that project into the future, this practice is inappropriate when weighing non-economic harms, such as the extinctions of species.<sup>167</sup> It is, therefore, a relatively simple issue to determine

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163. See generally Lukas Meyer, *Intergenerational Justice*, STAN. ENCYCLOPEDIA OF PHIL. (2015) (examining ethical issues between generations of people).

164. See, e.g., DEREK PARFIT, REASONS AND PERSONS 485 (1984) (“[In general,] we ought to be equally concerned about the predictable effects of our acts whether these will occur in one, or a hundred, or a thousand years. . . . [S]ome of our acts have permanent effects. This would be so, for instance, of the destruction of a species, or of much of our environment, or the irreplaceable parts of our cultural heritage.”); Nolt, *supra* note 158, at 703 (“[M]any intergenerational ethicists view the discounting of harms and benefits to future people as unjustifiable discrimination.”); Dominic Roser, *Intergenerational Ethics*, ENCYCLOPAEDIA BRITANNICA, <https://www.britannica.com/explore/savingearth/intergenerational-ethics> (last accessed Mar. 22, 2021) (“Some critics claim that . . . the concerns of future generations have less weight than those of the present. Nevertheless, despite those doubts, most ethicists consider the morally appropriate relation to future generations to be a serious topic.”).

165. See Nolt, *supra* 158 at 707 (“[A]ll nonanthropocentric theories of which we are aware would support this two-pronged long-term goal: to maintain or restore both biodiversity and climate stability.”).

166. See Ruhl, *supra* 18, at 1793 (“The ethics of intergenerational policy choices, in this case not between human generations but of our fellow species, seem inept at handling a tradeoff between avoiding a large probability of dangerous losses to an imperiled species in the present versus avoiding a low probability of catastrophic losses to the species in the distant future.”). Since the interests of future species are as important as those of present species, policymakers need only perform standard risk analyses to determine whether the expected value of an action is positive, as though the stakeholders in question were all in the present. Since the harms of climate change are so gargantuan and likely to occur, we can be confident that renewable energy projects tend to have a positive expected value in terms of species preservation. See *supra* Section I. Note further that the issue is not tradeoffs strictly within a species, but among species generally. See *supra* Section III(C).

167. See Nolt, *supra* 158, at 703 (“[Economic] discounting can often be justified by the dynamics of money (e.g., its tendency to yield return on investment). But in intergenerational value theory, which deals with noneconomic harms (e.g., suffering or death) and benefits (e.g.,

whether harming one species now is permitted to save many more species later: how confident are we that our actions will actually save more species? Because the species-preserving effect of renewable energy projects is overwhelmingly positive, the answer will often be very confident.<sup>168</sup> Still, there may be cause to hesitate when making such determinations as a matter of policy.<sup>169</sup> Before we can evaluate those concerns, it is important to carefully consider to what extent our feelings about the matter are affected by our psychologies.

### B. Psychology

We may still find ourselves and others reluctant to accept the idea of sacrificing the desert tortoise. A basic understanding of the psychology involved in a species clash will help not only keep us from being steered astray from the correct normative result, but it will also help when navigating reluctance from judges, juries, policymakers, and voters.

A number of cognitive biases may be at play when evaluating the intuitions surrounding individual members of species. The “identifiable victim effect” is the well-studied, but powerful, tendency to respond more strongly to a single identified individual at risk than to a large group.<sup>170</sup> One cause is the affect heuristic, a mental shortcut that supplies quick answers to moral problems based on the way those problems make us feel in the present.<sup>171</sup> Imagining an individual animal’s death in detail makes us feel bad and therefore makes us more likely to overvalue the event when compared to discussing, in vague terms, the death of species by climate change. This is especially likely when the animal being considered is “charismatic” and “high profile” rather than “obscure.”<sup>172</sup> Indeed, a 1990 Department of Interior report found that 50 percent of available recovery funds were spent on just ten species, contrary to instructions from Congress that prohibit

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happiness or health), all justifications for discounting are dubious[.]”.

168. See *supra* Section I. See also *infra* Section IV(C) (discussing how policymakers should handle borderline cases).

169. See *infra* Section IV(C) (discussing policy concerns).

170. See generally D. Small et al., *Sympathy and Callousness: The Impact of Deliberative Thought on Donations to Identifiable and Statistical Victims*, 102 ORGANIZATIONAL BEHAVIOR & HUM. DECISION PROCESSES 143 (2007) (explaining how humans relate more strongly to the individual, rather than a large group (or some other explanatory parenthetical)).

171. See generally DANIEL KAHNEMAN, THINKING, FAST AND SLOW (2011) (discussing mental heuristics and biases).

172. TIM CLARK ET AL., ENDANGERED SPECIES RECOVERY: FINDING THE LESSONS, IMPROVING THE PROCESS 11 (1994).

considering taxonomic classification in prioritizing recovery plans.<sup>173</sup>

This is a classic symptom of scope insensitivity, our psychological inability to “feel” the badness of outcomes as scaling up with the number of deaths involved.<sup>174</sup> In fact, psychological research demonstrates “mass numbing”—a person’s willingness to pay to save other people from some risk actually tends to *decrease* as the number of people at risk grows beyond ten or so.<sup>175</sup> This same phenomenon has been shown to apply in environmental contexts when valuing animal lives,<sup>176</sup> so it is not hard to imagine it influencing one’s willingness to sacrifice for the sake of preventing climate change.

Biases do not just affect our moral reasoning—they also can distort our predictions of the future. For example, the availability heuristic is our tendency to overestimate the likelihood of events with greater “availability” in memory, which can be influenced by how unusual or emotionally charged they may be or how recently we have experienced them.<sup>177</sup> We may overestimate the likelihood of a solar facility harming a desert tortoise based on the tortoise’s peculiar circumstances, appearance, or familiarity while we underestimate the likelihood of extinctions from climate change because we do not “see” them happening around us. These are considerations that must be kept in mind when we find ourselves viscerally hesitant to accept the sacrifice of some members of species in the present for the sake of many more species in the future.

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173. C. Griffin & T.W. French, *Protection of Threatened and Endangered Species and Their Habitats by State Regulations: The Massachusetts Initiative*, in TRANSACTIONS OF THE FIFTY-SEVENTH NORTH AMERICAN WILDLIFE AND NATURAL RESOURCES CONFERENCE (R. McCabe ed. 1992).

174. One compelling explanation for scope insensitivity is given by Eliezer Yudkowsky, *Cognitive Biases Potentially Affecting Judgment of Global Risks* at 16, in GLOBAL CATASTROPHIC RISKS (Nick Bostrom & Milan Iroki eds., 2008) (“Human emotions take place within an analog brain. The human brain cannot release enough neurotransmitters to feel emotion a thousand times as strong as the grief of one funeral. A prospective risk going from 10,000,000 deaths to 100,000,000 deaths does not multiply by ten the strength of our determination to stop it. It adds one more zero on paper for our eyes to glaze over[.]”).

175. Paul Slovic, “*If I Look at the Mass I Will Never Act*”: *Psychic Numbing and Genocide*, 2 JUDGMENT & DECISION MAKING 79 (2007); see Paul Slovic et al., *Psychic Numbing and Mass Atrocity*, in THE BEHAVIORAL FOUNDATIONS OF POLICY 126 (Eldar Shafir ed., 2013) (finding that people are most willing to pay to save groups of around ten people, but that they become less willing to pay to save larger groups of people than they are willing to pay to save one or two individuals).

176. See E. Markowitz et al., *Compassion Fade and the Challenge of Environmental Conservation*, 8 JUDGMENT & DECISION MAKING 397 (2013) (finding that across several studies, “compassion shown towards animals in need of aid decreased as the number of victims increased, identifiability of the victims decreased and the proportion of animals helped shrank”).

177. KAHNEMAN, *supra* note 171.

### C. Policy

Even if one accepts that we should be ethically willing to sacrifice a species now for the sake of a species later, one might think that enshrining this approach in policy is risky or counterproductive. I consider and ultimately reject reasons for holding that view.

The ESA is in most cases a useful statute. Prohibitions against harming endangered species usefully prevent the rampant or arbitrary destruction of such species. In the present, one function of the ESA is to steer all project development—renewable energy-related or not—away from sites where there are endangered animals. Additionally, the ESA has a technology-forcing effect—since the costs of harming endangered species are high, companies are incentivized to invest in less invasive technologies and methods.<sup>178</sup> The ESA is thus useful for protecting species from projects that do not have a species-preserving effect, such as fossil fuel projects. But as it is currently enforced, the ESA is not fine-grained enough to filter out the bad from the good. In a hypothetical world where the threat of climate change was less dire or where the costs of ESA compliance were lower, it would be noble to insist on siting renewable energy projects elsewhere and on stringent mitigation measures. But in our world, the pressure on renewable energy projects is unjustifiably excessive and self-defeating.

To secure the interests of endangered species in the present, Congress could instead create *positive* incentives for renewable energy projects that site away from endangered species or adopt mitigation measures. The ESA currently only functions as a negative incentive that imposes costs and barriers to projects that may impose harm on endangered species. By switching to a positive incentive structure for renewable energy (e.g., a large monetary award for renewable energy projects that site away from endangered species or adopt mitigation technologies), the destruction of species for mere convenience would have considerable opportunity costs that would steer firms away from harming endangered species where feasible. A positive incentive structure would better recognize the need to rapidly develop renewable energy.

Some commentators argue against an exceptional treatment of renewable energy compared to other projects under the ESA, claiming that a double standard undermines the legitimacy of environmental

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178. See Robbins, *supra* note 33 (mentioning, among other things, the development of wind turbines that are encased in a shell to prevent harms to birds/bats).

law.<sup>179</sup> A double standard “implies that two things which are the same are measured by different standards.”<sup>180</sup> By contrast, recognizing a species-preserving effect under the ESA measures two *different* things (projects that help species and those that hurt them) by a *singular* standard (their effects on species). Giving weight to species preservation is no more a double standard than is a carbon tax, which imposes higher fees on actors that burn more fossil fuels. Furthermore, not all double standards are bad—for example, progressive tax policies are widely accepted even though they set different marginal tax rates on taxpayers with different levels of income. Giving a project more favorable treatment for its species-preserving effect is normatively justified and likely to promote, rather than undermine, environmental law’s legitimacy by maximally protecting environmental interests.

Other commentators worry about line-drawing.<sup>181</sup> It may be difficult to avoid the misapplication of a “species pass” to projects that actually have no species-preserving effect. For example, a renewable energy project that requires a substantial amount of GHGs to be produced in its construction but that would only produce a small amount of clean energy might have no species-preserving effect and therefore not be the appropriate beneficiary of a species pass. Further, a fossil fuel power plant using advanced emissions control technologies might assert that the adoption of clean technology is species-preserving relative to other fossil fuel power plants. Distinguishing when and how to offer favorable treatment under the ESA will need to be laid out in detail once the practice becomes more widespread, but the challenge is far from insurmountable. After all, a project’s species-preserving effect is an empirical issue that can be predicted on the basis of the best data available. And we must not let the perfect be the enemy of the good—the risk that a few marginally harmful projects slip through is of relatively little consequence if the policy results in an enormous influx of clean, species-preserving energy.

There will be no perfect outcome. Our decisions about climate change will be felt by generations of both humans and animal species. We owe it to all of them to make necessary sacrifices and take

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179. See Nagle, *supra* note 20 (“[T]he special treatment that wind and solar energy facilities have received [is taken as] evidence that environmental law is only employed against disfavored parties[.] . . . Such rule of law concerns counsel against allowing only green benefits to trump green harms, for they undermine the legitimacy of the law’s efforts to prevent those green harms.”).

180. MARGARET EICHLER, *THE DOUBLE STANDARD: A FEMINIST CRITIQUE OF FEMINIST SOCIAL SCIENCE* 15 (1980).

181. See, e.g., Ruhl, *supra* note 18, at 1792–93.

calculated risks. Tragically, some of these may involve the loss of species today, such as individual Mojave desert tortoises. Our solace must be that posterity will be ever grateful for the multitude of species that will live on as a result.

### CONCLUSION

Environmentalists are understandably confounded by the conflict posed between endangered species and renewable energy projects. Although it is preferable to save as many species as possible and although renewable energy projects have a species-preserving effect, the ESA currently stands in the way of renewable energy projects that have a powerful species-preserving effect. This paper has articulated an interpretation of the ESA that would resolve this apparent contradiction and yield a more sensible approach to both climate change and the protection of species by framing both the ESA and renewable energy in terms of species preservation. The term “species,” to which the ESA applies, includes those which will be affected by climate change; as a result, agencies should consider tradeoffs between species sited near potential renewable energy projects and those who will be driven extinct without the construction of that project. The species-preserving effect is also relevant under the Section 7 “God Squad” exemption and Section 9 mitigation measures. At all times, the goal of agencies enforcing the ESA must be the same as it always has been: minimizing species extinctions and maximizing biodiversity.

The broader theme of this paper has been that climate change has dire consequences even for nonhumans. Taking these risks seriously suggests that there is a need to radically change our approaches to weighing costs and benefits in conservationist policymaking. There is no costless solution to climate change; yet determinations that there are any costs whatsoever currently preclude actions which are necessary to unlock the overwhelming benefits of climate change mitigation. Our methods of protecting species must evolve as our impact on their ecosystems intensifies.