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The Pricelessness of Biodiversity: Using the Endangered Species Act to Help Combat Extinction and Climate Change

*Alisha Falberg**

“The last word in ignorance is the man who says of an animal or plant: ‘What good is it?’”

-Aldo Leopold

“Biological diversity must be treated more seriously as a global resource, to be indexed, used, and above all, preserved.”

-E.O. Wilson¹

“Nothing is more priceless and more worthy of preservation than the rich array of animal life with which our country has been blessed.”

-President Nixon²

ABSTRACT

The science is clear. Climate change is happening, and it has a serious adverse effect on the majority of biodiversity, species, and ecosystems. Currently, there are no laws that serve to protect biodiversity and species from the oncoming changes; however, there is a law that serves to protect endangered and threatened species generally: the Endangered Species Act. This

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1. E.O. Wilson, *The Current State of Biodiversity*, in *BIODIVERSITY* 3, 3 (E.O. Wilson & Frances M. Peter eds., 1988).

2. MITCH TOBIN, *ENDANGERED: BIODIVERSITY ON THE BRINK* i (2010).

paper proposes using conservation biology principles to suggest several amendments to the Endangered Species Act to help save and conserve all species that will be adversely affected by climate change, not just those currently endangered or threatened. This paper only proposes amendments to the listing, critical habitat, recovery, and monitoring sections under Section 1533, even though many more amendment opportunities could be envisioned. There are many critiques to this approach, which are also addressed; however, it is the goal of this paper to argue that amending the Endangered Species Act is the most effective and efficient way to save biodiversity and species from climate change.

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I.

INTRODUCTION

One thousand five hundred meters up the mountains of the Monteverde cloud forest in Costa Rica once lived *Incilius periglenes*—the golden toad.³ This beautiful little toad, whose habitat and range was restricted to the cloud forest, has been extinct since 1989.⁴ Why did this formerly common species⁵ decline into extinction? The leading theory is climate change.⁶



Fig. 1: The Golden Toad⁷

The golden toad’s habitat and range was restricted to the relatively small area between 1,500 and 1,620 meters in the mountains of Monteverde.⁸ The range was so limited because the toad lived in the mists provided by the clouds on the mountain and bred in the temporary pools created at the beginning of the

3. *Incilius Periglenes*, IUCN RED LIST OF THREATENED SPECIES, <http://www.iucnredlist.org/details/full/3172/0> (last visited Dec. 28, 2013) [hereinafter *Incilius Periglenes*, IUCN].

4. *Id.*

5. *Id.*

6. *Id.*

7. Photo: http://en.wikipedia.org/wiki/Golden_toad.

8. *Incilius Periglenes*, IUCN, supra note 4.

tropical rain season.⁹ Among amphibians generally, there is a “greater extinction risk for higher-elevation species . . . [that are] already prone to extinction, because geographic ranges tend to decrease in size with increasing elevation.”¹⁰ This increased threat of extinction is exacerbated by climate change.¹¹ Climate change and increased emission of greenhouse gases have caused temperatures in the Monteverde cloud forest to warm, reducing the mist.¹² This caused species like the golden toad to have to shift up the mountain to where clouds still formed,¹³ but shifting up a mountain is problematic, as a species can only go so far up before there is no more land. This is all due to the changing climate.

Climate change represents an unprecedented threat to biodiversity. In fact, climate change is the second greatest cause of species extinction as of the 21st century, constituting a “threat multiplier,” meaning climate change intensifies all other threats to species and ecosystems.¹⁴ This paper seeks to address climate change’s impact on biodiversity by offering proposed amendments to the Endangered Species Act. By advocating for amending the Endangered Species Act, legislation that is already a force for protecting endangered and threatened species, this paper seeks to provide one more tool to combat the adverse effects of climate change on species and biodiversity. The Endangered Species Act could be an effective means to fight climate change, but not as currently written or implemented.

This paper begins by discussing what the world would look like without biodiversity. Part III then discusses climate change, biodiversity, and the problem climate change presents to species.

9. *Id.*

10. J. Alan Pounds et al., Widespread Amphibian Extinctions From Epidemic Disease Driven by Global Warming, 439 *NATURE* 161, 162 (2006), available at http://bio.research.ucsc.edu/~barrylab/classes/climate_change/PoundsNature_2006.pdf.

11. *Id.*

12. *Id.*

13. *Id.* at 163.

14. Patrick Parenteau, Species and Ecosystem Impacts, in *THE LAW OF ADAPTATION TO CLIMATE CHANGE: U.S. AND INTERNATIONAL ASPECTS* 307, 307 (Michael B. Gerrard & Katrina Fischer Kuh eds., 2012) (stating that the greatest threat to species is land use change).

Part IV moves on to outline the Endangered Species Act as currently written and implemented. It then uses conservation biology principles to show how and why the Endangered Species Act, particularly the listing, critical habitat, and recovery requirements, should be changed. Part V addresses critiques to amending the Endangered Species Act. Regardless of the current political hostility toward amendments of this nature, as well as several other obstacles, this paper asserts that if the amendments passed were strict, clear, precise, and numerous, the Endangered Species Act could be written to be an effective tool for conserving biodiversity against the threat of climate change.

II.

A WORLD WITHOUT . . .

Picture the present: “[s]omewhere between 1.5 and 1.8 million [species] have been discovered . . . [and] estimates of the true number of living species range . . . from 3.6 million to 100 million or more.”¹⁵ Now, picture the future if nothing is done to help combat the adverse effects of climate change on biodiversity and species:

In 2100 the natural world is suffering terribly. The frontier forests are largely gone . . . and with them most of the biodiversity hotspots. Coral reefs . . . and other aquatic habitats have deteriorated badly. Gone with these richest of ecosystems are half or more of Earth’s plant and animal species. . . . [T]he fragmentary biodiversity that survived to 2100 has also become much more genetically simplified . . . Earth is a much poorer place than it was back in 2000, and will stay that way forever. Such is likely to be the world of 2100—if present trends continue.¹⁶

This future is scientifically feasible. Scientific scenarios regularly show that biodiversity is declining and will continue to decline throughout this century and into the next if nothing is done to stop pollution and climate change.¹⁷

15. EDWARD O. WILSON, *THE FUTURE OF LIFE* 14 (2002).

16. *Id.* at 77.

17. See Henrique M. Pereira et al., *Scenarios for Global Biodiversity in the 21st Century*, 330 *SCIENCE* 1496 (2010).

Looking specifically at climate change as a driver of biodiversity decline, “[a] given change in climate is expected to have the largest proportional effect on biodiversity in . . . [ecosystems with] extreme climates, although biodiversity in all [ecosystems] likely will be sensitive to climate.”¹⁸ This study estimates that small changes in temperature and precipitation will have large effects on species and biodiversity.¹⁹ Looking at the current rate of extinction of species, it is also clear that the earth is losing biodiversity at an unprecedented rate.²⁰ Calculating the rate of extinction is difficult because it depends on many factors; however, generalized scenarios can be modeled to create a prediction.²¹ Generally, human activity has “driven extinction rates to a level 1,000-10,000 times the normal rate.”²² It is well documented that “extinction is proceeding at a rapid rate, far above prehuman levels, [and in] many cases the level is calamitous.”²³ Even with cautious parameters, “the number of species doomed each year is 27,000. Each day it is 74, and each hour 3.”²⁴ Climate change is only exacerbating this loss.²⁵

III.

CLIMATE CHANGE, BIODIVERSITY AND SPECIES

A. *What?*

The phrase “climate change” refers to the global climate’s

18. Osvaldo E. Sala et al., *Global Biodiversity Scenarios for the Year 2100*, 287 *SCIENCE* 1770, 1771 (2000).

19. *Id.*

20. Wilson, *supra* note 2, at 10 (“[T]here can be no doubt that extinction is proceeding far faster than it did prior to 1800.”).

21. *Id.* at 13.

22. Thomas E. Lovejoy, *Biodiversity: What Is It?*, in *BIODIVERSITY II* 7, 12 (Marjorie L. Reaka-Kudla, Don E. Wilson & E.O. Wilson eds., 1997). See also Wilson, *supra* note 2, at 13; Edward O. Wilson, *Biodiversity: Wildlife in Trouble*, in *THE BIODIVERSITY CRISIS: LOSING WHAT COUNTS* 18, 19 (Michael J. Novacek ed., 2001) (“It is difficult to estimate overall rates of extinction. However, biologists generally agree that on the land, at least, and on a worldwide basis, species are vanishing 100 times faster than before the arrival of humans.”).

23. EDWARD O. WILSON, *THE DIVERSITY OF LIFE* 255 (1992).

24. *Id.* at 280.

25. See *infra* Part III.C.

response to increasing amounts of greenhouse gases, especially carbon dioxide, being held in the atmosphere.²⁶ The trapping of these gases warms the planet and has led to the phenomenon known as “global warming,” which is a result of human activity and must be stalled in order to avoid further damage to the earth.²⁷ While there is a natural carbon cycle that releases carbon (and other gases) into the atmosphere,²⁸ humans have greatly sped up this process by drilling and mining fossil fuels and then burning them, which emits large quantities of carbon dioxide.²⁹

But why is climate change a threat? It is because of the vast environmental impacts that are occurring in its wake on almost every aspect of life on earth, not just biodiversity. Such impacts include melting arctic ice, rising sea levels, changing ocean ecology (such as ocean acidification), intensifying weather events, declining forests and increasing desertification, and impacts on ecosystems and wildlife.³⁰ According to the Intergovernmental Panel on Climate Change’s (IPCC) Fifth Assessment Report, “Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia.”³¹

26. See generally CHRIS WOLD ET AL., CLIMATE CHANGE AND THE LAW 2-3 (2009) (describing generally what climate change is, why it is occurring, and its impacts).

27. See *id.* at 3.

28. See *id.* at 4 (describing the carbon cycle as the process of photosynthesis—plants take in oxygen and release carbon—as well as the geological cycle, which consists of decaying organic materials that, as they decay over thousands of years, build up stocks of carbon that are slowly released as a result of weathering or erosion. These are commonly found as coal, oil, and natural gas.).

29. See *id.* at 5.

30. See *id.* at 19-27.

31. Intergovernmental Panel on Climate Change [IPCC], *Summary for Policymakers*, in CLIMATE CHANGE 2013: THE PHYSICAL SCIENCE BASIS. CONTRIBUTION OF WORKING GROUP I TO THE FIFTH ASSESSMENT REPORT OF THE IPCC 4 (Thomas F. Stocker et al. eds., 2013) [hereinafter IPCC FIFTH ASSESSMENT REPORT SUMMARY]. See also Organization, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, http://www.ipcc.ch/organization/organization.shtml#.Unfn_Y1JXws (last visited Nov. 4, 2013) (stating that the IPCC was established by the U.N. Environmental Programme and the World Meteorological Organization in 1988 “to provide the world with a clear scientific

The IPCC believes that climate change and global warming will continue to have these effects.³² Such changes in climate and temperature have a drastic effect on biodiversity.

Biodiversity, short for biological diversity, is “the full variety of life, from genes to species to ecosystems.”³³ Biodiversity is often measured in richness (number of unique life forms), evenness (equitability among life forms), and heterogeneity (dissimilarity among life forms),³⁴ and is composed of three levels: the top level is an ecosystem, the middle level is species, and the bottom level is genes.³⁵ Biodiversity can be viewed over time, as a characteristic of natural communities, globally or collectively, or where it is most concentrated, for example in tropical rain forests.³⁶ Regardless of which lens is used to measure biodiversity, the science is clear that climate change is having an impact:

Biodiversity is dependent on an intricate web of factors that can be upset by rapid climate change . . . [M]ost biodiversity, or at least an increasing proportion of it, is locked up in isolated patches. In the face of climate change . . . human activity has created an obstacle course for the dispersal of biodiversity. This could establish one of the greatest biotic crises of all time.³⁷

B. *Why?*

It is clear that biodiversity is declining; species are becoming threatened and going extinct at a rapid rate. But why should people care about conserving biodiversity? People should care because conserving wildlife is just as important as conserving

view on the current state of knowledge in climate change and its potential environmental and socio-economic impacts.”). The IPCC issues periodic reports, such as its newly released Fifth Assessment, to detail the scientific authority and status of the earth’s changing climate and the likelihood of risks climate change is causing. *Id.*

32. See IPCC FIFTH ASSESSMENT REPORT SUMMARY, *supra* note 32, at 14.

33. Wilson, *supra* note 24, at 18; WILSON, *supra* note 16, at 10.

34. See Bradley J. Cardinale et al., Biodiversity Loss and Its Impact on Humanity, 486 NATURE 59 (2012).

35. WILSON, *supra* note 16, at 10.

36. Lovejoy, *supra* note 23, at 7-8.

37. *Id.* at 12.

the human race and, in fact, countries depend on biodiversity. For most people, biodiversity provides various sources of food, clothing, shelter, and medicine.³⁸ Biodiversity provides material goods and natural services, such as promoting soil fertility, sustaining the movement of water, absorbing and detoxifying pollutants, and decomposing waste.³⁹ Not to mention aesthetics—preserving the natural wonders of the world—and ethics: human beings arguably have an ethical obligation not to destroy wildlife and nature.⁴⁰ Other benefits include the contribution of animals to the food web and the fact that many species help with decay and regeneration of plants and forests.⁴¹ These reasons make terrestrial ecosystems dependent on a high diversity of organisms for the functioning of the ecosystem to be efficient.⁴² “The more species living in an ecosystem, the higher its productivity and the greater its ability to withstand drought and other kinds of environmental strain.”⁴³

One can argue that, in order to save conserve biodiversity, one must place a value on it. But how does one place a value on biodiversity? Economists have tried to professionally answer the question of what value people place on the preservation of the ecosystem. To do so, environmental economists measure “the preferences of individuals and ascertain their trade-offs between environmental resources and money or conventional market commodities.”⁴⁴ According to some economists, biodiversity can be valued similarly to any other product; species can have commodity, amenity, and moral value.⁴⁵

38. Ruth Patrick, Biodiversity: Why Is It Important?, in BIODIVERSITY II, *supra* note 23, at 15-17.

39. Norman Myers, What’s This Biodiversity and What’s It Done for Us Today?, in THE BIODIVERSITY CRISIS: LOSING WHAT COUNTS 22, 23-25 (Michael J. Novacek ed., 2001).

40. Holly Doremus, Patching the Ark: Improving Legal Protection of Biological Diversity, 18 ECOLOGY L.Q. 265, 272-73 (1991).

41. Patrick, *supra* note 39.

42. *Id.*

43. Wilson, *supra* note 24, at 19.

44. W. Michael Hanemann, Economics and the Preservation of Biodiversity, in BIODIVERSITY, *supra* note 2, at 196-97.

45. See Bryan Norton, Commodity, Amenity, and Morality: The Limits of Quantification in Valuing Biodiversity, in BIODIVERSITY, *supra* note 2, at 201.

The commodity, amenity, and moral values placed on species are “distributed very unevenly among species.”⁴⁶ It is easier for people to put a higher value on a cute, cuddly animal, like a panda bear, than on something small and slimy, like the golden toad. In fact, species humans see as cute and charismatic will probably get more funding for their protection under the Endangered Species Act.⁴⁷ But calculating such values is difficult. “[W]e do not have sufficient knowledge to calculate the value of most species,” so, as a result, economists place an option value on species of unknown worth.⁴⁸ Using vague and indefinite values, ecological economists have come up with numbers. In 1997, the value of all services provided by all ecosystems around the world was estimated to be worth 33 trillion dollars per year.⁴⁹ An updated estimate in 2011, using the same study parameters, was between 125 and 145 trillion dollars per year.⁵⁰ Such values, though, are estimated based on how these species and ecosystems benefit humans, and it can be argued that this method of putting different values on biodiversity is not working; “[t]he value of biodiversity is more than the sum of its parts.”⁵¹

Many economists argue that the value of biodiversity and species cannot be calculated. While it seems true that “the

46. *Id.* at 202.

47. TOBIN, *supra* note 3, at 7 (2010). *See, e.g., Species Adoptions*, WORLD WILDLIFE FUND, <http://gifts.worldwildlife.org/gift-center/gifts/Species-Adoptions.aspx> (last visited Dec. 30, 2013). Often wildlife conservation groups focus on specific species over others. When sorted by threat level, none of the most popular species are extinct in the wild or critically endangered, showing that value is not placed on threat level, but on perceived threat level and “cuteness.”

48. Norton, *supra* note 46, at 202 (defining an option value as the “value we should place on the possibility that a future discovery will make useful a species that we currently think useless,” i.e. future worth or how much people are willing to pay to retain the option of saving the species).

49. JOE ROMAN, LISTED: DISPATCHES FROM AMERICA’S ENDANGERED SPECIES ACT 79-80 (2011) (listing other estimates of ecological values as well, such as: the benefit of coastal wetlands services valued at \$23.3 billion a year; coastal protection services provided by coral reefs valued at \$172 billion a year; and pollinators, like bumble bees, valued at \$40 billion a year).

50. Robert Costanza et al., Changes in the Global Value of Ecosystem Services, 26 GLOBAL ENVTL. CHANGE 152-58 (2014) (also stating the estimated the loss of eco-services from 1997 to 2011 due to land use change as between \$4.3 trillion and \$20.2 trillion per year).

51. Norton, *supra* note 46, at 203.

dominant economic realities of our time . . . are responsible for most of the loss in biological diversity . . . [making it] hardly surprising that . . . conservationists have begun to justify . . . efforts [to conserve biodiversity] in economic terms,” such economic reliance is flawed.⁵² One example, used frequently to suggest that relying on economics to save species is incorrect for conservation purposes, is that of the blue whale. When looking at the whaling industry through an economic lens, economist Colin W. Clark showed that it was “economically preferable to kill every blue whale left in the oceans as fast as possible and reinvest the profits in growth industries rather than to wait for the species to recover to the point where it could sustain an annual catch.”⁵³ This analysis, however, was based purely on the value of the whale in the whaling market; it did not take into account possible scientific values, medicinal values, aesthetics, or the value of saving a majestic species from extinction.⁵⁴ This is the problem with relying on economic analysis: sometimes it makes more economic sense to let a species go extinct and most times it is too difficult to place value on species, but biodiversity and species have value, however determined, and must be saved.

C. *How is Climate Change Affecting Species and Biodiversity?*

An ecosystem is an interdependent system: it depends on the biodiversity contained within it to function.⁵⁵ An ecosystem can range in size from entire forests or deserts to the smallest local pond, each one containing the circle of life for all plants, animals, and organisms within it.⁵⁶ Climate and weather are also part of an ecosystem, and each living thing in the ecosystem has adapted to the regional climate and weather patterns over time.⁵⁷ Therefore, changes in climate and weather patterns, as a result of climate change, have the potential to greatly alter

52. David Ehrenfeld, *Why Put a Value on Biodiversity?*, in BIODIVERSITY, *supra* note 2, at 212-13.

53. *Id.* at 213; WILSON, *supra* note 16, at 113.

54. WILSON, *supra* note 16, at 113.

55. Parenteau, *supra* note 15, at 307.

56. *Id.*

57. *Id.*

ecosystems and their biodiversity.⁵⁸

Climate change is one of the five most important direct drivers of biodiversity loss and ecosystem change.⁵⁹ Changes in the earth's climate have already begun to adversely impact biodiversity and ecosystems, and climate change as a driver is projected to increase.⁶⁰ Such impacts include "changes in species distributions, population sizes, and the timing of reproduction or migration events."⁶¹ According to the IPCC's Fourth Assessment Report, higher atmospheric CO₂ levels and increased global temperatures will "reduce biodiversity and perturb functioning of most ecosystems . . . compromis[ing] the services they currently provide."⁶²

Climate change is expected to continue to cause loss in biodiversity and contribute to extinction of species, especially those already at risk due to restricted habitats or ranges.⁶³ Climate change is not only a driver, but is also a multiplier. By including climate change in the mix of forcing functions, slow environmental stresses are becoming exacerbated, causing rapid and dramatic changes.⁶⁴ Climate change will cause species to go extinct in a way that is mathematically termed "exponential decay."⁶⁵ This means that species will start to decline quickly at first, then more slowly as fewer and fewer species become endangered (since there are not as many left).⁶⁶

If even the most modest projections of global warming prove correct, the world's fauna and flora will be trapped in a vise [*sic*]. On one side they are being swiftly reduced by deforestation and

58. *Id.* at 307-08.

59. MILLENNIUM ECOSYSTEM ASSESSMENT, ECOSYSTEMS AND HUMAN WELL-BEING: BIODIVERSITY SYNTHESIS 8 (2005) [hereinafter MILLENNIUM ECOSYSTEM ASSESSMENT], available at <http://www.maweb.org/documents/document.354.aspx.pdf> (identifying the other four drivers as land use change, invasive species, overexploitation of species, and pollution).

60. *Id.* at 10, 14.

61. *Id.* at 10.

62. Parenteau, *supra* note 15, at 308 (quoting the IPCC's Fourth Assessment Report).

63. MILLENNIUM ECOSYSTEM ASSESSMENT, *supra* note 60, at 10.

64. *Id.* at 21-22.

65. WILSON, *supra* note 24, at 278-79.

66. *Id.*

other forms of direct habitat destruction. On the other side they are threatened by the greenhouse gas effect. Whereas habitat loss on the land is most destructive to tropical biotas, climatic warming is expected to have greater impact on the biotas of the cold-temperature and polar regions.⁶⁷

Such responses to climate change will not happen suddenly or all at once, but rather will begin as warming begins and continue to increase as climate change persists.⁶⁸ Not only will species distribution and extinction change as temperatures warm, but, since warming temperatures will change weather patterns, biodiversity will be affected by precipitation changes as well.⁶⁹

Climate change will also cause species to migrate from their current ranges and habitats. Joshua Lawler of the University of Washington examined the ecological impacts of climate change on mammal species.⁷⁰ In the past, species have responded in three ways to changes in climate: adaption, migration, or extinction.⁷¹ These same patterns are present currently. Lawler focuses primarily on migration.⁷² Lawler found through research that species are tending to move northward and/or upward (a shift in elevational range of species) as global temperature increases.⁷³ He looked at the velocity of climate change (based on temperature) and the current and projected ranges of several species. Lawler then calculated the distance between the current and projected range and determined whether each species could migrate to the projected range faster than it took for the climate to become inhabitable.⁷⁴

On average, Lawler found that eight percent of mammals will probably not be able to keep up with climate change.⁷⁵ This effect

67. *Id.* at 271.

68. Robert L. Peters II, *The Effect of Global Climate Change on Natural Communities*, in BIODIVERSITY, *supra* note 2, at 451.

69. *Id.*

70. Joshua Lawler, *Ecological Impacts of Climate Change*, VIMEO (Apr. 12, 2013), <http://vimeo.com/63938017>.

71. *Id.*

72. *Id.*

73. *Id.*

74. *Id.* (with Lawler giving credit for this research to one of his graduate students).

75. *Id.* (finding that in some places the percentage of mammals that may not

has been observed fairly regularly. As ranges occupied by species become unsuitable due to climate change, species must move to a new, more suitable habitat or they will go extinct,⁷⁶ either because climate change is moving faster than the species are able, or because the species are too small and slow to move fast enough.⁷⁷ Another reason for extinction could be the size of the current range: if it is small, chances are the species will find the entire habitat unsuitable from climate change and extinction may be more likely.⁷⁸

Additionally, some ecosystems and species have nowhere to go because of human encroachment.⁷⁹ Plants present arguably the most problematic situation. Many plant species do not disperse their seeds far enough to migrate and those that do may not be able to do so fast enough to save themselves from climate change.⁸⁰ Plants respond strongly to all aspects of climate change—increased temperature, increased radiation, increased precipitation—and each responds differently, meaning the composition and distribution of plants will vary widely with climate change.⁸¹ This certainly will result in lost flora species.⁸² The Nature Conservancy “estimated that [seven to eleven percent] of North America’s vascular plant species would no longer encounter a suitable climate regime . . . within their present ranges in the event of a [three] degree Celsius increase in temperature.”⁸³

be able to keep up with climate change was zero and in some it was as high as forty percent).

76. Peters, *supra* note 69, at 454.

77. Lawler, *supra* note 71 (stating that most carnivores and rabbits offer examples of species that will be able to move and shrews, moles, and primates are some of the species that will not be able to keep up).

78. Peters, *supra* note 69, at 454.

79. WILSON, *supra* note 16, at 69 (stating that many species are “trapped” where they are currently living because of urban sprawl and land use conversion from forests and plains into cropland, meaning “thousands of species . . . could be lost.”).

80. Peters, *supra* note 69, at 455.

81. Irwin N. Forseth, Plant Response to Multiple Environmental Stresses: Implications for Climatic Change and Biodiversity, in *BIODIVERSITY II*, *supra* note 23, at 195.

82. *Id.*

83. David S. Wilcove et al., Leading Threats to Biodiversity: What’s

There are already examples of how species are being adversely affected by climate change.

1. The Pika



Fig. 2: The Pika⁸⁴

The North American pika lives in the western mountains at high elevations.⁸⁵ “A key characteristic of the . . . pika is its temperature sensitivity; death can occur after brief exposures to ambient temperatures greater than 77.9 [degrees Fahrenheit].”⁸⁶ Such range, temperature, and population restrictions have caused the pika to be a prime species threatened by climate change; it is one of the species most associated with the threat.⁸⁷ The pika’s habitat is predicted to increase in temperature by 5.4 degrees Fahrenheit in the summer, according to projection models.⁸⁸ One can easily see the pika’s problem when picturing mountain topography; as the global temperature warms, pikas, like the golden toad, must move farther up the mountains in

Imperiling U.S. Species, in *PRECIOUS HERITAGE: THE STATUS OF BIODIVERSITY IN THE UNITED STATES* 239, 252 (Bruce A. Stein et al. eds., 2000).

84. Photo: <http://www.britannica.com/EBchecked/topic/460278/pika>.

85. *Pika*, *ENCYCLOPEDIA BRITANNICA*, <http://www.britannica.com/EBchecked/topic/460278/pika> (last visited Dec. 31, 2013).

86. *American Pika*, U.S. FISH & WILDLIFE SERV., http://www.fws.gov/Nevada/nv_species/pika.html (last modified April 15, 2014) [hereinafter *American Pika*].

87. JODI A. HILTY ET AL., *CLIMATE AND CONSERVATION: LANDSCAPE AND SEASCAPE SCIENCE, PLANNING, AND ACTION 7* (Jodi A. Hilty et al. eds., 2012) [hereinafter *CLIMATE AND CONSERVATION*].

88. News Release: Endangered Species Act Protection for the Pika is not Warranted, U.S. FISH & WILDLIFE SERV. (Feb. 5, 2010) [hereinafter News Release: Pika], available at http://www.fws.gov/nevada/highlights/news_releases/2010/020510_pika_12_mo_nr.pdf.

order to survive, slowly shrinking their habitat and range.⁸⁹ Several pika populations are already extinct and those that remain are in decline.⁹⁰ Climate change is the only current threat to the pika.⁹¹

Despite the fact that climate change is threatening the pika's habitat and range, the U.S. Fish and Wildlife Service (FWS) has decided not to list the species as threatened under the Endangered Species Act.⁹² The FWS stated that it believes that, although the pika's range is shrinking, pikas have enough "suitable high elevation habitat to prevent them from becoming threatened or endangered."⁹³ According to the FWS, as pikas form nests in rock crevices, a better indicator of their habitat temperature change would be to measure temperatures below the habitat surface.⁹⁴ The FWS admits that losses in pika population will occur, but believes that the loss will not be significant enough to warrant the species as threatened or endangered.⁹⁵

2. The Polar Bear



Fig. 3: The Polar Bear⁹⁶

89. J.B. Ruhl, *Climate Change and the Endangered Species Act: Building Bridges to the No-Analog Future*, 88 B.U.L. REV. 1, 2-4 (2008).

90. *Id.* at 4.

91. News Release: Pika, *supra* note 89.

92. *Id.*

93. *Id.*

94. *Id.*

95. *Id.*

96. Photo: www.bearlife.org.

Another species commonly associated with the threat of climate change is the polar bear.⁹⁷ Polar bears live in the circumpolar arctic along the coasts, on islands, and on sea ice.⁹⁸ The sea ice provides a platform for polar bears to hunt, live, breed, and sometimes make dens;⁹⁹ however, climate change is causing this arctic sea ice that is so important to the polar bear to melt. The arctic is melting at a rapid pace, warming almost twice as fast as the rest of the earth.¹⁰⁰ This is causing “dramatic, seasonal sea-ice recession and permafrost melting,”¹⁰¹ meaning the sea ice platforms that the polar bears rely on are disappearing.

In 2008, the FWS listed the polar bear as a threatened species under the Endangered Species Act.¹⁰² The FWS relied on climate models prepared by the IPCC and determined that these changes in sea ice, due to increased Arctic temperatures from greenhouse gases, will significantly impact the polar bear population health.¹⁰³ Based on this data, as well as many other scientific studies, the FWS concluded that climate change will negatively affect polar bear populations within the foreseeable future and that they are unlikely to be able to adapt to the changes happening to their habitat.¹⁰⁴ Because their populations are not currently endangered and because their populations were abundant at the time of listing, the FWS listed them as merely “threatened.”¹⁰⁵ Unlike the pika, the threat to the polar bear’s habitat by climate change was seen as major enough to warrant listing.

97. See, e.g., CLIMATE AND CONSERVATION, *supra* note 88, at 7.

98. *Polar Bear Habitat*, WORLD WILDLIFE FUND, wwf.panda.org/what_we_do/where_we_work/arctic/wildlife/polar_bear/habitat/ (last visited Dec. 31, 2013).

99. *Id.*

100. See Steve Zack & Joe Liebezeit, Arctic Alaska, USA, in CLIMATE AND CONSERVATION, *supra* note 88, at 260 (citing the IPCC’s 2007 working group 2 report).

101. *Id.*

102. *In re Polar Bear Endangered Species Act Listing*, 794 F. Supp. 2d 65, 72 (D.D.C. 2011).

103. *Id.* at 73-74.

104. *Id.* at 76.

105. *Id.* at 76-77.

3. Marine Species and Ocean Acidification

The increasing acidification of the earth's oceans from climate change—called ocean acidification—is adversely impacting a variety of marine species.¹⁰⁶ This rise in acidity in the oceans is a result of the burning of fossil fuels and the increased amount of CO₂ in the atmosphere.¹⁰⁷ The oceans, like forests, are known as “carbon sinks,” meaning that they absorb CO₂ from the earth's atmosphere.¹⁰⁸ Since the industrial revolution, the oceans have absorbed around a quarter of all of the CO₂ emitted into the atmosphere, which has caused a twenty-six percent increase in the acidity of the oceans.¹⁰⁹ This increase in acid levels is changing marine biodiversity and limiting the ocean's ability to absorb more CO₂. It could also have a major impact on economies that rely on the ocean.¹¹⁰ The entire marine ecosystem is changing; rising acidity is affecting food webs, as well as carbon cycling, which may alter species composition and rates of primary productivity.¹¹¹ The effects of ocean acidification “with other stressors, such as warming, . . . introduced species, and overfishing, may act to alter ecosystem responses that would otherwise result from only one of these stressors.”¹¹²

106. See Wendy Broadgate et al., *Ocean Acidification Summary for Policymakers - Third Symposium on the Ocean in a High-CO₂ World*, INT'L GEOSPHERE-BIOSPHERE PROGRAMME 1, 9 (Wendy Broadgate et al. eds., 2013).

107. *Id.* at 1.

108. See generally WOLD ET AL., *supra* note 27.

109. Broadgate et al., *supra* note 107, at 1.

110. *Id.*

111. Victoria J. Fabry et al., *Impacts of Ocean Acidification on Marine Fauna and Ecosystem Processes*, 65 *J. MARINE SCI.* 414, 427 (2008), available at <http://icesjms.oxfordjournals.org/content/65/3/414.full.pdf+html> (stating that ocean acidification could affect carbon-cycling through pH-dependent speciation of nutrients and metals).

112. *Id.*

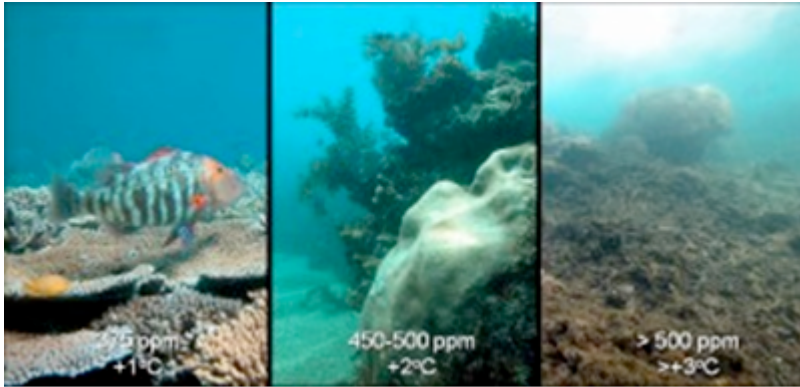


Fig. 4: Effects of acidification¹¹³

IV.

THE ENDANGERED SPECIES ACT

A. *An Overview of the Act*

Currently, the United States does not have an all-encompassing legal strategy to conserve biodiversity.¹¹⁴ The only program that comes close is the Endangered Species Act (ESA),¹¹⁵ a reactive regime that protects one species at a time from extinction;¹¹⁶ however, the ESA, as it is currently written and implemented, is “in danger of being overwhelmed by growing numbers of species in peril.”¹¹⁷ Changes need to be made to the ESA to better enhance its protection capabilities, as well

113. Photo: <http://vlscop.vermontlaw.edu/2013/11/19/from-forests-to-oceans-climate-change-affects-biodiversity-everywhere/>.

114. J. Michael Scott & Blair Csuti, Gap Analysis for Biodiversity Survey and Maintenance, in *BIODIVERSITY II*, *supra* note 23, at 333.

115. Endangered Species Act of 1973, 16 U.S.C. §§ 1531-1544 (2012). The ESA was signed into law on December 28, 1973 and was intended to provide the federal government with “the needed authority to protect an irreplaceable part of our natural heritage - threatened wildlife.” *ROMAN*, *supra* note 50, at 52 (citation omitted).

116. Scott & Csuti, *supra* note 115, at 333.

117. *Id.*

as to supplement its strategies for protecting habitats and ecosystems. The ESA was designed to be broad and far-reaching: it prohibits the “taking” of endangered species,¹¹⁸ promotes conservation through recovery plans,¹¹⁹ implements the international CITES treaty,¹²⁰ and creates critical habitats.¹²¹ The ESA also defines levels of extinction—from endangered¹²² to threatened¹²³—with protection increasing as a species becomes more in danger of extinction. The ESA was designed for the purpose of protecting species that were on the brink of (or threatened with possible) extinction. And even though the ESA has recovered few of the listed species back to full health, it can be credited with “preventing the ultimate extinction of the vast majority of protected species.”¹²⁴

Many view the ESA as successful; once listed, species in the U.S. have a greater chance of moving from high-risk to low-risk.¹²⁵ One study found that, based on the risks of extinction, 262 species would have disappeared in the U.S. by 2003 had they not been listed and protected under the ESA.¹²⁶ However, during that same time 35 listed species had gone extinct.¹²⁷ While this is an unfortunate number, it would have been much higher had

118. 16 U.S.C. § 1538.

119. 16 U.S.C. § 1533(f).

120. 16 U.S.C. § 1537. The CITES treaty is the Convention on the International Trade of Endangered Species.

121. 16 U.S.C. §§ 1532(5), 1533(a)(3). See also Listing and Critical Habitat, U.S. FISH & WILDLIFE SERVICE, <http://www.fws.gov/endangered/what-we-do/critical-habitats-faq.html> (last visited Nov. 4, 2013) (defining “critical habitat” as a “specific geographic areas that contain features essential to the conservation of a threatened or endangered species” and noting that “[a]s of March 1, 2013, critical habitat has been designated for 661 of the 1,499 U.S. species listed as threatened or endangered species.”); ROMAN, *supra* note 50, at 53 (arguing that the creation of critical habitats is perhaps that most powerful section of the ESA).

122. 16 U.S.C. § 1532(6) (defining “endangered” as any species that is in danger of extinction throughout all or a significant portion of its range).

123. 16 U.S.C. § 1532(20) (defining “threatened” as any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range).

124. Ruhl, *supra* note 90, at 5.

125. ROMAN, *supra* note 50, at 130.

126. *Id.*

127. *Id.* at 130-31.

the ESA not been passed. The same cannot be said internationally, though. The IUCN Red List shows that many populations of threatened species have deteriorated between 2007 and 2008.¹²⁸ And species will continue to decline if something is not done to combat the coming effects of climate change.

The ESA could be an effective tool to combat climate change and its threat to biodiversity, but not as currently written or implemented, as there is no section that addresses climate specifically. Current U.S. law and policy addresses the issue of climate change primarily through the Clean Air Act,¹²⁹ while species extinction is dealt with through the ESA. Since species and ecosystem endangerment is closely related to climate change, this paper seeks to propose amendments to the ESA, particularly to the listing,¹³⁰ critical habitats,¹³¹ recovery,¹³² and monitoring¹³³ requirements to tie the two issues together legally and to more directly address the threat of climate change to biodiversity.

1. Listing Under the ESA

ESA section 1533 focuses on the determination of endangered and threatened species.¹³⁴ In general, the Secretary¹³⁵ determines whether a species is endangered or threatened based on various factors, such as: destruction or modification of a species' habitat, overutilization for commercial or scientific purposes, disease or predation, the inadequacy of regulatory mechanisms, or other natural or manmade factors affecting the

128. *Id.* at 130.

129. See, e.g., *Massachusetts v. U.S. Evtl. Prot. Agency*, 549 U.S. 497 (2007).

130. Endangered Species Act of 1973, 16 U.S.C. §§ 1533(a)(1), (c) (2012).

131. 16 U.S.C. §§ 1533(a)(3), (b)(2).

132. 16 U.S.C. §§ 1533(d), (f).

133. 16 U.S.C. § 1533(g).

134. 16 U.S.C. § 1533.

135. "Secretary" refers to the Secretary of the Interior, under which falls the U.S. Fish and Wildlife Service, the primary agency authorized to implement the ESA. 16 U.S.C. § 1532(15).

species' existence.¹³⁶ Based on these factors, the Secretary can determine that a species should be listed and must publish that list, naming the specific species, its level of endangerment, and its designated critical habitat.¹³⁷ The Secretary must review the list from time to time to reflect any changes, such as new listings; removal of species from the list; or change in designation, like from threatened to endangered or vice versa.¹³⁸ Listing is determined "solely on the basis of the best scientific and commercial data available."¹³⁹ The Secretary obtains such information if the species has been listed internationally, by a state agency, or by a petition from an interested person.¹⁴⁰ The listing of a species also includes the creation and designation of the species' critical habitat.¹⁴¹

The FWS, which is the primary agency responsible for listing, has promulgated regulations on listing¹⁴² and conducts what it terms the "candidate conservation process" to determine which species it will recommend for review to be listed.¹⁴³ Its goal is to best implement the factors for listing under the ESA by gathering information from sources such as state fish and wildlife agencies, other federal agencies, universities, and tribes.¹⁴⁴ Once the FWS obtains the necessary information, it prioritizes each identified candidate based on "the magnitude and immediacy of threats to it, as well as its taxonomic

136. 16 U.S.C. § 1533(a)(1).

137. 16 U.S.C. § 1533(c)(1).

138. 16 U.S.C. §§ 1533(c)(1)-(2).

139. 16 U.S.C. § 1533(b)(1)(A) (providing a list of other considerations the Secretary must take into account, such as the status of the species and efforts being made currently to protect the species, like predator control, protection of habitat and food supply, or other conservation practices).

140. 16 U.S.C. §§ 1533(b)(1)(B), (3)(A).

141. 16 U.S.C. § 1533(a)(3).

142. 50 C.F.R. § 424.11 (2014) (providing factors for listing, delisting, or reclassifying species under the ESA).

143. See Candidate Conservation: Overview, U.S. FISH & WILDLIFE SERV., <http://www.fws.gov/endangered/what-we-do/index.html> (last updated July 15, 2013).

144. The Candidate Conservation Process, U.S. FISH & WILDLIFE SERV., <http://www.fws.gov/endangered/what-we-do/candidate-conservation-process.html> (last updated July 15, 2013).

distinctiveness.”¹⁴⁵ This priority system is designed for pure guidance purposes and is not mandatory.¹⁴⁶ The FWS adopted a priority-based approach to listing to save limited resources and maximize efficiency.¹⁴⁷ The FWS prioritizes on a “worst-first” basis; species that are in the greatest and most immediate danger are listed first.¹⁴⁸ It determines priority based on three criteria: magnitude of threat, immediacy of threat, and those species that represent a distinctive or isolated gene pool at a taxonomic level.¹⁴⁹ This system, however, retains flexibility because it only sets relative priorities and it makes exceptions.¹⁵⁰

The listing requirements in the ESA do not directly address listing a species based on the threat of climate change to the species or its habitat. Nor does the FWS specifically say that they will prioritize their candidates based on climate change threat; however, one listing decision recently received a lot of attention because it was directly related to climate change: the polar bear. The 2008 decision to list the polar bear as threatened triggered many lawsuits from a multitude of plaintiffs; some argued the FWS should have listed the polar bear as endangered, while others argued the FWS should not have listed it at all because the science is not definite.¹⁵¹ The court was not persuaded either way and ultimately found in favor of the agency.¹⁵² The court held that “[t]he task of defining and listing endangered and threatened species requires an expertise and attention to detail that exceeds the normal province of Congress, and of the courts as well.”¹⁵³ This conclusion by the court acknowledged that the FWS can list a species based on the

145. See *id.*

146. Endangered and Threatened Species Listing and Recovery Priority Guidelines, 48 Fed. Reg. 43,098, 43,098 (Sept. 21, 1983) (adopted by FWS and effective as of September 21, 1983).

147. *Id.*

148. *Id.* at 43,099.

149. *Id.* at 43,103.

150. *Id.* at 43,099, 43,102.

151. *In re Polar Bear Endangered Species Act Listing*, 794 F. Supp. 2d 65, 77, 81 (D.D.C. 2011).

152. *Id.* at 81-82, 116.

153. *Id.* at 81-82 (citing *Babbitt v. Sweet Home Chapter of Cmty. for a Great Or.*, 551 U.S. 687 (1995)) (internal quotations omitted).

threat to its habitat from climate change. Climate change contributes to the endangerment of species.

2. Critical Habitats Under the ESA

A critical habitat is defined under the ESA as “the specific areas within [or outside] the geographical area occupied by the species, at the time it is listed . . . on which are found those physical or biological features . . . essential to the conservation of the species and . . . which may require special management considerations or protection.”¹⁵⁴ When a species is listed as endangered or threatened, the Secretary shall determine and designate the habitat of that species, which will then be considered the “critical habitat.”¹⁵⁵ The designation of a critical habitat, like the decision whether to list a species, is determined based on the best scientific data available.¹⁵⁶ Additionally, determining a species’ critical habitat also requires a consideration of economic impact, any impact on national security, and other relevant impacts.¹⁵⁷ This means the Secretary conducts a cost/benefit analysis when determining whether to create a critical habitat and when determining its boundaries. Such analysis is discretionary. The Secretary may exclude areas from critical habitat designation if the benefits from exclusion outweigh the benefits of inclusion, unless it is determined that the failure to designate the area “will result in the extinction of the species concerned.”¹⁵⁸

As the primary agency empowered to implement the ESA, the FWS promulgated regulations stating criteria for designating a critical habitat.¹⁵⁹ The regulations state that critical habitats are to be determined, if prudent, at the time the species is proposed for listing.¹⁶⁰ It is not prudent to designate a critical habitat if: (1) the species is threatened by taking or other human activity

154. Endangered Species Act of 1973, 16 U.S.C. § 1532(5)(A) (2012).

155. 16 U.S.C. § 1533(a)(3).

156. 16 U.S.C. § 1533(b)(2).

157. *Id.*

158. *Id.*

159. 50 C.F.R. § 424.12 (2014).

160. 50 C.F.R. § 424.12(a).

and designating a habitat as critical will increase that threat, or (2) designating a critical habitat would not be beneficial to the species.¹⁶¹ A critical habitat cannot be determined if there is not enough scientific information on the impact of a designation or the needs of the species are not well enough known.¹⁶²

The FWS proposes the boundaries of critical habitats to be designated through notice and comment rulemaking in the Federal Register.¹⁶³ Once a habitat is designated as “critical,” the federal government must consult with the FWS before it can take any action within the specified area; this ensures federal actions will not destroy or adversely affect habitats of endangered or threatened species.¹⁶⁴ This consultation, however, is not required for private projects.¹⁶⁵ While critical habitats are not designed to be a refuge for endangered or threatened species, they do provide some extra protections for listed species, such as the consultation process.¹⁶⁶ The FWS uses the following criteria in determining a species’ critical habitat: “space for individual and population growth and for normal behavior; cover or shelter; food, water, air, light, minerals, or other nutritional or physiological requirements; sites for breeding and rearing offspring; and habitats that are protected from disturbances or are representative of the historic geographical and ecological distributions of a species.”¹⁶⁷

As of 2013, only 661 of the 1,499 species then listed as threatened or endangered also had a designated critical habitat.¹⁶⁸ This is because the FWS has placed a low priority on designating critical habitats, believing that the listing of species one-by-one is more important and a better use of resources.¹⁶⁹

161. 50 C.F.R. § 424.12(a)(1)(i)-(ii).

162. 50 C.F.R. § 424.12(a)(2)(i)-(ii).

163. Critical Habitat - What Is It?, U.S. FISH & WILDLIFE SERV., <http://www.fws.gov/Midwest/Endangered/saving/CriticalHabitatFactSheet.html> (last updated July 16, 2014).

164. *Id.*

165. *Id.*

166. *Id.*

167. 50 C.F.R. § 424.12(b); Critical Habitat - What Is It?, *supra* note 164.

168. Listing and Critical Habitat, *supra* note 122.

169. Critical Habitat - What Is It?, *supra* note 164.

Additionally, the FWS claims that critical habitats do not provide that much more protection for species and may actually have a reverse effect, resulting in harm.¹⁷⁰ With the threat of climate change looming, it may be more important to focus on a habitat approach to conservation, rather than the slow species-by-species listing currently prioritized.

3. Recovery Plans and Monitoring Under the ESA

ESA section 1533(f) provides the means for aiding species in recovery, arguably the main goal of the ESA. Under this section, the Secretary shall develop and implement “recovery plans” for the conservation and survival of the listed species.¹⁷¹ When developing the plans, the Secretary shall give priority to those listed species that are most likely to benefit from a recovery plan, particularly those species which may be in conflict with economic development projects.¹⁷² The Secretary must incorporate a description of the site-specific management actions, measurable criteria for determining when a listed species has recovered, and an estimate of the time and funding required to carry out the recovery plan.¹⁷³

The ESA also provides for the monitoring of recovered species to ensure they actually have recovered and do not need to be relisted.¹⁷⁴ There is a five-year minimum of monitoring required for such species.¹⁷⁵ If there is a risk of a recovered species having to be relisted, the ESA authorizes the Secretary to declare an emergency listing, which bypasses some of the timely requirements of the listing process.¹⁷⁶ Recovery plans and monitoring require a joint effort and the FWS works with states

170. *See id.* According to FWS, such harms may be due to “negative public sentiment to the designation, to inaccuracies in the initial area designated, and to the fact that there is often a misconception among other Federal agencies that if an area is outside of the designated critical habitat area, then it is of no value to the species.” *Id.*

171. Endangered Species Act of 1973, 16 U.S.C. § 1533(f)(1) (2012).

172. 16 U.S.C. § 1533(f)(1)(A).

173. 16 U.S.C. § 1533(f)(1)(B).

174. 16 U.S.C. § 1533(g)(1).

175. *Id.*

176. 16 U.S.C. § 1533(g)(2).

and other partners to help listed species recover.¹⁷⁷ The tools of recovery consist of “restoring and acquiring habitat, removing introduced animal predators or invasive plant species, conducting surveys, monitoring individual populations, and breeding species in captivity and releasing them into their historic range.”¹⁷⁸ Additionally, the ESA grants the Secretary discretion to encourage the conservation of listed species, allowing the Secretary to issue any regulation “he deems necessary” to conserve threatened and endangered species.¹⁷⁹ This provision grants the FWS conservation powers termed “special rules,” which allow the FWS a flexible mechanism to customize protections to fit the needs of individual species.¹⁸⁰

In addition to the listing priority guidelines, the FWS also prioritizes recovery plans.¹⁸¹ It gives priority for recovery plans to “those species and projects that offer the greatest potential for success.”¹⁸² Priority is determined based on four criteria to help identify which species will benefit most from a recovery plan: degree of threat, recovery potential, taxonomic status, and conflict (whether a species is in conflict with construction or other development or economic projects).¹⁸³ Once it creates recovery plans, the FWS then prioritizes tasks within the plan: first priority goes to those tasks that are taken to prevent extinction or irreversible decline, second priority to those tasks that are taken to prevent significant decline in species or habitat quality, and third priority to all other tasks providing for recovery.¹⁸⁴ The FWS then publishes the recovery plans for each species.¹⁸⁵

177. Recovery: Overview, U.S. FISH & WILDLIFE SERV., <http://www.fws.gov/endangered/what-we-do/recovery-overview.html> (last updated July 15, 2013).

178. *Id.*

179. 16 U.S.C. § 1533(d).

180. See Endangered Species Recovery Program, U.S. FISH & WILDLIFE SERV. (June 2011), <http://www.fws.gov/endangered/esa-library/pdf/recovery.pdf>.

181. Endangered and Threatened Species Listing and Recovery Priority Guidelines, 48 Fed. Reg. 43,098, 43,098 (Sept. 21, 1983).

182. *Id.* at 43,101.

183. *Id.* at 43,103-04.

184. *Id.* at 43,104.

185. For a list of recovery plans by species, see *Species and Populations with Recovery Plans*, U.S. FISH & WILDLIFE SERV. ENVTL. CONSERVATION ONLINE

Recovery plans, the conservation “special rule,” and monitoring certainly aid species in recovering from endangerment, but, as currently written and implemented, they are not enough. Recovery plans do not exist for even close to all of the currently listed threatened and endangered species. In fact, there are only seventy-six plans for endangered mammals.¹⁸⁶ The success stories of recovery plans that have worked are few.¹⁸⁷

The delisting and relisting of the grizzly bear offers one prime example of how the recovery plans are currently not working as they should. In 2009, the FWS decided the grizzly bear had recovered and delisted it under the ESA; this act was challenged in court.¹⁸⁸ The court held that the conservation strategy for the grizzly bear was inadequate and the grizzly bear population

SYS., http://ecos.fws.gov/tess_public/pub/speciesRecovery.jsp?sort=1 (last visited Nov. 1, 2014). An example of a recovery plan is that of the endangered blue whale. See RANDALL R. REEVES ET AL., NAT'L MARINE FISHERIES SERV., RECOVERY PLAN FOR THE BLUE WHALE (*BALAENOPTERA MUSCULUS*) (1998), available at http://ecos.fws.gov/docs/recovery_plan/whale_blue.pdf. The plan provides a background: species description and taxonomy, zoogeography, and protective legislation enacted. See *id.* at 2-3. The plan then discusses the natural history and human impacts of both the North Atlantic population and the North Pacific population of blue whales. See *id.* at 4-17. After giving the necessary background, the plan lays out the recovery actions and goals. See *id.* at 17-27. The main goal of the blue whale recovery plan is to get the populations large enough to downlist the whale from endangered to threatened. *Id.* at 17. The plan proposes to do this by identifying actions that will minimize the adverse human activities that are currently endangering the whale and implementing tasks to achieve the goal. *Id.* at 17-18. The plan provides an outline for the tasks: determine the stock structure of the blue whale population; estimate the size and monitor the trends in populations; identify and protect essential habitats for the whales; reduce or eliminate human caused injury or death to the whales; minimize detrimental effects from vessel interactions; maximize efforts to acquire scientific information about the whales; coordinate federal, state, and international recovery efforts; and establish criteria for downlisting. See *id.* at 19-27.

186. See Species and Populations with Recovery Plans, *supra* note 186.

187. The FWS “success stories” website only lists five success stories since 2010: the Oregon Chub, the Lake Erie Watersnake, the Maguire Daisy, the Okaloosa Darter, and the Tennessee Purple Coneflower. See *Recovery Success Stories*, U.S. FISH & WILDLIFE SERV., <http://www.fws.gov/endangered/what-we-do/recovery-stories.html> (last updated July 15, 2013).

188. See *Greater Yellowstone Coal., Inc. v. Servheen*, 672 F. Supp. 2d 1105, 1109 (D. Mont. 2009).

would decline if it were not listed under the ESA.¹⁸⁹ The court also found the FWS did not adequately consider the effects of climate change on the grizzly's food source, noting the adverse impact climate change can have on species a few years before the listing of the polar bear.¹⁹⁰ The court enjoined the FWS from delisting the grizzly bear.¹⁹¹ This lawsuit demonstrates how recovery plans, as currently implemented, may be an inadequate means for saving endangered and threatened species.

While there are several mechanisms in place under the ESA to protect and encourage recovery for those species listed as threatened or endangered, the ESA is not currently an effective tool to fight the adverse effects of climate change on species. Amendments to the ESA could be implemented that would protect species from the impacts of climate change and help strengthen the ESA's protections.

B. *Amending the Act*

The following section outlines proposed amendments to the ESA to make it a more effective tool to combat the adverse effects climate change has on species and biodiversity. The proposed amendments are simply examples of possible changes that could be made to strengthen the ESA. While such changes could be made throughout the entire ESA, these amendments only consider changes to Section 1533—determination of endangered species and threatened species. Also, while many of these amendments may, and most likely would, affect other

189. *Id.* at 1126.

190. *Id.* at 1118, 1126.

191. *Id.* at 1126. The decision by the U.S. District Court was appealed and the Ninth Circuit affirmed the District Court's determination on the possible negative impacts of climate change on the grizzly bear; however, the Court reversed the lower court's ruling that the conservation plans were inadequate. *Greater Yellowstone Coal., Inc. v. Servheen*, 665 F.3d 1015, 1032 (9th Cir. 2011). Despite that reversal, the grizzly bear was ultimately relisted as threatened under the ESA and a new recovery plan was recently drafted and published for notice and comment. *See* Grizzly Bear Recovery - Yellowstone Ecosystem, U.S. FISH & WILDLIFE SERV., <http://www.fws.gov/mountain-prairie/species/mammals/grizzly/yellowstoneindex.html> (last updated May 21, 2013).

sections of the ESA, such effects are beyond the scope of this paper.

1. Listing

Currently, the ESA lists species on an individual basis, determining species-by-species whether to list.¹⁹² This decision is done based solely on the “best scientific and commercial data” and the “status of the species;”¹⁹³ it is not based on prioritizing the utility of one species over another. While it could be argued that this is what the FWS is doing, prioritizing species for listing is not allowed under the ESA.¹⁹⁴ The Senate did consider such prioritizing when it amended the ESA in 1982, arguing “[b]iologically it makes sense . . . to place some special emphasis on protecting plants and invertebrates since they form the bases of ecosystems and food chains upon which other life depends.”¹⁹⁵ This approach, however, was rejected.¹⁹⁶ The FWS decided that all species are “of some importance to ecosystems,” the fact that one species may be more ecologically important than another should not be a factor in the listing priority system.¹⁹⁷ But should the ESA be amended to allow for prioritizing to make the listing and conservation of some species more important than others?

In ecosystems, there are certain species known as “keystone species,”¹⁹⁸ whose “existence seems to be essential to maintaining ecosystem structure . . . keystone species have a disproportionate impact on ecosystems due to their size . . . or

192. See, e.g., Ruhl, *supra* note 90, at 32.

193. Endangered Species Act of 1973, 16 U.S.C. § 1533(b)(1)(A) (2012).

194. See Endangered and Threatened Species Listing and Recovery Priority Guidelines, 48 Fed. Reg. 43,098, 43,098 (Sept. 21, 1983) (outlining the priority guidelines used by the FWS for listing species). See also The Candidate Conservation Process, *supra* note 144 (stating that the FWS gives priority numbers based on threat but it does not prioritize based on the utility of the species).

195. S. REP. NO. 97-418, at 14 (1982).

196. Endangered and Threatened Species Listing and Recovery Priority Guidelines, 48 Fed. Reg. at 43,101.

197. *Id.*

198. WILLIAM M. ADAMS, *AGAINST EXTINCTION: THE STORY OF CONSERVATION* 127 (2004).

their activities.”¹⁹⁹ Many conservationists argue that the focus should be on preserving particular species over others²⁰⁰ because keystone “species are the building blocks of ecosystem . . . and their survival is essential to all wider conservation goals.”²⁰¹ Sea otters serve as a prime example to demonstrate how a “keystone species” works in an ecosystem.²⁰² Sea otters live in salt-water ecosystems that are known as kelp beds because of the vast amount of giant kelp. The sea otters eat sea urchins also living in the kelp beds. The sea urchins eat algae. Without the sea otters, the population of sea urchins increases and strips the ocean floor of vegetation, removing the kelp beds. Without the kelp beds, the whole ecosystem living in the kelp beds disappears, including fish species and crabs that live there. This whole underwater ecosystem could potentially be destroyed without sea otters, which are currently listed as threatened under the ESA.²⁰³

Congress should amend the ESA to place a greater priority on keystone species, like sea otters, to help make sure whole ecosystems are not threatened. This is especially true if the species or ecosystem is threatened by climate change. The amendment would be added to section 1533(b) as another factor to consider on the basis of determining whether to list a species. The section would read (proposed amendment in bold):

(b) Basis for determinations

(1)(A) The Secretary shall make determinations . . . solely on the basis of the best scientific and commercial data available . . .²⁰⁴

(B) The Secretary may make determinations required by subsection (a) (1) of this section if, by relying on the best scientific and commercial data available, the Secretary

199. *Id.*

200. *Id.* at 128.

201. *Id.*

202. See *id.* at 126-27 (describing the importance of sea otters in kelp forest ecosystems and explaining how the loss of sea otters can lead to the removal of vast kelp beds through an overabundance of sea urchins).

203. See Southern Sea Otter, U.S. FISH & WILDLIFE SERV., <http://www.fws.gov/ventura/endangered/species/info/sso.html> (last modified Sept. 30, 2014).

204. Endangered Species Act of 1973, 16 U.S.C. § 1533(b)(1)(A) (2012).

determines that a species threatened or endangered is a keystone species of an ecosystem. If such a determination is made, the keystone species may be listed as a priority species under this section, requiring extra measures to be taken to conserve the species.

(C) In carrying out this section, the Secretary shall give consideration to species²⁰⁵

This change would allow the Secretary and the FWS to use their discretion in giving priority to certain threatened or endangered keystone species. The change also would make it easier to list such species. For example, if a keystone species could be adversely affected by climate change, thus putting its whole ecosystem in jeopardy, the Secretary and the FWS may choose to list the species even if it is not currently threatened or endangered. This amendment could also help prioritize the listing of endemic species—species that are only found in one location—as the amendment would create a sort of hierarchy in the listing process.

There are, of course, challenges with prioritizing the listing system. One major problem is that “it provides no easy point of reference for the FWS to use to identify the species to be considered in devising a priority list.”²⁰⁶ This is because, under a priority ranking system, all species, even those not endangered or threatened, would have to be ranked by importance in the ecosystem.²⁰⁷ Additionally, it would be difficult to determine how much more or less protection to give priority species, since, as currently applied, the ESA has a uniform approach.²⁰⁸ It seems to make most sense to adopt some kind of a range of differing protections based on priority if the Secretary chooses to prioritize a species under the proposed amendment.

Generally, the ESA considers five broad factors when determining whether to list a species as threatened or

205. See 16 U.S.C. § 1533(b)(1)(B) (the proposed amendment changing this portion to subsection (C)).

206. Doremus, *supra* note 41, at 331.

207. *Id.*

208. *Id.* at 332.

endangered.²⁰⁹ One of those factors is “the present or threatened destruction, modification, or curtailment of [the species’] habitat or range.”²¹⁰ It was this factor that the FWS relied upon to list the polar bear, asserting that the loss of arctic ice threatened to destroy the polar bears’ habitat and qualified it for listing.²¹¹ While the FWS linked this threatened habitat destruction to climate change by relying on the IPCC report, it did not say that climate change was a factor used to list species. The ESA should be amended to state that climate change can be used as a factor for listing purposes. The FWS can use factors already in the ESA, as it did in *In re Polar Bear*, but continued reliance on interpretation of science to list species may continue to get pushback and lead to more court decisions. The decision to list the polar bear received much pushback from groups that do not believe the science demonstrating climate change is real; they asserted many arguments that climate science is too uncertain and therefore should not be used as a tool to list species.²¹² Listing already takes months, if not years, and continued fights over whether climate change is real will only delay the listing of those species, like the polar bear, that are being adversely affected by rising global temperatures.

To stop the fights over whether climate change should be seen as a factor that threatens destruction of a species habitat under the current ESA factors, Congress should add climate change as a factor to the ESA. If it were an added factor, there would no longer be court battles over whether the FWS misapplied or misinterpreted the ESA²¹³ when it lists species based on the threat climate change poses to it. The amendment would be added to section 1533(a)(1) as a sixth factor to consider. The section would read (proposed amendment in bold):

(a) Generally

209. 16 U.S.C. § 1533(a)(1).

210. 16 U.S.C. § 1533(a)(1)(A).

211. *In re Polar Bear Endangered Species Act Listing*, 794 F. Supp. 2d 65, 76 (D.D.C. 2011).

212. *Id.* at 69, 91.

213. *Id.* at 90-91 (addressing the joint plaintiffs’ argument that FWS “misinterpreted and misapplied the ESA when it concluded that the polar bear is likely to become endangered within the foreseeable future”).

(1) The Secretary shall . . . determine whether any species is an endangered species or a threatened species because of any of the following factors:

(A) . . . ;²¹⁴ or

(F) present or threatened destruction of the habitat or range of a species or the decrease in population size of a species due to the global climate warming trend and changes in atmospheric or oceanic circulation.

This amendment would give the FWS a more concrete way to list species threatened by climate change, such as the polar bear. The FWS would still have to consider the science and would still go through the “candidate conservation process,” but with climate change as a factor in the ESA, the process could be much smoother and may provide for less resistance. Additionally, the Obama Administration has signaled that it recognizes the specter of climate change and will use the ESA to identify climate-threatened species.²¹⁵

Listing multi-species or entire ecosystems at a time is another consideration to examine, since the “central purpose of the ESA is to ‘provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved.’”²¹⁶ This would replace the current species-by-species approach. As the “current reduction of diversity . . . [is] the most extreme in the past 65 million years,”²¹⁷ one could make a strong argument that the current species-by-species listing system is too slow. According to Professor Holly Doremus, “[t]he species-by-species focus of the ESA precludes effective protection of biological diversity, which should properly be the focus of protective policy.”²¹⁸ If whole ecosystems were considered for listing, the conservation process could be greatly expedited and prioritizing based on utility (for that particular ecosystem) would not be necessary.

214. See 16 U.S.C. § 1533(a)(1).

215. J.B. RUHL, PIT BULLS CAN’T FLY: ADAPTING THE ENDANGERED SPECIES ACT TO THE REALITY OF CLIMATE CHANGE 11 (2009).

216. *Id.* at 5.

217. Wilson, *supra* note 2, at 11-12.

218. Doremus, *supra* note 41, at 265.

Ecosystems are distinctive. Every ecosystem type “has a unique structure that allows energy and nutrients to flow among its various components.”²¹⁹ This means that “[w]henver a naturally or human-induced disturbance occurs within an ecosystem, its dynamic composition, structure, and functions change.”²²⁰ This means that listing species individually, instead of in a multi-species or ecosystem approach, could create disturbances in the ecosystem as a whole. Focusing on the conservation of one species in the ecosystem may have the desired effect of saving that particular species, but this type of listing may not take into account the effects on other species, vertebrate and invertebrate, within that shared space.

As examined when discussing keystone species, all species in an ecosystem have functions:

The absence of seemingly insignificant species within an ecosystem may have widespread implications for the existence of other species in an ecosystem. Some species may be more “essential” than others from a functional or ecological perspective . . . Other species may be important as indicators of the integrity of the ecosystem in which they occur . . . Understanding what roles species . . . play in maintaining habitat quality for other species and their functions within ecosystems may be valuable in land-use planning and natural resource policy intended to maintain biodiversity.²²¹

Biological conservationists assert, therefore, that it is important to understand how each species in an ecosystem interacts with one another before taking steps that could impact the system, like various conservation efforts.

These types of multi-species or ecosystem approaches have been tried before, but in the recovery context and not with listing. One example is the South Florida Multi-Species Recovery Plan (MSRP).²²² The MSRP contains information on the biology,

219. Richard K. Baydack & Henry Campa III, *Setting the Context, in PRACTICAL APPROACHES TO THE CONSERVATION OF BIOLOGICAL DIVERSITY* 3, 12 (Richard K. Baydack, Henry Campa III & Jonathan B. Haufler eds., 1999).

220. *Id.*

221. *Id.* at 13.

222. *See* South Florida Multi-Species Recovery Plan, U.S. FISH & WILDLIFE SERV., <http://www.fws.gov/verobeach/listedspeciesMSRP.html> (last updated July 23, 2014).

ecology, status, trends, management, and recovery actions for sixty-eight South Florida species listed under the ESA.²²³ The idea behind the multi-species approach was to help restore and maintain the biodiversity in South Florida's natural communities.²²⁴ The MSRP includes mammals, such as the Florida panther and the West Indian manatee, birds, reptiles, invertebrates, and plants.²²⁵ The plan also considers many different ecological communities in South Florida, like coastal, marsh, mangrove, swamp, flatland, and reef communities.²²⁶ Another example is the Recovery Plan for Hawaiian Forest Birds.²²⁷ This plan covers twenty-one different species of Hawaiian forest bird. Most are listed as endangered²²⁸ and are found in the same ecosystem: upper elevation rain forests on the islands of Hawaii, Maui, and Kauai.²²⁹ The goal of this plan was to bring together all of the single plans for each species and turn them into one comprehensive plan that would benefit all the different listed birds.²³⁰

Multi-species and ecosystem planning is still controversial within the biological community and is often critiqued, indicating multi-species or ecosystem listing under the ESA probably would be critiqued as well. Such criticisms assert that it is too unclear what criteria FWS uses to decide when to use a multi-species approach and that, if not appropriately grouped based on threats, there may not be any utility in using such an approach.²³¹ Additionally, critics have argued that single-species plans are more beneficial because they provide a better foundation for recovery, as each species has different characteristics and threats that should be individually

223. *Id.*

224. *Id.*

225. *Id.*

226. *Id.*

227. See U.S. FISH & WILDLIFE SERV., REVISED RECOVERY PLAN FOR HAWAIIAN FOREST BIRDS (2006), available at http://ecos.fws.gov/docs/recovery_plan/060922a.pdf

228. *Id.* at viii.

229. *Id.*

230. *Id.* at xii.

231. See Parenteau, *supra* note 15, at 323.

addressed, and because group plans provide less attention to each species within the plan.²³²

However, multi-species or ecosystem listing under the threat of climate change could alleviate some of those concerns. Since this type of listing would be based purely on the threat of climate change to the ecosystem and the species within the ecosystem, threats to individual species would not be of as much concern; the threat would be the same to all. Also, with this approach, the focus would shift to a “bigger picture” view, looking at helping all of those species threatened by climate change in that ecosystem and taking action to protect them all at once. This is a much faster approach than the current species-by-species listing system and could help some species that may not yet be threatened or endangered, but may become so as the climate warms.

Arguably, Hawaii is already doing this with its Forest Birds Plan. Since the threats to the birds are the same, the area where they are found is relatively small and contained in one ecosystem, and all of the birds are highly endangered, Hawaii is grouping these birds together to speed up the recovery process.²³³ If it looked at listing this way, the FWS would consider multiple species and whole ecosystems as one before it came time to create recovery plans. Thus, when creating the plan, the FWS would already have created the group and could then devise one plan.

The amendment would still allow for the traditional single species approach but would allow for multi-species or ecosystem listing as well. The amendment would be added to section 1533(c). The section would read (proposed amendment in bold):

(c) Lists

(1) The Secretary . . . shall publish . . . a list of all species **or ecosystems** determined by him . . . to be endangered species or ecosystems and a list of all species **or ecosystems** determined by him . . . to be threatened species **or ecosystems**. Each list shall refer to the species contained therein by scientific and common

232. See *id.*

233. See Revised Recovery Plan for Hawaiian Forest Birds, *supra* note 228, at viii-ix, xii.

name or names, if any, specify with respect to each such species over what portion of its range it is endangered or threatened, and specify any critical habitat within such range. **If listing an ecosystem as a whole, the list shall refer to the ecosystem by type, such as wetland or old-growth forest, location, and size, as well as specifying particular species that live in the listed ecosystem.** The Secretary shall from time to time revise each list . . .²³⁴

Additionally, since this amendment is meant to speed up the process of protection for endangered and threatened species under the ESA, the section on timing of review should be amended as well. The amendment would be added to section 1533(c)(2). The section would read (proposed amendment in bold):

(2) The Secretary shall—

(A) conduct, **at least once every two years**, a review of all species **and ecosystems** included in a list . . .²³⁵

This change would allow for a faster process and would take into account an issue that threatens more than one species and, in some cases, whole ecosystems. This process would also be more efficient. If each species threatened by climate change were to be individually listed, as the process is currently set up, FWS would have potentially thousands of different species to research and possible scenarios to track.²³⁶

Additionally, this ecosystem approach could account for the protection of unknown species, or species with unknown benefits. An example is the case of the spotted owl. When it was listed, the spotted owl raised a lot of controversy because only a specific habitat could “provide the birds with both enough large hollow trees for nesting and an expanse of open understory.”²³⁷ Loggers and environmentalists fought over the owl’s designation, but “overlooked . . . was the fate of an entire habitat, the old-growth coniferous forest, with thousands of other species of plants,

234. See Endangered Species Act of 1973, 16 U.S.C. § 1533(c)(1) (2012).

235. See 16 U.S.C. § 1533(c)(2)(A) (as currently written, mandating the Secretary to conduct a review of listed species at least once every five years).

236. Ruhl, *supra* note 90, at 12.

237. WILSON, *supra* note 24, at 258-59.

animals, and microorganisms . . . Among them are three rare amphibian species . . . Also present is the western . . . source of taxol, one of the most potent anti-cancer substances ever found.”²³⁸

The listing of the spotted owl and the designation of its critical habitat proved beneficial not just for the owl, but for saving species that were not even known to be rare or beneficial. Species like the spotted owl serve as a symbol for their endangered ecosystem.²³⁹ If whole ecosystems were listed, this surprising conservation of rare and beneficial species could happen more often.

[W]hen the entire habitat is destroyed, almost all of the species are destroyed. Not just eagles and pandas disappear, but also . . . the invisible players that make up the foundation of the ecosystem. Conservationists now . . . place emphasis on the preservation of entire habitats and not only the charismatic species within them . . . The relationship is reciprocal: when star species . . . are protected, they serve as umbrellas for all the life around them. And so to threatened and endangered species must be added a growing list of entire ecosystems, compromising masses of species.²⁴⁰

Incorporating a multi-species scope is not new; Congress passed an all-encompassing species protection act when it passed the Marine Mammal Protection Act, which states that “its primary objective is the maintenance of the health and stability of the marine ecosystem” and seeks to protect all marine mammals.²⁴¹

Additionally, multi-species and/or ecosystem listing has been presented before. In 1990, the Inspector General of the Department of the Interior, concerned by the ineffective implementation of the ESA at the time, recommended immediate listing of all imperiled species using multi-species listing to expedite the process.²⁴² In 1992, in another effort to expedite the

238. *Id.*

239. ROMAN, *supra* note 50, at 181.

240. WILSON, *supra* note 24, at 259-60.

241. Doremus, *supra* note 41, at 303.

242. ROMAN, *supra* note 50, at 181-82.

listing process, several environmental and animal activist groups sued the FWS.²⁴³ The lawsuit resulted in a few listing changes, including a commitment by FWS to pursue a multi-species, ecosystem approach to listing.²⁴⁴ According to the settlement, FWS now will recognize that such an approach “will assist . . . in better analyzing the common nature and magnitude of threats facing ecosystems, help . . . understand[] the relationships among imperiled species in ecosystems, and be more cost-effective than a species-by-species approach to listing responsibilities.”²⁴⁵ The Obama Administration has also endorsed a whole-ecosystem listing approach.²⁴⁶ While there seems to be much support, there does not seem to be as much implementation. The proposed amendment would fix that.

Finally, since it is established that there are species, like the polar bear, that are not currently endangered, but will be in the near future due to climate change, the ESA should list for preventive purposes. This list would be different from the current threatened and endangered list. Its purpose would be to list species that have the potential to become endangered or threatened in the future because of threats like climate change, but are currently thriving or at least of little concern. This list would be preventative in nature and the species would be of a lower priority for protection than those listed as threatened or endangered.

An example of a program that combines prevention and conservation of species, landscapes, and biological communities is California’s Natural Community Conservation Planning Act (NCCP).²⁴⁷ California decided that the ESA and the CESA—California’s version of the ESA—did not provide enough protection against the threats to California’s wildlife. The legislature, with the goal of conserving the state’s “wildlife

243. See Eric R. Glitzenstein, *On the USFWS Settlement Regarding Federal Listing of Endangered Species*, 10 *ENDANGERED SPECIES UPDATE* 1, 1 (1993) (referring to *The Fund for Animals et al. v. Turner*, Civ. No. 92-800).

244. *Id.* at 3.

245. *Id.*

246. ROMAN, *supra* note 50, at 183.

247. See CAL. FISH & GAME CODE §§ 2800-2840 (West 2003).

heritage,” adopted the NCCP in response.²⁴⁸ Under NCCP Plans, “covered species” are defined as those listed under the ESA and the CESA, as well as non-listed species, which are to be conserved and managed under the Plan.²⁴⁹ This means that California protects even those species that are not yet technically endangered or threatened. California’s approach is forward-looking; the state understands that even if species are not currently listed, they may someday. California is taking measures to prevent the possibility that all its wildlife will decline, even those species that are currently thriving.

FWS had a list that included non-endangered and non-threatened species called the “Category-2” list.²⁵⁰ “Category-2 candidates were species for which the Service had information indicating that protection under the Act may be warranted but for which it lacked sufficient information on status and threats to determine if elevation to ‘Category-1 candidate’ status was warranted.”²⁵¹ In other words, the list that contained species that had potential to become threatened or endangered and should be monitored. The FWS discontinued this list in 1996.²⁵²

248. FISH & GAME § 2801.

249. FISH & GAME § 2805(e).

250. *See* Endangered and Threatened Wildlife and Plants; Notice of Final Decision on Identification of Candidates for Listing as Endangered or Threatened, 61 Fed. Reg. 64,481, 64,481 (Dec. 5, 1996) [hereinafter Notice of Final Decision].

251. *Id.*

252. *Id.* In discontinuing the list, FWS stated:

When the Service first started publishing . . . lists of candidates and potential candidates, no comparable list existed. . . Now, a number of agencies and organizations track species that may be declining, including State natural resource agencies and Natural Heritage Programs, Federal land-management agencies, the Biological Resources Division of the U.S. Geological Survey (USGS), professional societies, and conservation organizations. . . Duplicative effort to maintain lists is not the best use of limited endangered species funding. . . It is the intent of the Service to work with all interested parties and to use scientifically credible sources of peer-reviewed information, when available, to identify new candidate species.

The need for a species of concern list extends beyond implementation of the Endangered Species Act. Using the old Category-2 list as a “species of concern” list was inappropriate; it is widely believed that sensitive, rare, and declining species are more inclusive than those found in the old Category-2 list. Many Divisions of the Fish and Wildlife Service, such as Migratory Birds, Refuges,

There were a variety of adverse comments to FWS's decision to discontinue the Category-2 listing and FWS had a response to each. FWS's main response was that Category-2 lists were beyond the scope of the ESA.²⁵³ FWS also cited other federal laws that mandate the protection of biodiversity, stating these laws should take care of species that might have fallen under Category-2.²⁵⁴ While this may have been true, the oncoming threat of climate change and how it will affect species seems to point in the opposite direction, meaning it may be time to reinstate a list similar to Category-2.

With the goal of prevention in mind, and despite the FWS's reservations, the ESA should be amended to include currently non-threatened and non-endangered species that have the potential to become listed due to climate change. The amendment would be added as a new section, making it section 1533(j). The section would read (proposed amendment in bold):

(j) Least Concern²⁵⁵ Species

(1) The Secretary shall by regulation determine whether any species is a "least concern" species. A species may be considered least concern if it may be threatened, due to the threat of climate change, within the foreseeable future.

Endangered Species, Habitat Conservation, Environmental Contaminants, and Fish and Wildlife Management Assistance will continue to work with partners to identify and protect species of concern.

Id.

253. *Id.*

254. *Id.* at 64,482.

255. This label is based on a labeling system used by other conservation groups, such as the IUCN Red List and the World Wildlife Fund, which break threatened species up into more levels than just threatened and endangered. The IUCN Red List has seven different labels: least concern, near threatened, vulnerable, endangered, critically endangered, extinct in the wild, and extinct. See IUCN, IUCN RED LIST CATEGORIES AND CRITERIA: VERSION 3.1, AT 14-15, (2nd. ed. 2012), available at http://jr.iucnredlist.org/documents/redlist_cats_crit_en.pdf. The World Wildlife Fund, when petitioning for "species adoptions," breaks species into three categories: near threatened/least concern, endangered/vulnerable, and extinct/extinct in the wild/critically endangered. See Species Adoptions, WORLD WILDLIFE FUND, <http://gifts.worldwildlife.org/gift-center/gifts/Species-Adoptions.aspx> (last visited Feb. 2, 2014) (click on the "Sort By" drop-down menu, then select "Threat Level").

(A) A species shall be classified as "least concern" determined solely based on the best scientific and commercial data available to the Secretary after conducting a review of the current status of the species and its habitat, as well as potential threats of climate change to the status of the species and its habitat.

(B) In carrying out this section, the Secretary shall give consideration to species that are not currently threatened, but may become so within the foreseeable future.

(2) The purpose of this section is to create a lower status of protection and designation for species other than "threatened." Therefore, species placed on this list have a lower protection priority than species already listed as threatened or endangered under subsection (a) of this section.

(A) This section acts as a preventive measure to conserve potentially threatened species, due to climate change, before they are eligible for listing under subsection (a) of this section.

(3) The Secretary shall designate a habitat for least concern species on the basis of the best scientific data available. This habitat shall be published in the Federal Register.

(A) The designated habitat of least concern species shall serve as a monitoring tool. Once designated as a habitat for a least concern species, the Secretary shall monitor that habitat once every two years and determine if the habitat and the species have changed due to climate change. If there has been a substantial change, the Secretary shall re-evaluate the listing of the species and habitat under subsections (a) and (b) of this section.

(B) Once a species is listed as least concern and a habitat has been designated, the Secretary shall implement a conservation plan aimed at protecting the listed species population from declining in number. The goal of this plan is prevention, therefore, the plan should not be as restrictive in nature as conservation plans for threatened species or endangered species under this section. Rather, the plan should take into consideration development and growth to the extent that

it may interfere with the population size of a least concern species.

(4) Interested persons may petition the Secretary to list a species as least concern and to designate a habitat. Interested persons may also petition the Secretary to re-evaluate a listed least concern species. The Secretary shall respond to all petitions in accordance with this section and section 553(e) of Title 5.

This change allows for the conservation of a broader range of species and would work to start protecting species before they become threatened or endangered. FWS Region Three already has a similar program called “Species of Concern.”²⁵⁶ “Species of Concern” refers to species which Region Three believes “might be in need of concentrated conservation actions,” that vary depending on the health of the species in question.²⁵⁷ Under Region Three’s program, “Species of Concern” receive no legal protection and the designation does not necessarily mean the species will end up on the list.²⁵⁸

Since the goal is prevention, the list would serve as a monitoring and awareness tool to help ensure that species that could face a threat like climate change are noticed before that threat comes into existence. The amendment also provides for interested persons, like wildlife conservation advocates, to have a comprehensive list of species to monitor. The amendment provides such groups with a means to hold the FWS accountable—that they are doing their job by keeping conservation as a main goal.

Each of the amendments to ESA’s listing process proposed above would aid in creating a comprehensive scheme furthering protection of all species from the threat of climate change. However, listing is not the only place the ESA could be amended to address this threat.

256. See Species of Concern, U.S. FISH & WILDLIFE SERV., <http://www.fws.gov/midwest/es/soc/> (last visited Feb. 14, 2014).

257. Id.

258. Id.

2. Critical Habitats

Protecting habitats—where biodiversity exists—is critical. The destruction and degradation of habitats is the most pervasive threat to biodiversity.²⁵⁹ Habitat destruction contributes to the endangerment of approximately eighty-five percent of species.²⁶⁰ Stating that habitat destruction is one of the horsemen of the environmental apocalypse,²⁶¹ E.O. Wilson, a top authority on biodiversity science, argues, “the only way to save wild species is to maintain them in their natural habitats.”²⁶² Wilson goes on to assert:

[C]onservation experts have shifted their focus . . . from individual plant and animal groups (species) to entire threatened habitats, whose destruction would cause the extinction of many species . . . The logic of experts is simple: by concentrating conservation efforts on such areas, we can save the largest amount of biodiversity at the lowest economic cost.²⁶³

Currently, critical habitat is determined on a species-by-species basis, only becoming designated if a species has been listed and if its critical habitat can readily be identified.²⁶⁴ Not all listed species have designated critical habitats.²⁶⁵ Therefore, many of the above recommendations, such as expanding listing to ecosystems, would also apply to the designation of critical habitats. However, since habitat is imperative to the conservation of species, the ESA should be amended to make sure that every listed species has at least some part of its range designated as a critical habitat. The amendment would be added to section 1533(b)(2). The section would read (proposed amendment in bold):

(2) The Secretary shall designate critical habitat . . . on the basis of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any

259. Wilcove et al., *supra* note 84, at 242.

260. *Id.*

261. WILSON, *supra* note 24, at 253.

262. Wilson, *supra* note 24, at 20.

263. *Id.*

264. Endangered Species Act of 1973, 16 U.S.C. § 1533(a)(3) (2012).

265. *See* Critical Habitat - What Is It?, *supra* note 164.

other relevant impact, of specifying any particular area as critical habitat. **The Secretary shall designate at least some part of the range of every endangered species and threatened species listed under subsection (a)(1) of this section.** The Secretary may exclude any area from critical habitat if he determines that the benefit of such an exclusion outweighs the benefits of specifying such area as part of the critical habitat, unless **the exclusion would result in no area being designated as critical habitat or unless** he determines, based on the best scientific and commercial data available, that the failure to designate such area as critical habitat will result in the extinction of the species concerned.²⁶⁶

This guarantee would remove some of the discretion FWS currently has in deciding not to designate critical habitats for species, but would allow for the cost/benefit analysis to remain in place. This amendment would also guarantee that each listed species has some form of protected area.

One major issue with the designation of critical habitat as it intersects with threats from climate change is that species are going to move and migrate as the global climate changes. This is called species range shift: as the climate changes, species tend to move toward the poles.²⁶⁷ Lawler, along with other biological ecologists, have tried to model the set of climates species are able to exist in today and then, using projected future climate data, have tried to figure out where suitable climate space will be for those species in the future.²⁶⁸ Lawler and his colleagues used that data to create maps for many species showing where the species exist today, where they will move to in the future, and where they will not be able to survive in the future.²⁶⁹

Lawler then studied how species would migrate and what paths they might take to get to the newly climatically suitable habitat.²⁷⁰ Using the Human Influence Index, which essentially measures humanity's impact on land, Lawler looked for routes

266. See 16 U.S.C. § 1533(b)(2).

267. See Lawler, *supra* note 71.

268. *Id.* (This type of modeling is called a bioclimatic model or species distribution model.)

269. *Id.*

270. *Id.*

that would provide paths to newly suitable climates, as well as avoiding areas of high human land use.²⁷¹ Lawler then calculated the movement of animals to determine pathways that species would likely take.²⁷² He did this with ten different climate models using about 3,000 species, creating a summary map of movements and pathways of migration.²⁷³ This map showed how much movement, the direction of movement, and the agreement in the direction of movement (i.e. how many species of the 3,000 were all moving in the same direction) species may take.²⁷⁴ The map defined primary corridors of species movement based on human impact and climate change and assumes that species will take the least cost and “smartest” path through the landscape.²⁷⁵ For example, there was a potentially large corridor of movement in the Appalachian Mountains.²⁷⁶

These maps can identify conservation areas that would promote the movement of species in a changing climate.²⁷⁷ The ESA could use this information to protect the major migratory paths and corridors that species will take as the climate changes through designating them as a critical habitat. The amendment would be added to section 1533(b). The section would read (proposed amendment in bold):

(3) The Secretary shall designate critical habitat corridors, and make revisions thereto, under subsection (a)(3) of this section on the basis of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impact, of specifying any particular pathway as a critical habitat corridor. A critical habitat corridor shall only be designated if it can be determined to be a major pathway through which multiple species, affected by climate change, will use to

271. *Id.*

272. *Id.*

273. *Id.*

274. *Id.*

275. *Id.*

276. *Id.*

277. *Id.*

migrate to a more suitable climate for that species based on the changes to their formerly suitable climate. The Secretary may perform the same balancing test used in subsection (b)(2) of this section when designating any area as a critical habitat corridor.²⁷⁸

This amendment would allow for these “smart” paths to remain protected to facilitate easier movement for species as they adapt to climate change. Since Lawler took into account human impact when creating these paths, the paths he determined would allow for species to remain, as much as possible, in wild areas. Therefore, designating such corridors as critical would protect the paths from any further human impacts, allowing for species to move as uninhibited as possible.²⁷⁹

Such changes to the designation of critical habitat would better protect species from the effects of climate change. It would provide them with areas to live and to move without much inhibition and better facilitate their transition as the climate shifts allowing species to better adapt.

3. Recovery and Monitoring

Recovery and monitoring is arguably the most important section of the ESA; if the listed species are not monitored and do not recover to the point of self-sustainability, there is no point in placing them under protection. However, the ESA has arguably not been very successful in its goal of listed species recovery. While it is true that listed species have a much better chance of recovery, “only one percent of the species under its protection

278. This text is completely new. This would be inserted after (b)(2), and the former (b)(3) would become (b)(4) and so on, with the former (b)(8) becoming (b)(9). See 16 U.S.C. § 1533(b) (2003).

279. There are also suggestions to protect wildlife corridors in the international environmental legal regime. The REDD+ (Reducing Emissions from Deforestation and Forest Degradation) program under the U.N.’s Framework Convention on Climate Change has been urged to finance projects that not only reduce deforestation and forest degradation but also protect corridors linking existing protected areas to better safeguard biodiversity. See Dyna Rocjmyaningsih, REDD+ Should Finance Corridors Between Protected Areas, Argues Study, MONGABAY.COM (Feb. 14, 2014), <http://news.mongabay.com/2014/0214-dyna-redd-corridors.html>.

have recovered and been delisted.”²⁸⁰ This is not a criticism of the ESA, as most species listed are on the road to recovery, but rather an argument that the Act is not working fast enough. Recovery plans and monitoring have the potential to save more listed species quicker.

Scientifically, recovery is “the active attempt to return an ecological system . . . to some previous condition following a period of change or disruption.”²⁸¹ As currently written, the ESA requires “recovery plans” to be prepared and implemented for listed species.²⁸² However, the ESA does not define “recovery;”²⁸³ it only states the purpose, implementation process, and requirements for recovery plans.²⁸⁴ This section providing for recovery plans (§ 1533(f)) is critical because its intention to increase the population of listed species differs from other functions of the ESA, such as designating critical habitat, that simply aim to prevent further decline.²⁸⁵ The goal of this section is to create plans that would restore species populations to viable, self-sustaining levels so that they can be delisted.²⁸⁶ The

280. KIERAN SUCKLING ET AL., CTR. FOR BIOLOGICAL DIVERSITY, ON TIME, ON TARGET: HOW THE ENDANGERED SPECIES ACT IS SAVING AMERICA'S WILDLIFE 1 (2012), available at http://www.esasuccess.org/pdfs/110_REPORT.pdf. Despite the fact that only one percent of listed species have fully recovered enough to be delisted, “90 percent of species are recovering at the rate specified by their federal recovery plan.” *Id.*

281. William R. Jordan III, Ecological Restoration and the Conservation of Biodiversity, in BIODIVERSITY II, *supra* note 23, at 371.

282. See Endangered Species Act of 1974, 16 U.S.C. § 1533(f) (2012).

283. There is no definition given for “recovery” in either § 1533(f) or the definitions section of the Act under § 1532. See 16 U.S.C. §§ 1532, 1533(f).

284. See 16 U.S.C. § 1533(f).

285. See Steven P. Campbell et al., An Assessment of Monitoring Efforts in Endangered Species Recovery Plans, 12 ECOLOGICAL APPLICATIONS 674, 674 (2002) (emphasizing the importance of recovery planning to the ESA). See also, e.g., 16 U.S.C. § 1531 (discussing generally the purposes of the Endangered Species Act as to “conserve” species); 16 U.S.C. § 1532(5)(A)(i) (defining critical habitat as areas that are “essential to the *conservation* of the species”) (emphasis added).

286. See Joshua J. Lawler et al., The Scope and Treatment of Threats in Endangered Species Recovery Plans, 12 ECOLOGICAL APPLICATIONS, 663, 663 (2002) (citing a 1990 U.S. Fish & Wildlife report to Congress and discussing the importance of recovery plans in the ESA's framework for delisting endangered species).

ESA can state this more clearly. The amendment would be added to section 1533(f)(1). The section would read (proposed amendment in bold):

(f) Recovery Plans

(1) The Secretary shall develop and implement plans (hereinafter in this subsection referred to as "recovery plans") for the conservation and survival of endangered species and threatened species listed pursuant to this section, unless he finds that such a plan will not promote the conservation of the species. **Recovery shall be defined as the active attempt to return a listed species to a population size that is viable and self-sustaining so that measure provided pursuant to this chapter are no longer necessary and the species may be removed, in accordance with the provisions of this section, from wither of the lists published under subsection (c) of this section.** The Secretary, in developing and implementing recovery plans, shall, to the maximum extent practicable . . .²⁸⁷

This amendment would provide a more concrete, scientific definition of recovery and state specifically the goal of recovery plans under the ESA.

Recovery plans are also vague on measurable criteria; i.e. what constitutes a sizable enough population to justify removal of the species from the list. The ESA merely states that "objective, measurable criteria" shall be used to make that determination.²⁸⁸ However, the recovery of species depends on identifying specific threats and removing them. For some species, a single, relatively tractable, factor may contribute heavily to the risk of extinction, making recovery feasible in a relatively short time.²⁸⁹ For other species facing numerous or poorly understood threats, there are even greater challenges for recovery. Many threats not fully understood go unaddressed in recovery plans. One study found that thirty-seven percent of

287. See 16 U.S.C. § 1533(f)(1).

288. 16 U.S.C. § 1533(f)(1)(B)(ii).

289. Examples include the Bald Eagle and the Peregrine Falcon, which have both recovered largely due to the banning of the pesticide DDT, and the Gray Wolf, which is recovering due to the banning of hunting and trapping in Yellowstone National Park. See Lawler, *supra* note 286, at 666.

identified threats in recovery plans did not have a recovery task associated with it.²⁹⁰ In other words, there was no plan to deal with the identified threat to the species. This same study found that threats were also addressed differently: major threats were addressed more often in recovery plans than minor threats; threats from “exotics” were addressed more frequently than threats from agriculture, construction, and water diversion (which were the least addressed threats in recovery plans); and threats that were better understood were addressed more frequently than those that were poorly understood.²⁹¹

This shows that when basic information about threats is lacking, “assigning and prioritizing tasks to recover species is necessarily difficult.”²⁹² The study by Lawler et al. concluded that such a “[l]ack of knowledge regarding the nature of threats facing species is likely to be one of the factors contributing to the failure of plans to address threats with recovery actions.”²⁹³ Finding that approximately one-third of all major threats facing species were not specifically addressed with a recovery task in recovery plans suggests a weakness in the ESA recovery planning process.²⁹⁴ More effort should be put forth to study and define threats with the ESA reflecting that goal; the ESA should be more definite on what constitutes “objective, measurable criteria.” The amendment would be added to section 1533(f)(1)(B)(ii). The section would read (proposed amendment in bold):

(B) incorporate in each plan—

(i) . . .

(ii) objective, measurable criteria, which, when met would result in a determination, in accordance with the provisions of this section, that the species be removed from the list. **Criteria shall be determined based on the best available scientific data and shall take into account all threats to the listed species, however minor. If a criteria is not currently**

290. *Id.* at 665.

291. *Id.* at 665-66.

292. *Id.* at 667.

293. *Id.*

294. *Id.*

well documented or measurable, steps shall be taken to better understand such criteria in order to best assess each and every threat to a species that should be considered in its recovery plan; and . . .²⁹⁵

This change would incorporate the findings, weaknesses, and recommendations proposed in the Lawler et al. study. It would allow for recovery plans to better address and assess all threats to listed species, including climate change, and making recovery more effective and efficient.

Recovery plans are also vague on timing. The ESA only requires an estimate of time and costs required “to carry out [the] measures needed” to achieve intermediate steps toward, as well as ultimately meet, the recovery goal.²⁹⁶ This non-specific, non-definite approach to recovery plans may be a large reason why so many listed species are seen recovering at the rate proposed by their recovery plan, but so few have actually recovered. The amendment would be added to section 1533(f)(1)(B)(iii). The section would read (proposed amendment in bold):

(B) incorporate into each plan—

(i) . . .

(iii) the time required, **set out in a timetable providing dates for each part of the recovery plan to be completed and an overall timeframe for the species to be recovered by**, and the cost to carry out those measures needed to achieve the plans goal and to achieve the intermediate steps toward that goal.²⁹⁷

This change would allow for an actual and specific timeframe for recovery of the listed species. While it is difficult to predict timing, and while it is likely most plans would not meet their proposed timetables, a concrete timeframe would help speed the process of recovery and could allow for actual rate of recovery data compilation. Additionally, many other policies utilize this type of timetable, including policies on climate

295. See Endangered Species Act of 1973, 16 U.S.C. § 1533(f)(1)(B) (2012).

296. 16 U.S.C. § 1533(f)(1)(B)(iii).

297. See *id.*

change,²⁹⁸ showing that setting goals in science related policy is not a novel concept.

As proposed in the listing section,²⁹⁹ recovery plans could also incorporate multiple species. And, again, Hawaii's Recovery Plan for Hawaiian Forest Birds (the "Hawaii Plan") provides a great example for multi-species recovery plans. The Hawaii Plan has recovery objectives, recovery criteria, recovery habitat, recovery actions, and a monitoring and research program all established in a comprehensive fashion.³⁰⁰ The Hawaii Plan also estimated that it would take a minimum of 30 years from the date of the report's publication for most of the species under the plan to recover.³⁰¹ The plan takes into account each individual bird species, but proposes goals for recovery overall as a group.³⁰² By doing so, the Hawaii Plan aids the recovery of all twenty-one species collectively. The plan looks at ecosystems and habitats more broadly and takes an expansive view of the protecting land.³⁰³ For example, it proposes forestry management, which would not only aid in the conservation of the Hawaiian Forest Birds, but would help other species and the climate.³⁰⁴

As asserted in the listing section, this multi-species approach would be faster and carry broader benefits than moving at a species-by-species pace. The ESA should include both multi-species listing and multi-species recovery plans. The amendment would be added to section 1533(f)(1)(A). The section would read (proposed amendment in bold):

(A) give priority to those endangered species or threatened species **or groups of endangered species or threatened species (in a multi-species plan approach)**, without regard to taxonomic classification, that are most likely to benefit from such

298. A prime example is the Kyoto Protocol, which sets forth tables and targets for reducing greenhouse gas emissions. See Kyoto Protocol to the U.N. Framework Convention on Climate Change, Dec. 11, 1997, 2303 U.N.T.S. 148.

299. See *supra* Part IV.B.1.

300. See Revised Recovery Plan for Hawaiian Forest Birds, *supra* note 228, at ix-xii.

301. *Id.* at xiii.

302. *Id.*

303. See *id.* at 4-1.

304. *Id.*

plans . . .³⁰⁵

This change would authorize and encourage multi-species recovery plans, which are already happening in some places, but would still allow for single species plans if determined to be best.

This amendment also addresses the shift of focus in the biological conservationist movement from a species-by-species approach to a multi-species approach.³⁰⁶ The idea is “it is simply not possible to address more than a small fraction of biodiversity on a per species basis,” and protecting large habitats and ecosystems will protect more species habituating within them.³⁰⁷ This type of multi-species approach is also more cost-effective, provides a better use of resources, and provides a greater chance of long-term success.³⁰⁸ The FWS has recognized this and has been informally promoting the use of multi-species recovery plans since the inception of the ESA, encouraging plans for species that are taxonomically similar or share similar threats.³⁰⁹

One thing is certain, though – if this approach is to be effective, like the Hawaii Plan, the species within the multi-species plans must have a similar location, face similar threats, and, possibly, be of the same taxonomic backgrounds.³¹⁰ It will be up to FWS to determine whether and when to create multi-species recovery plans; the amendment to the ESA will only make the process more formal. While FWS has not issued any guidelines, internal training memoranda provide FWS staff with an idea of when to create multi-species recovery plans:

[S]ingle-species plans are appropriate if a species is distinct in its habitat requirements and threats and if it is the only species in its geographic area. Multi-species plans should be considered when

305. See Endangered Species Act of 1973, 16 U.S.C. § 1533(f)(1)(A) (2012).

306. See J. Alan Clark & Erik Harvey, *Assessing Multi-Species Recovery Plans Under the Endangered Species Act*, 12 *ECOLOGICAL APPLICATIONS* 655, 655 (2002).

307. *Id.*

308. See *id.*

309. See *id.* at 655-56.

310. See, e.g., *id.* at 656 (discussing critiques to multi-species recovery plans, specifically noting that it is difficult to lump together multiple unrelated species and try to fit them within a single recovery plan).

two or more species of the same genus, geographical area, or political area share common threats. Finally, ecosystem plans may be appropriate where several listed members of a shared biotic community rely on protection and/ or restoration of the ecosystem to recover. [Such] plan[s] should address common threats and recovery needs of the community as a whole . . .³¹¹

However, it is important to note that, while an amendment and guidelines like this by the FWS would encourage multi-species recovery plans, there is still the discretion to continue to plan species-by-species, as sometimes single species recovery plans are more effective for recovery of species.³¹²

The ESA also has a monitoring section, which aims to monitor those species once listed and now deemed “recovered.”³¹³ Once a species has been delisted, the monitoring section requires the Secretary and the States to monitor said species for at least five years.³¹⁴ This section also mandates the Secretary to prevent significant risk to the well being of any recovered species.³¹⁵ Monitoring is an important step in the recovery process. Monitoring can be used to assess the current population status of a species, to provide critical biological data concerning the species, to observe the response of species to recovery plan (which is essential to the recovery process), and to make sure threatened and endangered species do not decline and again become threatened, endangered, or even extinct.³¹⁶

Even though monitoring is considered an essential aspect of the ESA process, Campbell et al. found that “monitoring is less

311. Id.

312. See, e.g., *id.*, at 660 (concluding that most of the time single species recovery plans provide a better foundation for recovery than multi-species plans, but noting that multi-species plans can be an effective strategy if properly organized because they allow for a greater number of species to be covered by a plan, despite limited funding and resources).

313. See Endangered Species Act of 1973, 16 U.S.C. § 1533(g) (2012); see also 16 U.S.C. § 1533(b)(3)(C)(iii) (mandating that the Secretary implement a monitoring system for endangered and threatened species as well as species deemed to have recovered less than five years ago to prevent significant risk of the well-being of recovered species).

314. 16 U.S.C. § 1533(g)(1).

315. 16 U.S.C. § 1533(g)(2).

316. Campbell, *supra* note 286, at 674-75.

thoroughly considered in the recovery process than is appropriate, possibly because it does not directly benefit the species in terms of increased abundance in the way that other recovery efforts such as threat mitigation or captive breeding do.”³¹⁷ This must be remedied. Recovery plans that incorporate monitoring can be a more efficient process, both in terms of time and money, for listed species because “a well-planned and implemented monitoring program [can] provide the basis for effective adoption of adaptive management of rapidly changing populations of threatened and endangered species and their habitats.”³¹⁸ Such monitoring plans should be species-specific and based on habitat and threat, as well as monitoring the ecosystem surrounding the delisted species.³¹⁹ Currently, most monitoring plans are a template for all de-listed species, but a more species-specific approach would better serve individual species, as well as saving resources.³²⁰ Campbell et al. suggest that “[a] good monitoring program will gather current, accurate, and relevant information on the species of interest, which can then be used to assess the effectiveness of current recovery efforts, and direct and modify future efforts.”³²¹

The ESA should follow this recommendation. The amendment would be added to section 1533(g). The section would read (proposed amendment in bold):

(1)(A) The Secretary shall, in implementation of this system, create a species-specific monitoring plan that takes into account the habitat and ecosystem of the recovered species. The plan will incorporate all current, accurate, and relevant information based on the best available scientific data for each recovered species.³²²

This amendment would make the monitoring aspect of the ESA more effective, efficient, and direct. It would address the

317. Id. at 679.

318. Id.

319. Id. at 680-81.

320. *Id.*

321. Id. at 681.

322. See Endangered Species Act of 1973, 16 U.S.C. § 1533(g)(1) (2012). This portion would be a completely newly added subsection to § 1533(g)(1).

recommendations made by Campbell et al. for a better recovery process and would better conserve resources. While recovery is an invaluable section of the ESA, conservation efforts are also key and could be used to not only help threatened, endangered, and recovered species survive, but keep species from becoming threatened or endangered in the first place.

4. Conservation Plans

Conservation is a key principle in conservation biology and ecosystem management.³²³ Conservation biology “is a science . . . that combines applied management principles, from fields such as forestry and wildlife and range management, with theories from the basic sciences to address problems of maintaining biological diversity.”³²⁴ Basically, conservation means protecting biodiversity. But climate change has required conservation biologists to change their approach to conservation; “climate change means that [conservationists] can no longer manage for a historical reference point, but rather must manage for change . . . [because] change is coming.”³²⁵ When it comes to human influences on the environment, such as climate change, “influence is inevitable, and conservation depends not on eliminating novel (or ‘external’) influences, but on finding ways of compensating for them in such a way that the systems resume behaving—or can continue to behave—as if these influences were absent.”³²⁶ This is the challenge.

Conservation biologists currently employ several strategies, using them at various scales, usually in combination with one another, in an attempt to save biodiversity.³²⁷ When deciding which strategy, or combination thereof, to implement, biologists consider several factors: managing for the appropriate scale of

323. See generally Baydack, *supra* note 220, at 10 (discussing the goals of ecosystem management and conservation biology).

324. *Id.*

325. Charles C. Chester et al., *Climate Change Science, Impacts, and Opportunities*, in *CLIMATE AND CONSERVATION*, *supra* note 88, at 3.

326. Jordan, *supra* note 282, at 372.

327. See, e.g., Jonathan B. Haufler, *Strategies for Conserving Terrestrial Biological Diversity*, in *PRACTICAL APPROACHES TO THE CONSERVATION OF BIOLOGICAL DIVERSITY*, *supra* note 220, at 26-27.

the project (landscape and time), looking at historical and present disturbances to the ecosystem and the scale of those influences, and determining the natural geological and climate boundaries.³²⁸

An example of one conservation strategy that conservation biologists have discussed and employed is assisted migration. Assisted migration is “the action of picking up and moving certain . . . species that either cannot or will not be able to migrate on their own” due to climate change.³²⁹ This management approach attempts to “(re)establish habitat corridors that allow species to naturally disperse in response to climate change . . . [and] is a controversial topic.”³³⁰ The controversy stems from introducing species to a range outside their native range, which can lead to negative ecological and biological impacts.³³¹ The counterargument is that “there is nothing conventional about the challenges climate change presents” to biodiversity.³³² However, there are still many challenges associated with assisted migration, even if one disregards the possible negative effects of introducing new species to new habitats, ranges, or corridors.

First, where will the species go? It seems most probable that federal lands will be used for assisted migration of species. The National Park Service (Park Service) seems open to the idea, as they already reintroduce extirpated species to park lands, welcome naturally migratory species to park lands, and are

328. *Id.* at 27.

329. Julie Lurman Joly & Nell Fuller, *Advising Noah: A Legal Analysis of Assisted Migration*, 39 *ENVTL. L. REP. NEWS & ANALYSIS* 10413, 10413 (2009). An example of successful assisted migration is Dr. Camille Parmesan’s work with butterflies. Parmesan argues that such assisted migration and colonization may be the only way to save species that cannot adapt on their own to the adverse effects of climate change and that translocation should be done regardless of the possible risks. See Camille Parmesan et al., *Poleward Shift in Geographical Ranges of Butterfly Species Associated with Regional Warming*, 399 *NATURE* 579-583 (1999), available at <http://www.nature.com/nature/journal/v399/n6736/pdf/399579a0.pdf>.

330. Parenteau, *supra* note 15, at 317.

331. *Id.*

332. *Id.*

legally obligated to protect the wildlife within their parks.³³³ However, the Park Service may be reluctant to introduce completely foreign species into their parks; they have guidelines against introducing “exotic species,” which go against the Park Service’s pledge to maintain natural ecosystems within the parks.³³⁴ FWS land could also provide for assisted migration land through its Wildlife Refuge System,³³⁵ which forces the consideration of resources in the context of a larger landscape, as opposed to in isolation, ensuring landscape-scale conservation.³³⁶ However, like the Park Service, FWS does not permit introducing foreign species onto the refuges, but unlike the Park Service, FWS can override this policy for endangered species and many refuges have such broad purposes that assisted migration for species endangered from climate change could easily fit within them.³³⁷ There are also possibilities on many other federal lands, such as U.S. Forest Service land, Bureau of Land Management Land, and designated Wilderness Areas, but each of these comes with its own set of laws, regulations, policies, and challenges.³³⁸

333. See Joly & Fuller, *supra* note 331, at 10414 (citing the National Park Service Organic Act of 1916, 16 U.S.C. § 1 (2012)) (stating that the Park Service is obligated to protect wildlife).

334. *Id.* at 10415 (discussing the Park Service’s Management Practices guidelines and how the Park Services has interpreted the *Management Practices* as meaning that the protection of a park’s natural components and natural ecosystems encompasses the exclusion of exotic species).

335. *Id.* at 10415-16 (citing the Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. §§ 668dd-668ee (1998)) (stating that the FWS’s wildlife refuge mission is to administer lands for the restoration of wildlife and their habitats and mandates the Secretary provide for conservation of wildlife and their habitats, ensure the biological integrity, diversity, and environmental health of the refuge system, and make sure the mission is carried out).

336. *Id.* at 10416. Some forms of assisted migration are already occurring within the Refuge System; red wolves are being raised in a refuge in Florida even though there are no historical records of those wolves even being present there. The wolves are only raised on the refuge and are then relocated to their “natural” habitat, meaning this is only a form of assisted migration and relocation. *Id.* at 10416-17.

337. See, e.g., *id.* at 10417 (discussing an example of a broad refuge program, the Coachella Valley NWR, which takes as part of its purpose the protection of an endangered lizard).

338. See *id.* at 10417-22 (discussing other federal land options, including

Another question presented is which species will be, or should be, moved? Clearly, priority should be given to listed endangered and threatened species, with endangered species receiving an even higher concession. But even within the ESA, there could be barriers to overcome, such as the takings clause in section 1538.³³⁹ Such barriers, however, do not seem to pose much of a problem; the Department of the Interior has broad powers to conserve species, FWS has implemented captivity breeding and re-introduction for endangered species before³⁴⁰ (which could be used as a type of precedent for assisted migration), and the ESA's mission itself—to use all means to aid listed species in recovery—suggests assisted migration could be implemented under the ESA.³⁴¹

There is also the “experimental populations” provision of the ESA.³⁴² This section authorizes the Secretary to release and transport any population “of an endangered species or a threatened species outside the current range of such species if the Secretary determines that such release will further the conservation of such species.”³⁴³ The Secretary must first make a determination that the release and transport is essential to the continued existence of the species and, the release of the species must be in geographic areas separate from other populations of the species.³⁴⁴ This provision successfully reintroduced the gray wolf to Yellowstone National Park, the Aplomado falcon to Northern New Mexico, and whooping cranes to Louisiana.³⁴⁵ While the experimental section is not completely analogous to

those listed above and others, and talking about legal issues with using such lands for assisted migration).

339. *See id.* at 10423 (citing 16 U.S.C. § 1538 (2003)) (arguing that the ESA prohibits the taking of an endangered or threatened species and that doing so could be a barrier to assisted migration since picking up a species and moving it to a new location can be considered a “take”).

340. In the 1980s, condors were so endangered that FWS approved a captive breeding and re-introduction scheme to save the species from extinction. *See id.* at 10423.

341. *Id.*

342. *See* Endangered Species Act of 1973, 16 U.S.C. § 1539(j) (2012).

343. 16 U.S.C. § 1539(j)(2)(A).

344. 16 U.S.C. §§ 1539(j)(2)(B), (j)(3).

345. Parenteau, *supra* note 15, at 329-30.

assisted migration, it provides a good comparison and model. Other legal barriers to implementing assisted migration are laws that deal with invasive species and cross-border species transfers, but, like the ESA, there seem to be ways around them for endangered species protection.³⁴⁶

To measure whether or not such conservation strategies are working, the IUCN and other international conservation organizations have created biodiversity indicators.³⁴⁷ These indicators function as a measure of effectiveness and efficiency; they allow implementers to assess whether their decisions are conserving biodiversity or leading to degradation and loss.³⁴⁸ Examples of biodiversity indicators are: the IUCN Red List Index, the Living Planet Index, and the Global Wild Bird Index.³⁴⁹ Such biodiversity indicators showed that the ‘2010 Biodiversity Target’ was not met.³⁵⁰

The ESA currently has a relatively small section that pertains to conservation planning in section 1533, but this could be expanded. As currently written, the ESA gives the Secretary very broad power to “issue such regulations as he deems necessary . . . to provide for the conservation of [listed] species.”³⁵¹ The one exception is that such regulations cannot “take” a listed species.³⁵² This is still a very broad power and could be used for more effective and efficient conservation planning policy. The amendment would be added to section 1533(d). The section would read (proposed amendment in bold):

(d) Protective regulations

(1) Whenever any species is listed as a threatened species **or endangered species** pursuant to subsection (c) of this section . . .

346. Joly & Fuller, *supra* note 331, at 10424-25 (discussing such laws as Executive Order 13112, The Lacey Act, and CITES).

347. See Biodiversity Indicators, IUCN, http://www.iucn.org/about/work/programmes/species/our_work/biodiversity_indicators/ (last visited Mar. 10, 2014).

348. *Id.*

349. *Id.* (explaining further that the IUCN Red List measures threat categories for species and that the other two indicators are population-based).

350. *Id.*

351. Endangered Species Act of 1973, 16 U.S.C. § 1533(d) (2012).

352. *Id.*

353

(2) The Secretary, when issuing such regulations he deems necessary and advisable under subsection (1) of this subsection, shall create a conservation plan for the threatened species or endangered species that takes into account the species, the species' habitat, and the species' ecosystem. This plan shall be created based on the best available scientific data and shall incorporate the biological conservation strategies deemed best for such species. If it is determined that a species needs assisted migration, the Secretary shall work with U.S. Fish & Wildlife Services, as well as other federal agencies and the States, to determine the best plan and placement for the species, taking into account all biological, ecological, economical, and legal considerations, and excepting the taking of any species under section 1538 of this title.

(3) If the Secretary creates a conservation plan, the plan shall include biological indicators that will serve as a measurement of the success of the plan. The plan shall be reviewed every five years and if, according to the biological indicators, the plan is not effective or efficient, the Secretary shall revise the plan to be able to meet the conservation goals set for the species.

This amendment will provide for a more defined power for the Secretary and direct him or her to actually use the power, rather than leaving it more or less discretionary. The amendment also adds endangered species, broadening further the power to create protective regulations. The amendment also takes into account various scientific conservation strategies, recognizing that different plans may work differently for different species and ecosystems, and authorizing the use of the "best" strategy, or combination thereof, based on science. This amendment would hopefully compel better conservation planning for species faced with any threat, not just climate change, and set forth a

353. *See id.* This section currently does not have numbers, which is why the (1) is bolded here, as it is new. The rest of the language of the new subsection (1) is the same as the current language under (d), except for the addition of "endangered species."

monitoring process to make sure the plan is actually working.

The FWS has also already adopted a Climate Change Strategic Plan in which a main purpose is “to work with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people in the face of accelerating climate change,” which the Service recognizes as a cognizable and impactful threat.³⁵⁴ The goals of FWS’s plan are basic and broad—adaptation,³⁵⁵ mitigation,³⁵⁶ and engagement³⁵⁷—but the FWS provides more concrete steps to achieve these goals by laying out “Seven Bold Commitments.”³⁵⁸ Delving even further, the FWS Climate Change Strategic Plan also sets forth specific goals within each

354. Rising to the Urgent Challenge: Strategic Plan for Responding to Accelerating Climate Change, U.S. FISH & WILDLIFE SERV. 3, 8-10 (Sept. 2010) [hereinafter *FWS Climate Change Plan*] (internal quotation marks omitted), available at <http://www.fws.gov/home/climatechange/pdf/CCStrategicPlan.pdf>.

355. “Adaptation: Minimizing the impact of climate change on fish and wildlife through the application of cutting-edge science in managing species and habitats.” *Id.* at 14. This is based largely on the IPCC definition. *Id.*

356. “Mitigation: Reducing levels of greenhouse gases in the earth’s atmosphere.” *Id.*

357. “Engagement: Joining forces with others to seek solutions to the challenges and threats to fish and wildlife conservation posed by climate change.” *Id.*

358. *Id.* at 11. The seven commitments are: (1) for regional climate science partnerships to facilitate the sharing of scientific and technological information; (2) establish landscape conservation cooperatives throughout communities that enable members to work together to save habitats; (3) develop new organizational and managerial processes; (4) have more outreach to and education for communities and businesses; (5) become carbon neutral by 2020; (6) apply “Strategic Habitat Conservation” as the Service’s framework for landscape conservation; and (7) lead the conservation movement by developing a national fish and wildlife climate adaptation strategy, creating a national biological inventory and monitoring partnership, and organizing a national climate change forum. *Id.* at 13-14. “Strategic Habitat Conservation” contains five elements, which are key components to adaptive management and landscape-scale conservation. *Id.* at 15. The strategy starts with Biological Planning, setting goals and targets, then creates a Conservation Design, which is the plan proposed to meet the goals and targets, then Conservation Delivery implements that plan. *Id.* After implementation there is Outcome-based Monitoring and Adaptive Management to measure the success and improve the results. *Id.* Finally, there is Assumption-based Research, which aims to increase knowledge and understanding through repetitive looping of all of the steps just described. *Id.*

of these three objectives.³⁵⁹

Since FWS is the agency primarily responsible for administering the ESA, it is important for the agency to be considering climate change and how to protect wildlife against the oncoming changes. This Strategic Plan by FWS incorporates many of the conservation ideals necessary to stave off many negative effects on fish and wildlife from climate change. Although FWS presents admirable goals, more is necessary to take action to save species and biodiversity, especially since these goals are simply that: goals. They are not law or mandatory policy. While commendable, there is a chance they will not succeed, or at least not in the hoped-for timeframe. A more directive approach must be taken.

Another approach that fits nicely into a conservation-planning scheme is what conservationists call the “gap analysis concept.”³⁶⁰ This process establishes priorities for conservation in a region by first identifying and classifying the various elements of biodiversity, examining “the existing and proposed system of protected areas and other land-management units that help conserve [biodiversity],” and determining which elements are unrepresented in the existing conservation area.³⁶¹ Once this is established, priorities for future conservation actions can be created.³⁶² This process demonstrates the utility in prioritizing the listing of species; prioritizing first aids conservation efforts overall. The federal government is already using gap analysis in its National Gap Analysis Program under the U.S. Geological Survey in the Department of the Interior.³⁶³

These conservation ideals, along with listing, critical habitat

359. *Id.* at 19-30 (going into further detail about all of FWS’s goals, such as developing long-term capacity for biological planning and conservation design, planning and delivering landscape conservation actions that support climate change adaptations, developing partnerships and monitoring programs, and changing business practices to become carbon neutral).

360. See F. William Burley, Monitoring Biological Diversity for Setting Priorities in Conservation, in *BIODIVERSITY*, *supra* note 2, at 227-28; Scott & Csuti, *supra* note 115, at 333.

361. *Burley*, *supra* note 362, at 227-28.

362. *Id.*

363. See *National Gap Analysis Program*, U.S. GEOLOGICAL SURVEY, <http://gapanalysis.usgs.gov/> (last visited Jan. 20, 2014).

designation, recovery and monitoring, are what are needed to help species fight the on-coming effects of climate change. The change is coming and without application of these scientific principles to the law making them mandatory, trying to save affected species may not occur, or if it does, it may occur too haphazardly or slowly to make much difference. The amendments proposed in this section aim to put more science in the law, thus making it easier to help species adapt to climate change and to save those species threatened and endangered by it (as well as many that are not).

D. *Why Amend the Act?*

While reading through the proposed amendments above, one may ask, why make such amendments? Will they really make a difference? Is amending the ESA the best way to go? While there are recognizable challenges and criticisms to this approach, as discussed below,³⁶⁴ this paper argues that amendments may be the best approach.

The goal of these proposed amendments is to create one comprehensive policy dealing with climate change and biodiversity, wildlife, and species. Using the ESA is the most appropriate approach, as it already helps to save threatened or endangered species. By changing the ESA in this way, it would broaden the power of the ESA and could allow for a more proactive process for helping preserve biodiversity. These amendments would aid in the protection of species against the oncoming changes to their habitat because of climate change, but many of these amendments would also better serve the species already listed, or some that may become listed due to climate change.

It is the hope of this paper to show that the ESA as currently written and implemented is not enough; if the goal is to protect our nation's biodiversity for generations to come, changes must occur. This is not a new philosophy. Conservationists have long recognized that the ESA, while effective, may not be the most effective. Some have "ascribed much of the loss of biological

364. See *infra* Part V.

diversity in the United States to an ineffective policy that emphasized piecemeal conservation of elements rather than . . . comprehensive protection.”³⁶⁵ Politics has also played a role: “politics, mainly in the form of congressional intervention, frequently [taints] listing decisions and either [prevents] or [constrains] the mapping of ‘critical habitat’ where protections are enhanced.”³⁶⁶

The story of the snail darter and *TVA v. Hill*³⁶⁷ presents a good example of how the ESA, while a powerful conservation tool, does not hold the potential it could if it were better utilized or amended.³⁶⁸ The Senate Committee on the Environment and Public Works had already begun drafting amendments to the ESA during the *TVA v. Hill* trial, believing that there should be a better balance in the Act between development and protection.³⁶⁹ On June 18, 1979, an amendment was added to the ESA as a rider to an energy bill and it got the votes needed to pass.³⁷⁰ Just like that, the ESA was amended to favor the development of the TVA dam over protecting the endangered snail darter. The snail darter disappeared from that river.³⁷¹

This story illustrates how the ESA may not be the hero legislation people believe. As soon as it started inhibiting major

365. Fred B. Samson & Fritz L. Knopf, Putting Diversity into Resource Conservation, in PRACTICAL APPROACHES TO THE CONSERVATION OF BIOLOGICAL DIVERSITY, *supra* note 220, at 175.

366. TOBIN, *supra* note 3, at 83.

367. See *Tennessee Valley Auth. v. Hill*, 437 U.S. 153 (1978).

368. In the Supreme Court case, the Court ultimately upheld the permanent injunction against TVA’s dam project to protect the endangered snail darter:

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. The paradox is not minimized by the fact that Congress continued to appropriate large sums of public money for the project, even after congressional Appropriations Committees were apprised of its apparent impact upon the survival of the snail darter. We conclude, however, that the explicit provisions of the Endangered Species Act require precisely that result.

Id. at 172-73.

369. ROMAN, *supra* note 50, at 65-66.

370. *Id.* at 68-69.

371. *Id.* at 70.

economic development projects, some of its teeth were pulled. Legislators created a loophole in the ESA that allowed the government to declare a species “warranted but precluded” by budget constraints, leading to a convenient way for the government to get around its ESA responsibilities.³⁷² The huge political support that had favored the ESA at its passage was beginning to falter as the realities of protecting species set in.³⁷³ The amendments that followed softened the language of the ESA; words like “do not” were changed to “are not likely to” and from “no” to “if” or “maybe.”³⁷⁴ More and more opponents of the ESA continued to allow it to retain its bark, but not its bite.³⁷⁵ Such strategies “acknowledged the primacy of individual rights over the sacrifices people were willing to make for nature.”³⁷⁶

This has been the trend with the ESA and it cannot continue if there is any hope of saving species from climate change. The ESA needs to get back to the place it was before the snail darter—a piece of legislation that saved species no matter the cost. For many conservationists, the ESA’s budget is too small and the list is too short,³⁷⁷ but amending the listing process could help remedy this frequent criticism.

Amending the ESA would also provide more direction to the FWS. Currently, the FWS has tremendous discretion to interpret the ESA as it sees fit. Right now, FWS can decide if it wants to use climate change as a factor or not; “climate change as a regulatory subject matter is not immune from agency discretion.”³⁷⁸ FWS can decide whether it wants to do multi-species or ecosystem listings or recovery plans. This discretion, which can lead to uneven and possibly slower results, would be

372. TOBIN, *supra* note 3, at 83.

373. ROMAN, *supra* note 50, at 70.

374. *Id.* at 71, 142.

375. *Id.* at 72-75 (discussing how Ken Dodd was fired for using FWS stationery to warn a restaurant they may get in trouble for cooking an endangered rattlesnake because it was the favorite restaurant of the then Interior Secretary and noting that during the Reagan administration, Reagan shut down the listing program completely).

376. *Id.* at 142.

377. *Id.* at 132.

378. Ruhl, *supra* note 90, at 10.

lessened if the ESA were amended as proposed. The new Act would provide more mandatory actions and force FWS to act in certain ways, ideally making protection more effective and efficient.

Current threats to biodiversity, such as climate change, may currently be out of reach of the ESA, and thus out of humanity's control to change, but changing the ESA to deal with these coming problems is within our control. The goal of the proposed amendments is to mainly provide biodiversity with a more effective tool to fight climate change. More broadly, these amendments also give the government another tool, besides the Clean Air Act, to combat the adverse affects climate change will have on the environment and species. Many species need this protection—many are reliant on protective and management actions, many are slow breeders, and “[t]he idea that you could just return the species to some population level and then just walk away isn't going to work for most species.”³⁷⁹ The proposed amendments would save more than just those species affected, but habitats and ecosystems as well, preserving biodiversity for generations to come.

V.

CRITICISMS TO THIS APPROACH

There are, of course, issues and criticisms with adding such amendments. First, this proposed amendment states that climate change is real and that it is affecting species. Unfortunately, there are still people that do not believe this is so. Another related issue is that these amendments would be hard to pass in today's political climate; it may be not be feasible considering it has had many opponents both in the past and present. And, if the gates were opened, more damage could be done to the ESA, rather than strengthening it. An argument could also be made that these amendments would not make a difference in the protection of biodiversity, so why bother at all, or perhaps that such amendments would harm other aspects of the ESA. Finally, there are arguments about the costs of

379. ROMAN, *supra* note 50, at 133 (internal quotations omitted).

implementing such amendments and whether the ESA is actually the best tool for the job.

A. *Climate Change is a Hoax and the ESA Has Got to Go*

Even though the science demonstrates that climate change is real and that it is impacting every aspect of the globe, including biodiversity,³⁸⁰ skeptics still exist. Unfortunately, some of these skeptics are members of Congress,³⁸¹ and it is those congressmen and women who could prevent these amendments. In 2002, Republican consultant Frank Luntz issued a memo to the party:

The scientific debate is closing [against those who deny the reality of climate change] but not yet closed. There is still a window of opportunity to challenge the science. . . Voters believe that there is no consensus about global warming within the scientific community. Should the public come to believe that the scientific issues are settled, their views about global warming will change accordingly. . . [Y]ou need to continue to make the lack of scientific certainty a primary issue in the debate.³⁸²

380. See generally WOLD ET AL., *supra* note 28; IPCC Fifth Assessment Report Summary, *supra* note 32; MICHAEL E. MANN, *THE HOCKEY STICK & THE CLIMATE WARS: DISPATCHES FROM THE FRONT LINES* (2012) (discussing the politics behind climate change and Mann's "hockey stick" graph, which shows global temperature data over the past 1,000 years and demonstrates that temperature had risen with the increase in industrialization and use of fossil fuels and concluding that human activity since the industrial age raised CO2 levels, trapping greenhouse gases in the atmosphere and warming the planet).

381. See, e.g., Phil Plait, *I Told You So: Congressman Parrots Climate Change Denial Errors*, SLATE (Sept. 19, 2013, 12:31 PM), http://www.slate.com/blogs/bad_astronomy/2013/09/19/climate_politics_congress_man_parrots_climate_change_denial_errors.html (reporting on Congressman McKinley, a republican from West Virginia, who recently claimed that there has been almost no increase in temperature over the past 40 years and that the arctic ice is actually increasing); John M. Broder, *White House Promises Veto of Anti-E.P.A. Bill*, N. Y. TIMES GREEN BLOG (Apr. 5, 2011, 4:27 PM), http://green.blogs.nytimes.com/2011/04/05/white-house-promises-veto-of-anti-e-p-a-bill/?_r=0 (reporting on the proposed Energy Tax Prevention Act, sponsored by Representatives Fred Upton, Republican of Michigan, and Ed Whitfield, Republican of Kentucky, and endorsed by Senator James Inhofe, an outspoken climate change skeptic, which would "bar the Environmental Protection Agency from regulating greenhouse gases for the purpose of combating climate change.").

382. See MANN, *supra* note 381, at 22 (alterations in original except for final

Statements like this show that some important decision-makers in this country are consciously attacking the credibility of climate change science, making it a political issue rather than a scientific one. Such tactics continued through the Bush Administration, with Philip Cooney, chief of staff for the White House Council on Environmental Quality, editing and removing passages from various government reports on climate change during 2002 and 2003 in order to weaken expressed conclusions.³⁸³ Arguments concerning the believability of climate change continue to this day. In 2005, Senator James Inhofe stated on the floor of the U.S. Senate that climate change is “the single greatest hoax ever perpetrated on the American public.”³⁸⁴ Inhofe is currently still serving in the U.S. Senate. With the Republican Party, as well as others, working so hard to deny climate change science, how is their even hope that climate change would be considered in amending any statute, let alone the ESA? This is a real barrier to, and a fair criticism for, attempts to amend the ESA.³⁸⁵

The ESA has been a contentious law almost since it was passed. Arguably, the most contentious period was in the mid-1990s when Bruce Babbitt, then Secretary of the Interior and very pro-ESA, and Richard Pombo, a congressman from California whose goal it was to dispose of the ESA, were fighting over the survival of the ESA.³⁸⁶ Led by Pombo, in 1995, Congress declared a moratorium on new ESA listings, and Babbitt, trying to work around this, began using the little-known Antiquities Act, which allowed the President to protect federal land.³⁸⁷

ellipsis and capitalization).

383. *Id.* at 110-11.

384. *Id.* at 117.

385. See, e.g., Congress Launches Broad Assault on Endangered Species, DEFENDERS OF WILDLIFE (Sept. 1, 2011), <http://www.defenders.org/press-release/congress-launches-broad-assault-endangered-species> (reporting on how members of Congress submitted multiple proposals to undercut endangered species protection).

386. TOBIN, *supra* note 3, at 103-04.

387. See *id.* at 107 (describing how President Clinton, spurred on by Babbitt, used the Antiquities Act to create a 1.7-million-acre National Monument, which was not only good for species but good for the environment as well, as it halted a coal mining project).

Babbitt also attempted to reform the ESA through regulatory changes and initiatives that could be carried out by the executive without legislative approval.³⁸⁸ Some have argued that Babbitt's innovations for changing and implementing the ESA cannot be replicated, making the argument against amending the ESA now.³⁸⁹

The anti-ESA Republican trend continued during the George W. Bush years; during his time in office, Bush put about eight species on the list each year, compared to Clinton's approximately sixty-eight.³⁹⁰ In fact, Douglas Krofta, Bush's head of the Endangered Species Program's listing branch, issued a policy that said employees could "use info from [internal] files that refuted petitions but not anything that supported them."³⁹¹ Studies have also shown that when there are more Republican members of Congress on oversight or appropriation committees, the number of listing decisions decreases.³⁹² This suggests that "political considerations strongly affect the fate of endangered species,"³⁹³ meaning the ESA may not have much hope of amendment in today's political climate.

Even more recently, proposals are underway to overhaul the ESA in ways that would undermine its purpose.³⁹⁴ These measures were not successful, but with such hostility toward endangered species, is it realistic to think that measures that would aid conservation would be passed? If they were, would they be effective? The answer to this is yes, if the amendments passed were strict, clear, precise, and numerous, the ESA could be written to be an effective tool for conserving biodiversity against the threat of climate change. Plus, not all of Congress is

388. *Id.* at 108.

389. *See, e.g.,* J.B. Ruhl, *Endangered Species Act Innovations in the Post-Babbittian Era—Are There Any?*, 14 *DUKE ENVTL. L. & POL'Y F.* 419 (2004).

390. *ROMAN*, *supra* note 50, at 186.

391. *Id.*

392. *See* J.R. DeShazo & Jody Freeman, *Congressional Politics*, in 1 *THE ENDANGERED SPECIES ACT AT THIRTY: RENEWING THE CONSERVATION PROMISE* 68, 69 (Dale D. Goble et al. eds., 2006).

393. *Id.* at 71.

394. *See* *Congress Launches Broad Assault on Endangered Species*, *supra* note 386.

hostile toward the ESA and climate change. In fact, members of the House Appropriations Committee urged Interior Department officials to conduct deeper assessments of how climate change is affecting species.³⁹⁵ This shows that while Congress may not be openly acknowledging climate change in its policies, there are others ways to go about creating change.

Even though there is hostility in Congress, going this route of actually amending the ESA is the best option. The government should step in and act because preservation of species is a “collective good,” meaning the optimal strategy is to act collectively; “it is not a dominant strategy for each individual privately.”³⁹⁶ Biodiversity preservation needs one comprehensive action by the government; it cannot continue to be carried out haphazardly through different agencies, non-profits, conservation groups, and individuals. And even if it seems infeasible, there is still value to be gained in making proposals for change. As Gus Speth stated:

The aim of these transformations is deep, systematic change. That means that many of the proposals are “impractical” and “politically unrealistic.” That’s true by today’s standards but says more about our politics than the proposals themselves. If some of these ideas seem radical today, wait until tomorrow. It will be clear before long that system change is not starry-eyed but the only way forward.³⁹⁷

These amendments may not be politically feasible now, but the way things are heading, there will come a tipping point, and then they may be feasible in the future.

B. *Changing the ESA Would Do More Harm than Good—or Have No Effect At All. . .*

Returning to the Babbitt-Pombo story, during Babbitt’s time

395. See Dean Scott, *Appropriators Urge Interior to Deepen Review of How Global Warming is Affecting Species*, 38 ENV’T REP. (BNA) 1015 (2007).

396. Hanemann, *supra* note 45, at 194.

397. JAMES GUSTAVE SPETH, *AMERICA THE POSSIBLE: MANIFESTO FOR A NEW ECONOMY* 89 (2012). While Speth was talking about changes to our growth economy and many other aspects of American life, the sentiment speaks to all deep-rooted changes that may seem radical when proposed.

as Secretary he had hoped to reform the ESA in ways that would strengthen it, like these proposed amendments.³⁹⁸ But he received backlash from both sides; activists were worried he would “dull the edges of the sharpest instrument in their toolbox” and Babbitt himself was afraid that an attempt to amend the ESA would open it up to attacks by those, like Pombo, who wanted to “gut its protections.”³⁹⁹ This is a big criticism of opening the ESA up for amendment today. In a Congress controlled by the Republicans, many of whom would side with Pombo today, proposing amendments to the ESA in this way could actually do more harm than good. There could be a chance that the amendments to the ESA would actually detract from its purpose, become weaker as a protection tool, or be scrapped altogether. This is definitely a valid concern; however, with a Democratic President who claims to be an environmentalist,⁴⁰⁰ if the Republicans tried to pass a weaker version of the ESA, chances are the President would not sign it into law

C. *The ESA is Not the Best Tool and, Even if it Were, It's Too Expensive!*

Many argue that, while more needs to be done to save and conserve biodiversity, both from climate change and generally, the ESA is not the best tool. Amending the ESA will not work. “[W]e are not making choices as the local, state, and federal levels that could prevent species from becoming endangered in the first place. Tinkering with the [ESA] will not solve this

398. TOBIN, *supra* note 3, at 108.

399. *Id.*

400. There are many examples of President Obama's claim of being an environmentalist, particularly when it comes to recognizing climate change. See *Climate Change & President Obama's Action Plan*, THE WHITE HOUSE, <http://www.whitehouse.gov/climate-change> (last visited Jul. 31, 2014). Obama also recognizes climate change's impacts on such things as jobs, food, energy resources, ecological services, recreation, and tourism opportunities. See *Stewardship of the Ocean, Our Coasts, and the Great Lakes*, 75 Fed. Reg. 43,023, 43,023 (Jul. 19, 2010) (recognizing that the oceans, coasts, and great lakes are threatened by climate change and that Americans, as stewards, must work to protect these natural resources).

problem.”⁴⁰¹ There is also the fact that the ESA was not designed or originally intended to combat climate change and problems can arise when one attempts to use an already enacted statute designed to address one problem to attempt to address another.⁴⁰² However, after *Massachusetts v. EPA*, the Supreme Court seems to be leaning toward the principle that just because Congress may not have intended a law to include climate change, does not mean that the agency responsible for implementing the law can simply ignore it.⁴⁰³

Professor J.B. Ruhl has taken the stance that, while it would seem like the ESA should be a tool for saving species from climate change, it just does not work.⁴⁰⁴ The ESA is made to protect species from “discrete, human-induced threats that have straightforward, causal connections to a species, such as clearing of occupied habitat for development or damming of a river. That is not the climate change situation.”⁴⁰⁵ Ruhl argues that the ESA is not the best tool because it cannot regulate greenhouse gases, which are a leading cause of climate change, which then affects species.⁴⁰⁶ This is not what these amendments propose, and, indeed, this author agrees regulating greenhouse gas sources through the ESA would not work.

Ruhl does, however, believe that climate change should be a factor in the implementation of the ESA: “the agencies’ objective should be to use the ESA to define, monitor, and respond to the ecological reshuffling effects of climate change” by listing *inter*

401. Frank W. Davis, Dale G. Goble & J. Michael Scott, *Renewing the Conservation Commitment*, in 1 *THE ENDANGERED SPECIES ACT AT THIRTY: RENEWING THE CONSERVATION PROMISE*, *supra* note 393, at 305.

402. A great example of this phenomenon is EPA’s current attempt to expand the reach of the Clean Air Act. See *Utility Air Regulatory Group v. EPA*, 134 S. Ct. 2427 (2014) (showing that the EPA is trying to use the Clean Air Act to lessen greenhouse gases to fight climate change and that contenders argue that was not the original purpose or intent of the Act).

403. See Ruhl, *supra* note 90, at 8.

404. See J.B. Ruhl, *Adapting the Endangered Species Act to Climate Change*, 41 *NO. 2 ABA TRENDS* 8, 9 (2009).

405. *Id.* at 8.

406. *Id.*; see also Ruhl, *supra* note 216, at 11 (quoting Interior Secretary Salazar and stating that the ESA “is not the proper mechanism for controlling our nation’s carbon emissions,” meaning it is not the proper legislation for controlling how greenhouse gases are impacting species).

alia climate-threatened species, incorporating climate change into consultations, and designing conservation and recovery initiatives.⁴⁰⁷ These are all ideas that were similarly proposed in the amendments above. Ruhl has argued that the ESA “has proven to be unwieldy when applied on large working landscape levels,” so there is no reason it would be more effective when applied to a global problem like climate change.⁴⁰⁸ However, Ruhl also recognizes the fact that “there soon may be no practical way to administer the ESA in its present form” to save species from the adverse affects of climate change.⁴⁰⁹ Ruhl has also proposed similar amendments and reforms to the ESA to those proposed by this paper.⁴¹⁰

Other critics argue that amendments to law are needed, but just not to the ESA. For example, Professor Robert Glicksman believes that the President, land management agencies, and Congress should use land management to change the status and permissible uses of particular land units to allow for species migrations due to climate change.⁴¹¹ Another possibility is through the courts; federal courts have interpreted the Property clause of the Constitution, which authorizes the government to regulate conduct on nonfederal land that threatens to harm federal parcels, expansively,⁴¹² meaning this is another route to protecting land for wildlife and species. Others have suggested expanding the public trust doctrine or amending NEPA, rather than amending the ESA.⁴¹³ Regardless of other presented options, Professor Glicksman acknowledges that the ESA focuses “too narrowly on preservation of individual species in isolation, [and] Congress should amend [it] to require the administering

407. Ruhl, *supra* note 405, at 8-9.

408. Ruhl, *supra* note 90, at 6.

409. *Id.* at 7.

410. Ruhl, *supra* note 216, at 12-14 (proposing a new listing category, “climate-threatened species;” proposing transition measures for climate-threatened species to aid in migration; and proposing biodiversity prioritizing, to name a few).

411. Robert L. Glicksman, *Ecosystem Resilience to Disruptions Linked to Global Climate Change: An Adaptive Approach to Federal Land Management*, 87 NEB. L. REV. 833, 875 (2009).

412. *See id.* at 877-78.

413. Doremus, *supra* note 41, at 324-28.

agencies to broaden their focus.”⁴¹⁴

Others have proposed creating new laws altogether. Professor Doremus suggests the creation of a Representative Ecosystems Act, which could be a supplement to the protections of the ESA.⁴¹⁵ This new act would “implement a program of ecosystem preservation . . . [that] would not obviate the need for individual protection for species . . . Nor . . . render unnecessary prohibitions on the taking of migratory or other species that may occasionally stray from their protected areas . . . [but would] provide an excellent mechanism for protecting biological diversity.”⁴¹⁶ This hypothetical act is similar to the amendments proposed here, setting priority for different ecosystem and habitat types, gathering information about the ecosystems to make the best educated decisions on protection, and deciding what size and type to protect,⁴¹⁷ making the idea a good one, but also posing the question of why try and enact new legislation when amendments could be added to old legislation?

Even though there are naysayers claiming that the ESA is not the tool for saving biodiversity, it seems agreed that “federal leadership, funding, and technical expertise are required to implement coherent species protection and recovery strategies.”⁴¹⁸ It can also be agreed that inconsistent federal policies have diminished the ESA’s effectiveness, as well as conservation and recovery of species generally.⁴¹⁹ So why fight a more comprehensive ESA that will work to accomplish better conservation goals?

The ESA is currently an expensive program and with the added amendments, which will greatly expand the number of species listed, the program will only cost more. This is a major criticism. Especially considering the current state of the economy, the national debt, and the refusal by many in government to raise taxes. Each year FWS is supposed to report

414. Glicksman, *supra* note 412, at 883.

415. Doremus, *supra* note 41, at 318.

416. *Id.* at 318-19.

417. *Id.* at 320-21.

418. Davis, *supra* note 402, at 297.

419. *Id.*

on the expenditures made on ESA species. “From 1989 to 2000, the FWS report estimates that a

little over \$3.5 billion of taxpayer dollars was spent on ESA-related activities.”⁴²⁰

REPORTED EXPENDITURES ON ESA SPECIES

(MILLIONS OF DOLLARS)

Year Reported Expenditure | Year Reported Expenditure

1989	\$ 43.7		1995	\$297.6	
1990	102.3		1996	285.7	
1991	176.8		1997	300.9	
1992	291.5		1998	454.3	
1993	222.2		1999	514.1	
1994	244.6		2000	610.3	Fig. 9 ⁴²¹

This chart shows the growing amount of money FWS is spending each year on ESA species before any proposed amendments would go into effect. Such amendments would only raise this already high amount.

One study showed that these expenditures understate the real expense of the ESA.⁴²² In its report, FWS did not have to report on many of the administrative costs, efforts that benefit species in foreign countries, or state and local government costs, and it was allowed to estimate expenditures.⁴²³ This underreporting of expenditures was confirmed in 1996 when the House Committee on Resources conducted a hearing to examine the costs of the various federal agencies that implement the ESA.⁴²⁴ The hearing discovered that the estimates made by these agencies was about twice as much as what FWS had estimated (see table above), meaning that, if the amount reported was assumed accurate, it

420. RANDY T. SIMMONS & KIMBERLY FROST, ACCOUNTING FOR SPECIES: THE TRUE COSTS OF THE ENDANGERED SPECIES ACT 3 (2004), *available at* http://perc.org/sites/default/files/esa_costs.pdf.

421. *Id.* (citing the FWS Report).

422. *See id.* at 4-14.

423. *Id.* at 4-6, 8.

424. *Id.* at 6.

can be concluded that “the reported expenditures in the most recent FWS report do not reflect actual expenditures . . . [and] the reported expenditures of \$610 million [in 2000] are no more than half of what was actually spent. . . Thus, a more accurate estimate would be at least \$1.2 billion.”⁴²⁵ That is quite the amount to spend on a program that, with these amendments, would only grow.

So, are we getting what we are paying for? That is the key question and a pointed criticism of amending the ESA. Would it be worth it, as far as actual dollars and cents?⁴²⁶ One study offered a telling analogy: “[S]uppose a federal education program for high-risk students enrolled 1,139 U.S. children and 565 foreign kids but graduated only 60 in 26 years, at a cost of billions. This is the record of the ESA.”⁴²⁷ This does not bode well for spending even more for the proposed amendments. However, by incorporating more conservation biology principles to listing, increasing and improving the listings, critical habitat, recovery and conservation aspects, the success of the ESA may improve, and the spending would be more worthwhile.

Plus, a change has to be made, and why not make it a legal change? The ESA has undergone frequent amendment and administrative development in its forty years and, as far as law

425. *Id.* at 7.

426. An additional consideration is whether people would be willing to pay. For example, if the ivory-billed woodpecker were to go extinct, there would be “no discernible effect on American prosperity.” WILSON, *supra* note 16, at 112. So why would Americans pay to save the woodpecker? When determining the economic benefits of environmental policies, economists measure people’s willingness to pay (WTP) to obtain the improvement. When surveyed about willingness to pay for environmental benefits, education, age, income, and party affiliation are significant considerations. Higher education is associated with a greater willingness to pay, as is higher income level and younger age. Additionally, Republicans are significantly less willing to pay than Democrats, especially when the policy is related to climate change mitigation. Such findings indicate that people may not be willing to pay to save biodiversity from climate change. But if they don’t, the future of biodiversity may be bleak. See Matthew J. Kotchen et al., *Are Americans Willing to Pay for Climate Change Mitigation?*, RESOURCES FOR THE FUTURE (Dec. 5, 2011), <http://www.rff.org/Publications/WPC/Pages/Are-Americans-Willing-to-Pay-for-Climate-Change-Mitigation.aspx>.

427. SIMMONS, *supra* note 421, at 15 (internal quotations omitted).

goes, it is still in its adolescence.⁴²⁸ While the ESA has taken forty years to morph into its current state, biodiversity does not have another forty to wait for more changes; change must occur now and change to the statute itself would be the fastest, most effective, and most efficient means. Scholars have called on politicians to take what has been learned from the first thirty years of the ESA's existence and use that to make decisions for the future, such as increased funding for information collection and a stronger use of the ESA as an information-gathering tool.⁴²⁹ But the lessons learned from the first generation of the ESA can also be used to amend the Act to make it a more effective tool to fight the effects of climate change.

Despite all of the criticisms and potential drawbacks to amending the ESA, this paper argues that proposing amendments is and will still be the best way forward. The time to act is now and act we must. "[W]e are currently on the wrong end of the conservation road, we need to discover that and reverse course as soon as possible lest we set in motion extinctions and other irreversible consequences."⁴³⁰ Amending the ESA to help save biodiversity from climate change, and in general, will help us reverse course on the conservation road.

VI.

CONCLUSION

One often hears the argument: if we don't act now, our children will only see the majestic polar bear in zoos (or maybe only in books) because they will be extinct in the wild. This is true of much biodiversity. If steps are not taken to reduce threats to endangered species, those species will become extinct. Changes to the ESA could help preserve biodiversity. Such amendments could not only save the polar bear, the pika, and the oceans, but could also have the potential to save many other species that could be adversely affected by climate change.⁴³¹As a

428. Holly Doremus, *Lessons Learned*, in 1 *THE ENDANGERED SPECIES ACT AT THIRTY: RENEWING THE CONSERVATION PROMISE*, *supra* note 393, at 196.

429. *Id.* at 207.

430. *Id.* at 196.

431. The North American Wolverine is another recent example. Over time,

threat-multiplier, it is important to address climate change in order to help conserve biodiversity and the endangered species the ESA was designed to save.

the wolverine's range has become limited to only a few states and the exiting populations are small and isolated. See Leonard F. Ruggiero et al., *Wolverine Conservation & Management*, 71 *J. OF WILDLIFE MGMT.* 2145, 2145 (Sept., 2007), available at <http://onlinelibrary.wiley.com/doi/10.2193/2007-217/pdf>. The few states hosting the scarce populations are ideal for the wolverine because of the snow cover during the wolverine's "spring denning period," which is vital for reproduction. *Id.* at 2146. However, the wolverine range is undergoing impacts from climate change. See *CLIMATE AND CONSERVATION*, *supra* note 88, at 240-41. Winters in the region are shorter and warmer, causing more rainfall than snowfall. *Id.* at 247-48. This causes species that depend on snow, such as the wolverine who depends on the spring snow cover for denning, reproduction, and food caches, to experience an even greater impact from rising temperatures that could be very problematic for the species. *Id.* However, recently an FWS biologist ordered a reversal of the recommendation to list the animals as threatened, citing uncertainties "about the degree to which we can reliably predict impacts to wolverine populations from climate change." Louis Sahagun, U.S. Reverses Proposal to List Wolverine as Threatened, *L.A. TIMES*, Jul. 5, 2014, <http://www.latimes.com/nation/la-na-wolverine-20140706-story.html>. As a Michigan Wolverine, and as someone who submitted a comment through the FWS notice-and-comment proceedings for the listing of this species, I could not justify leaving this species out of my article.