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ADAPTING LIKE THE ANIMALS: THE ENDANGERED SPECIES ACT AS A MODEL FOR HUMAN ADAPTATION TO CLIMATE CHANGE

INTRODUCTION

Tuvalu, a small, remote island nation made up of nine coral atolls, lies halfway between Australia and Hawai'i.¹ Tuvalu is, in many ways, an earthly paradise, with white sand beaches that are surrounded by the turquoise waters of the South Pacific. Those same waters are now threatening the country's very existence. Because of global climate change, Tuvalu is slowly succumbing to the sea.² Tuvalu will be one of the first populated islands to disappear as sea-levels continue to rise, leaving its 11,000 inhabitants both homeless and stateless.³ Some estimates suggest that by as early as 2050 Tuvalu could be completely submerged.⁴ But Tuvaluans are not giving up without a fight. The islanders considered bringing litigation against countries that refused to sign the Kyoto Protocol and in 2002 their government persuaded New Zealand to accept the entire population of Tuvalu as climate change refugees at a rate of sixty per year.⁵ Although these are encouraging first steps, such

1. *The World Factbook*, CENT. INTELLIGENCE AGENCY, <https://www.cia.gov/library/publications/the-world-factbook/geos/tv.html> (last updated June 20, 2014).

2. Tiffany T.V. Duong, *When Islands Drown: The Plight of "Climate Change Refugees" and Recourse to International Human Rights Law*, 31 U. PA. J. INT'L L. 1239, 1239 (2010).

3. *Id.*

4. Elizabeth Burleson, *Climate Change Displacement to Refuge*, 25 J. ENV'T L. LITIG. 19, 25 (2010).

5. See Tom Price, *Global Warming: High Tide in Tuvalu*, SIERRA CLUB MAG. (Sept. 2, 2014), <http://www.tuvaluislands.com/news/archived/2003/2003-07-A.htm>; see also *Tuvalu*, NAT'L PUB. RADIO (Nov. 17, 2001), <http://www.npr.org/templates/story/story.php?storyId=1133294> [hereinafter NPR]. In 2001, Tuvalu, Fiji, Kiribati, Tonga, and New Zealand adopted the Pacific Access Category (PAC), an immigration agreement that allows people suffering from the effects of climate change on Tuvalu, Kiribati, and Tonga to relocate and receive residency in New Zealand. PAC uses an annual quota system; up to 400 residents are permitted to migrate to New Zealand annually.

measures fall far short of the mitigative and adaptive solutions that climate change demands.⁶ More expansive initiatives are needed.

Though the planet has always experienced a level of natural climate change variability, the current period of rising global surface temperatures is without precedent in recent years, or perhaps even the entirety of human history.⁷ It is also irreversible, at least in the near future.⁸ Because of this, framing climate change as an “either-or choice between mitigation and adaptation”⁹ is at best futile and at worst a diversion of precious time and resources. That mankind must “[a]dapt or perish, now as ever, is nature’s inexorable imperative;”¹⁰ and in the face of global climate change, the need to adapt is more urgent than ever. Tuvalu is one of countless states that will be dramatically altered by climate change in the coming decades, regardless of our ultimate mitigation efforts.¹¹ In many cases, people in these regions will face incredible hardships that simply cannot be prevented.¹² Thus, it is necessary to explore all available means of coping with climate change, particularly adaptive measures that

Pacific Access Category, IMMIGRATION NEW ZEALAND (Jan. 17, 2014), <http://www.immigration.govt.nz/opsmanual/46183.htm>.

6. Although seemingly generous when compared to Australia, which refused outright to accept any Tuvaluan environmental refugees, the PAC sets a number of restrictions on which islanders qualify for residency. These parameters mean that many, specifically those most vulnerable (i.e., children, the elderly, the uneducated, the unskilled, and the poor) will be refused residency under the PAC. *A Citizen’s Guide to Climate Refugees*, SAFECOM INC., (Jan. 17, 2014), <http://www.safe.com.org.au/foe-climate-guide.htm>.

7. FORUM 2009: CLIMATE CHANGE — THE ANATOMY OF A SILENT CRISIS, GLOBAL HUMANITARIAN FORUM (2009) 1, 6 available at <http://www.ghf-ge.org/human-impact-report.pdf>.

8. *A Citizen’s Guide to Climate Refugees*, *supra* note 6.

9. J.B. Ruhl, *Climate Change Adaptation and the Structural Transformation of Environmental Law*, 40 ENVTL L. 363, 369–71 (2010); see also Philip E. Hulme, *Adapting to Climate Change: Is there Scope for Ecological Management in the Face of a Global Threat?* 42 J. APPLIED ECOLOGY 784, 785 (2005).

10. H.G. Wells, *THE MIND AT THE END OF ITS TETHER* 1, 19 (1945).

11. Bangladesh, Egypt, Indonesia, Pakistan, Mozambique, Gambia, Senegal, Suriname, China, India, and other island states are particularly vulnerable to rising sea levels. All are likely to be faced with extreme refugee crises as the effects of global warming become more dire. See Norman Myers, *Environmental Refugees in a Globally Warmed World*, 43 BIOSCIENCE 752, 753–56 (1993).

12. *Id.* at 752–53.

provide long-term solutions to the long-term problem that is global warming.

So far, the international community has largely failed to make sufficient progress, in terms of climate change adaptation,¹³ but important groundwork has been laid elsewhere. The Endangered Species Act (“ESA”), adopted by the United States in 1973, is an example of legislation upon which an effective law to encourage climate change adaptation could be modeled. The core of the ESA determines which species to protect, which threats to regulate, and how best to regulate to those threats.¹⁴ The ESA serves as “a viable way to respond to the ecological reshuffling of species” and a “guide human adaptation measures.”¹⁵ It is America’s principal species conservation program, designed to arrest the decline of a species and bring about its recovery.¹⁶ Particularly, sections 4, 5, 7, and 9 provide meaningful and pragmatic guidance on how human adaptation to climate change could be achieved on an international scale.¹⁷ A multilateral treaty that is designed around a listing function, similar to section 4 of the ESA, is essential in helping vulnerable countries to develop climate change adaptation plans, while enlisting the help of the broader international community to manage costs and facilitate implementation.

This Note explores how the ESA addresses the issue of climate adaptation and how the policies contained therein can serve as a model for human adaptation. Part I discusses climate change adaptation generally, as well as the argument for adaptive and mitigative measures to address climate change. Part I also briefly addresses existing laws on climate change. Part II focuses on the ESA and its most forceful provisions—and how those provisions can provide a foundation for measures that promote human adaptation to climate change. Part III uses the ESA to develop principles for a multinational initiative addressing human

13. See Ira R. Feldman & Joshua H. Kahan, *Sustainable Directions in U.S. Environmental Law: Preparing for the Day After Tomorrow: Framework for Climate Change Adaptation*, 8 SUSTAINABLE DEV. L. & POL’Y 61, 61–64 (2007).

14. J. B. Ruhl, *Climate Change and the Endangered Species Act: Building Bridges to the No-Analog Future*, 88 BOSTON UNIV. L. REV., 1, 31 (2008).

15. Ruhl, *supra* note 9, at 388.

16. Ruhl, *supra* note 14, at 13–14.

17. A human rights-based approach is both unrealistic and idealistic. See, e.g., Simon Caney, *Climate Change, Human Rights, and Moral Thresholds*, in CLIMATE ETHICS 163 (2010).

adaptation to climate change and applies such initiatives to imperiled societies. Part IV closes with a discussion of international barriers to the implementation of human adaptation legislation. Finally, this Note concludes that the ESA does, in fact, provide a valuable template for drafting future international climate change initiatives.

I. BACKGROUND

A. *What is Climate Change?*

The Intergovernmental Panel on Climate Change (“IPCC”) is a U.N. organization composed of hundreds of scientists and cooperating governments.¹⁸ The IPCC analyzes the most current scientific, technical, and socioeconomic data produced worldwide, which is also relevant to the understanding of climate change, and has proclaimed itself “the leading international body for the assessment of climate change.”¹⁹ According to the IPCC, climate change is “a change in the state of the climate that can be identified . . . and that persists for an extended period of time, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity.”²⁰ Although natural shifts in global temperature have occurred throughout history, there is now a consensus in the peer-reviewed literature—and among IPCC members—that recent temperature increases exceed variations due to natural forces, and that human activity is responsible for the bulk of these increases.²¹ Carbon dioxide emissions are credited with creating a “greenhouse effect” in which various heat-trapping

18. *Organization*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (Jan. 17, 2014), <http://www.ipcc.ch/organization/organization.shtml#Uj8-lcakp7c>.

19. *Id.*

20. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: SYNTHESIS REPORT (2007) 1, 30 available at http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf [hereinafter *Synthesis Report*].

21. Katharine M. Baldwin, *NEPA and CEQA: Effective Legal Frameworks for Compelling Consideration of Adaptation to Climate Change*, 82 S. CAL. L. REV. 769, 772–73 (2009). The IPCC’s Fourth Assessment Report was published in 2007 and declared that climate change is unequivocally accelerating—and there was a 90 percent certainty that climate change was human induced. See Edward Cameron, *The Human Dimension of Global Climate Change*, 15 N.W. J. ENVTL L. & POLY, 1, 1–2 (2009).

gases produced by industrial activity are retained in the atmosphere and cause global temperatures to rise.²²

While we are currently unable to predict the large scale effects of climate change on human settlements or ecosystems, scientists are not optimistic about the years to come.²³ According to the IPCC, sea level rise under global warming is inevitable.²⁴ Maintenance of greenhouse gas (“GHG”) concentrations at or above present levels will not stabilize sea levels for many centuries²⁵ and “other climate change-driven alterations in ecological, meteorological and climactic conditions will also be facts of life, at least until the end of this century and almost certainly much longer.”²⁶ In addition to rising sea levels, climate change will result in a shift in rainfall patterns, an increase in drought and flooding, the spread of infectious disease, an increase in the frequency and intensity of tropical storms, destruction of ecosystems, melting of the polar ice caps, a rise in malnutrition, crop failure and famine, and a decrease in access to potable water.²⁷ Now is the time to prepare for climate change—and adaptation must be an integral part of that preparation.²⁸

The world’s poor will be the most adversely affected by climate change,²⁹ which could potentially halt, and eventually reverse, certain human development indicators.³⁰ As the effects of climate change become more severe, the hungry will find it harder

22. Baldwin, *supra* note 21, at 772–73.

23. Robin Kundis Craig, “Stationarity is Dead”—*Long Live Transformation: Five Principles for Climate Change Adaptation Law*, 34 HARV. ENVTL. L. REV. 9, 14–16 (2010).

24. R.K. Pachauri, Chairman, Intergovernmental Panel on Climate Change, Press Presentation at 27th Session of the Intergovernmental Panel on Climate Change, 1, 13 (Nov. 17, 2007), *available at* <http://www.worldoceanobservatory.org/events/freshwater/docs/pachauri-17-november-2007.pdf>.

25. Prerna Jain & Pragati Jain, *Climate Change: A Major Issue in the Sustainable Development of India*, 1 INT’L. J. RES. COM., ECON. & MGMT., 136, 137 (2011).

26. Craig, *supra* note 23, at 24.

27. Jian & Jian, *supra* note 25, at 137–38.

28. Feldman & Kahan, *supra* note 13, at 61.

29. CHRISTIAN AID, THE HUMAN FACE OF CLIMATE CHANGE: A CHRISTIAN AID REPORT 1, 4 (Feb. 5, 2014), *available at* http://www.christianaid.org.uk/images/CC_impacts_adaptation_final.pdf.

30. UNITED NATIONS DEVELOPMENT PROGRAMME, HUMAN DEVELOPMENT REPORT 2007/2008: FIGHTING CLIMATE CHANGE: HUMAN SOLIDARITY IN A DIVIDED WORLD (2007), *available at* <http://hdr.undp.org/sites/default/files/re>

to grow food, the displaced will find it harder to build homes, and the impoverished will find it harder to provide for their families and themselves.³¹ In the context of climate change, citizens of developing countries are the world's "last and least."³² They contributed the least to the growing number of GHGs entering the atmosphere, and thus are the least responsible for human-induced climate change.³³ Unfortunately, they are also among the least represented in the international community, and thus will have little, if any, control over international agreements that address climate change. Moreover, they are the last to receive international aid.³⁴ For individuals such as these, who were already vulnerable to poverty, the painful consequences of climate change are already being felt.³⁵ The world's most impoverished possess a "chronic lack of adaptive capacity, including financial, technical, and institutional resources," leaving them ill-prepared to deal with the myriad of threats posed by climate change.³⁶

The most endangered communities, like those within island nations, Sub-Saharan Africa, and South Asia, are heavily dependent on climate-sensitive resources, like fish, rice, grains, cereals, and other crops.³⁷ When these and other resources disappear, these jeopardized communities have no other means of supporting their families and must often leave their homes as refugees.³⁸ Although certain states, such as New Zealand, have offered to accept displaced Pacific Islanders, these offers are rare

ports/268/hdr_20072008_en_complete.pdf. In 2005, the World Health Organization and UNICEF estimated that over one billion people were faced with inadequate access to fresh water and the U.N. Food and Agriculture Organization estimated that 820 million of the 854 million people suffering from hunger and malnutrition live in developing countries. *Id.*

31. UNITED NATIONS DEVELOPMENT PROGRAMME, HUMAN DEVELOPMENT REPORT 2014: SUSTAINING HUMAN PROGRESS: REDUCING VULNERABILITIES AND BUILDING RESILIENCE 1, 20–50 (2014), available at <http://is-suu.com/undp/docs/hdr14-report-en?e=3183072/9245907#search>.

32. Cameron, *supra* note 21, at 4–5.

33. Jian & Jian, *supra* note 25, at 137.

34. Cameron, *supra* note 21, at 5.

35. Jian & Jian, *supra* note 25, at 137.

36. Cameron, *supra* note 21, at 4.

37. *Id.* at 5–6.

38. Myers, *supra* note 11, at 752.

and limited.³⁹ Another proposed solution to the problem of climate change refugees is the “safe-island” concept.⁴⁰ It suggests that island countries resettle vulnerable communities from smaller islands, which are extremely susceptible to climate change, to larger, more secure islands within the state.⁴¹ Proponents of the “safe-island” concept argue that it would enable governments to concentrate resources on protecting only salvageable settlements.⁴² But even if relocation measures, like New Zealand’s or the “safe-island” concept, were more widely adopted, relocation is an incomplete solution to climate change—and creates problems of its own.⁴³

As the situation stands, nations like Tuvalu face the prospect of being washed off the face of the earth without a successor state.⁴⁴ Even nations that will not be entirely submerged are unlikely to have enough space to accommodate significant portions of their populations, leaving potentially millions of people stateless.⁴⁵ Pacific Islanders, in particular, are worried about being

39. Craig, *supra* note 23, at 31. States are generally more inclined to take measures like the ones taken by India, which has built a 2,100 mile-long fence at its border with Bangladesh to keep climate change refugees from entering the country, and the United States, which built a similar fence along its border with Mexico. Measures taken by the United States, the world’s largest economy, have left some in the international community with little hope that other, less prosperous states will develop humane means of coping with the influx of climate change refugees. *Id.* at 21.

40. Cameron, *supra* note 21, at 7.

41. *Id.*

42. *Id.*

43. Even if it were possible to relocate all climate change refugees, many would rather not. Nations that will be washed away by rising sea levels are worried about their right of self-determination and the prospect of becoming indigent minority populations in hostile receiving states. Duong, *supra* note 2, at 1251–60.

44. Burleson, *supra* note 4, at 29.

45. Islands, like the Maldives, Kiribati, Tuvalu, and the Marshalls in the Indian and Pacific Oceans, as well as similarly situated islands in the Caribbean, are among the most vulnerable to rising sea-levels, flooding, and tropical storms, all of which are likely to become more extreme in the coming years. Most of these islands presently lie only a meter or two above sea-level, and ultimately face total elimination as sea levels continue to rise. The population of the non-Caribbean islands is expected to exceed 50 million by 2030 and 46 million of these people are likely to find their homes and livelihoods severely affected by climate change. *See* Myers, *supra* note 11, at 756.

“absorbed” into foreign states and losing their national and ethnic identities.⁴⁶ Climate change poses a direct threat to their right to self-determination, which is a well-recognized and fundamental principle of international law.⁴⁷ The ESA serves as a useful model for answering many of the problems created by climate change, and can be used as a guide in crafting human adaptation initiatives.

B. Dual Response to Climate Change: Adaptation vs. Mitigation

The phrase “climate change adaptation” refers to “changes made to better respond to present or future climactic and other environmental conditions, thereby reducing harm . . .”⁴⁸ or the “[a]djustment in natural or human systems in response to actual or expected climactic stimuli or their effects, which moderates harm or exploits beneficial opportunities.”⁴⁹ Adaptation, as a response to climate change, is inherently more complex than mitigation.⁵⁰ Mitigative measures have a clear regulatory goal: to substantially reduce global emissions of greenhouse gases as soon as possible. Adaptation, however, requires responding to potentially unforeseeable events and outcomes with a series of localized efforts.⁵¹

Adaptation initiatives must include proactive and reactive strategies.⁵² Proactive strategies try to anticipate the effects of climate change and institute measures to reduce harm, or even maximize benefits, to be gained from climate change.⁵³ Such proactive strategies include crop and industry diversification, seasonal climate forecasting, water storage systems, climate change

46. Burleson, *supra* note 4, at 27.

47. Margaux J. Hall & David C. Weiss, *Avoiding Adaptation Apartheid: Climate Change Adaptation and Human Rights Law*, 37 YALE J. INT'L L. 309, 333 (2012).

48. U.S. GLOBAL CHANGE RESEARCH PROGRAM, GLOBAL CLIMATE CHANGE IMPACTS IN THE UNITED STATES 10–11 (2010) (as cited in J.B. Ruhl *Climate Change Adaptation and the Structural Transformation of Environmental Law*, 40 ENV'T L. 363, 366 (2010)).

49. J.B. Ruhl *Climate Change Adaptation and the Structural Transformation of Environmental Law*, 40 ENV'T L. 363, 366 (2010).

50. Craig, *supra* note 23, at 27–28.

51. Baldwin, *supra* note 21, at 775.

52. Alejandro E. Camacho, *Adapting Governance to Climate Change: Managing Uncertainty Through a Learning Infrastructure*, 59 EMORY L.J. 1, 15 (2009).

53. *Id.*

insurance programs, and supplementary irrigation systems.⁵⁴ In contrast, reactive strategies respond to climate change events after-the-fact, and include measures like disaster recovery and emergency response.⁵⁵ In essence, climate change adaptation seeks to respond to, rather than prevent, climate change.

Much of the international community's focus has been on the mitigation of GHGs, at the expense of developing a means of learning to cope with the changes to come.⁵⁶ While advocating for a shift in focus from mitigation to adaptation, the role of mitigation in addressing climate change must not be devalued. Yet, for too long mitigation has been portrayed as "a scientific and technological challenge that eases us out of the climate change problem without sacrifices or losers."⁵⁷ Such a depiction of the current global condition is misleading, counter-productive, and false. Because of "committed" warming—climate change that will occur regardless of mitigation measures, as a result of already accumulated greenhouse gases in the atmosphere—what happens to ecological systems over the next several decades will largely be beyond human control.⁵⁸ Even if drastic steps are taken immediately to reduce carbon dioxide emissions, and regulate other contributing factors, glaciers have already begun to melt, sea levels have already started to rise, and the atmosphere has already been adversely affected by carbon dioxide emissions.⁵⁹

Therefore, mitigation must be coupled with adaptive measures. Such methods decrease human vulnerability while simultaneously increasing "the adaptive capacity of both humans and the ecological systems upon which they depend."⁶⁰ Because of climate change, "humans have decisively lost the capability—to the extent we ever had it—to dictate the status of ecosystems and their services."⁶¹ Humans tend to think of themselves as apex predators at the top of, if not altogether removed from, the food chain. Humanity has shaped the world to

54. *Id.*

55. *Id.*

56. Feldman & Kahan, *supra* note 13.

57. Ruhl, *supra* note 49, at 369.

58. Craig, *supra* note 23, at 9.

59. Baldwin, *supra* note 21, at 769.

60. Craig, *supra* note 23, at 21.

61. *Id.* at 14.

fit its needs for centuries through mining, deforestation, the construction of cities and major infrastructure such as dams, bridges, and highways. Because of climate change, however, we no longer have the luxury of “opting out” of adapting to our surroundings.

Thus, it is no longer feasible to rely on mitigation alone; adaptation must be the new focus, and basis, for climate change policy.⁶² But, we need not build from the ground up. When determining how best to respond to climate change, existing laws can provide meaningful direction in determining how to prioritize resource allocation and formulate policies for human adaptation. The ESA, lauded as one of the most successful environmental laws in the world,⁶³ serves as a meaningful illustration of effective legislation and the policies contained therein may be repurposed to address human needs. The creation of a list, similar to the Endangered Species List, would serve as a mechanism for ensuring that countries most likely to be affected receive adequate assistance and protection to allow them to implement climate change adaptation measures.

C. Existing Law

Although adaptation has been neglected as a means of coping with climate change, it has not been ignored entirely. The United Nations Framework Convention on Climate Change (“UNFCCC”), an international environmental treaty, was negotiated at the 1992 Earth Summit in Rio de Janeiro as part of an attempt to stabilize GHG emissions and to prevent interference with global climactic systems.⁶⁴ The treaty originally set no mandatory limits on GHG emissions for individual nations, and contained no enforcement provisions. It was effectively non-binding on its signatories.⁶⁵ Three years later, countries recognized that the UNFCCC failed to adequately address GHG emissions and

62. Ruhl, *supra* note 49, at 369.

63. J.B. Ruhl, *Cities, Green Construction, and the Endangered Species Act*, 27 VA. ENV'T'L L.J. 145, 147 (2009).

64. *What is the UNFCCC & The COP?*, CLIMATE LEADERS, <http://www.climate-leaders.org/climate-change-resources/india-at-cop-15/unfccc-cop> (last visited Jan. 17, 2014).

65. *Id.*

adopted the Kyoto Protocol, in order to fortify the UNFCCC and make meaningful progress in the reduction of GHG emissions.⁶⁶

While the Kyoto Protocol focuses on mitigation, it makes reference to climate change adaptation in all ten of its provisions.⁶⁷ Articles 4.8 and 4.9 of the Protocol ask parties to provide funding, insurance, and technology to developing countries to aid in their adaptation to climate change, as well as any other assistance required to meet their specific needs concerning climate change adaptation.⁶⁸ The Kyoto Protocol also establishes the Adaptation Fund (the “Fund”), which supports “concrete adaptation measures” such as vulnerability and adaptation assessment, capacity building, technical training and technology transfer, pilot programs, and strengthening and developing early warning systems for extreme weather events.⁶⁹ All parties to the UNFCCC are required to contribute to the Fund.⁷⁰ In the past three years, the Fund has “dedicated” more than US\$190 million dollars to “increase climate resilience” in twenty-eight countries.⁷¹ That amounts to approximately US\$2,357,143 per country. This figure represents the amount of money each country has been approved to receive, yet most states have received only a fraction of the promised amount.⁷²

66. The Kyoto Protocol was formally adopted in 1997 and now has 192 parties. *Background on the UNFCCC: The International Response to Climate Change*, UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE, http://unfccc.int/essential_background/items/6031.php (last visited Jan. 17, 2014).

67. Feldman & Kahan, *supra* note 13, at 61.

68. *Id.*

69. *Id.*

70. *Implementing Adaptation*, UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE, http://unfccc.int/cooperation_and_support/financial_mechanism/adaptation_funding/items/2535.php, (last visited Jan. 17, 2014).

71. *About the Adaptation Fund*, ADAPTATION FUND, <https://www.adaptation-fund.org/about> (last visited Jan. 17, 2014).

72. *Funded Projects*, ADAPTATION FUND, https://www.adaptation-fund.org/funded_projects (last visited Jan. 17, 2014). Argentina has only received US\$584,154 of the US\$4,296,817 in funding approved in December, 2012, to help improve the climate change resilience of small-scale agriculture near Buenos Aires. Tanzania and the Cook Islands have each received under US\$800,000, of the approximately US\$5,000,000 pledged to each state in December, 2011, to help cope with rising sea levels. Eritrea has received less than US\$900,000 of the US\$6,520,850 promised to assist Anseba Region respond to water and food scarcity. *Id.*

Other important initiatives include the Least Developed Countries Work Programme, adopted in 2001, the Nairobi Work Programme, adopted in 2006, and the Cancun Adaptation Framework, adopted in 2010.⁷³ As is typical for U.N. initiatives, all three programs are incredibly vague and provide little practical guidance. Instead, they often place the burden on Least Developed Countries to identify their particular needs and create national adaptation plans that outline those needs and provide strategies to address them.⁷⁴ While effective adaptation measures require taking a localized approach and recognition of the fact that climate change will produce varying outcomes,⁷⁵ U.N. initiatives are often overly broad, to the point that they fail to provide any substantive, meaningful guidance on how countries can address climate change.⁷⁶

Though international legislation regarding human climate change adaptation is limited, many states have developed adaptive measures at the national or subnational level regarding species that face a serious risk of extinction due to global climate change.⁷⁷ Collectively, these provisions use both mitigative and adaptive tools, such as habitat preservation, pollution regulation, and assisted migration to limit the extinction of at-risk species.⁷⁸ Many of the issues faced by endangered species are the same as those faced by human settlements. These include the loss of habitat; degraded ecological conditions; “induced invasions”⁷⁹ where a species is forced to encroach on the habitat of

73. *FOCUS: Adaptation*, UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE, <http://unfccc.int/focus/adaptation/items/6999.php> (last visited Jan. 17, 2014).

74. *Workstreams- Adaptation*, UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE, <http://unfccc.int/adaptation/workstreams/items/6995.php> (last visited Jan. 17, 2014).

75. *Global Climate Change: Vital Signs of the Planet*, NAT'L AERONAUTICS & SPACE ADMIN., <http://climate.nasa.gov/effects> (last visited Jan. 17, 2014).

76. Dieter Helm, *Climate-Change Policy: Why Has So Little Been Achieved?*, 24 OXFORD REV. ECON. POL'Y 211, 217–20 (2008).

77. Alejandro E. Camacho, *Assisted Migration: Redefining Nature and Natural Resource Law Under Climate Change*, 27 YALE J. ON REG. 171, 191–99 (2010). The United States has enacted several important domestic laws, such as the National Forest Management Act, the Federal Land Policy and Management Act of 1976, the National Wildlife Refuge System Improvement Act, the National Park Service Organic Act, the Wilderness Act of 1964, and perhaps most important of all, the Endangered Species Act. *Id.*

78. *Id.*

79. Ruhl, *supra* note 14, at 24–25.

others after its own territory has been destroyed; the depletion of vital natural resources; and increasingly volatile weather patterns.⁸⁰ Therefore, rather than starting from scratch, legislators should learn whatever they can from existing measures, like the ESA, and apply that knowledge to the problem of human adaptation and the preservation of threatened human societies.

II. THE ENDANGERED SPECIES ACT: A GUIDE FOR HUMAN ADAPTATION

A. *The Endangered Species Act*

Affectionately referred to as the “pit bull” of environmental laws, the ESA is one of the most comprehensive and effective laws of its kind.⁸¹ Signed into law by President Nixon on December 28, 1973,⁸² the ESA has also been described as the “crown jewel” of America’s environmental laws⁸³ and “the most comprehensive legislation for the preservation of endangered species ever enacted by any nation.”⁸⁴ The ESA, however, has also proved to be one of the nation’s most controversial and widely litigated statutes.⁸⁵ It has been in place for four decades and has proven itself capable of withstanding political and judicial pressure⁸⁶ with an impressive display of flexibility and adaptability. Over the past forty years, the ESA has protected hundreds of species from the threat of extinction.⁸⁷ There are currently 2,171 species on the Endangered Species List.⁸⁸ As of 2002, 30 percent of listed species had stable populations, 6 percent were recorded as improving, 21 percent were declining, and 39 percent were characterized as uncertain.⁸⁹ Generally, the longer a species is

80. Hall & Weiss, *supra* note 47, at 314–17.

81. Ruhl, *supra* note 66, at 147.

82. Shannon Petersen, *Congress and Charismatic Megafauna: A Legislative History of the Endangered Species Act*, 29 ENVTL. L. 463, 476 (1999).

83. *Id.* at 464.

84. *Tennessee Valley Auth. v. Hill*, 437 U.S. 153, 180 (1978).

85. Petersen, *supra* note 82, at 466–67.

86. *Id.* at 464.

87. Ruhl, *supra* note 14, at 5; J. Michael Scott et al., *By the Numbers, in THE ENDANGERED SPECIES ACT* 30, 16, 29–32 (2006).

88. *Summary of Listed Species, Listed Populations and Recovery Plans*, U.S. FISH & WILDLIFE SERVICE, http://ecos.fws.gov/tess_public/pub/boxScore.jsp (last visited Jan. 17, 2014).

89. Scott, *supra* note 87, at 30.

on the list the better it has fared.⁹⁰ In 1999 it was estimated that the ESA saved as many as 227 U.S. species from extinction in just twenty-six years.⁹¹ It has successfully responded to the myriad of challenges facing threatened species, including habitat loss⁹² caused by fire, drought, and flooding.⁹³ These challenges in turn drive species from their traditional habitats to locations which may be ill-suited to their survival or result in the introduction of foreign species into stable ecological systems which cause disruption in the ecological equilibrium to the detriment of other species.⁹⁴

Climate change does not just displace animal species. It also creates millions of human "climate change refugees," and causes millions of other people to fall farther into poverty and contract various climate-change-related diseases.⁹⁵ The ESA "takes a species-specific approach that has proven effective when employed to address discrete human-induced threats that have straightforward causal connections to a species."⁹⁶ The "species-specific" approach adopted by the ESA provides a useful starting point in solving how humanity will adapt to the global phenomena broadly encapsulated in the term "climate change," and all of the sub-issues, such as temperature increase, rise in water levels, change in precipitation levels and patterns, decrease in

90. *Id.*

91. *Id.* at 31.

92. *Id.* at 30.

93. Camacho, *supra* note 77, at 179.

94. Jason S. McLachlan et al., *A Framework for Debate of Assisted Migration in an Era of Climate Change*, 21 CONSERVATION BIOLOGY 297, 298 (2007).

95. Myers, *supra* note 11, at 752.

The incidence of mosquito-borne diseases, including malaria, dengue, and viral encephalitis, are among those diseases most sensitive to climate Climate-related increases in sea surface temperature and sea level can lead to higher incidence of water-borne infectious and toxin-related illnesses, such as cholera and shellfish poisoning. Human migration and damage to health infrastructures from the projected increase in climate variability could indirectly contribute to disease transmission. Human susceptibility to infections might be further compounded by malnutrition due to climate stress on agriculture and potential alterations in the human immune system caused by increased flux of ultraviolet radiation. Johnathan A. Patz, et al., *Global Climate Change and Emerging Infectious Diseases*, 275 J. AM. MED. ASSOC. 217, 218 (1996).

96. Ruhl, *supra* note 14, at 6.

availability of potable water, and the extinction of various species, to which it refers. Although the ESA is a powerful statute, it is also extremely flexible.⁹⁷

B. Key Provisions of the ESA

Section 4 outlines the means by which species are categorized as “endangered” or “threatened.”⁹⁸ Section 4(a)(1) requires the Fish and Wildlife Service (“FWS”) to use “the best scientific and commercial data available” to determine whether the threat of reduction in habitat, overutilization, disease or predation, inadequacy of regulatory mechanisms, or other natural, or manmade, factors have rendered the species endangered or threatened.⁹⁹ This section precludes the consideration of any economic factors when determining whether a species should be categorized as threatened or endangered.¹⁰⁰ Though the power of the ESA is primarily rooted in sections 4, 7, and 9,¹⁰¹ Section 5 is another important provision of the ESA. It contains a concise grant of authority that vests the Secretary of the Interior with

97. *Id.* at 27.

Climate change adaptation . . . should be based on principled flexibility [P]rincipled flexibility means that both the law and regulators (1) distinguish in legally significant ways uncontrollable climate change impacts from controllable anthropogenic impacts on species, resources, and ecosystems that can and should be actively managed and regulated, and (2) implement consistent principles for an overall climate change adaptation strategy, even though application of those principles in particular locations in response to specific climate change impacts will necessarily encompass a broad and creative range of adaptation decisions and actions. Craig, *supra* note 23, at 17.

Such an adaptation is possible through restructuring of the Endangered Species Act to apply it to human communities. Such flexibility can be found in the ESA.

98. 16 U.S.C. § 1533 (1973).

99. 16 U.S.C. § 1533(a)(1)(A)–(E). Collectively, all plants, mammals, fish, birds, amphibians, reptiles, crustaceans, mollusks, arthropods, and other invertebrates are eligible for protection under the ESA. 16 U.S.C. §§ 1532(8), (14), (16) (1973). The Secretary of the Interior has delegated his power to the Fish and Wildlife Service, while the Secretary of Commerce has delegated his power to the National Marine Fisheries Service. 16 U.S.C. §§ 1532(15), 1533(a)(1).

100. 16 U.S.C. § 1533(b)(1)(A).

101. Petersen, *supra* note 82, at 464.

the ability to acquire land, through purchase, donation, or otherwise, as he deems necessary to the advancement of the threatened or endangered species.¹⁰²

Section 7 governs interagency cooperation.¹⁰³ It mandates that all federal agencies consult with the Secretary to ensure that “any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species.”¹⁰⁴ In *Tennessee Valley Authority v. Hill*, the Supreme Court greatly expanded section 7 of the ESA.¹⁰⁵ Justice Burger, writing for the majority, concluded that

[o]ne would be hard pressed to find a statutory provision whose terms were any plainer than those in section 7 of the Endangered Species Act. Its very words affirmatively command all federal agencies to “insure that actions authorized, funded, or carried out by them do not jeopardize the continued existence” of an endangered species or “result in the destruction or modification of habitat of such species” This language admits of no exception.¹⁰⁶

In other words, section 7 serves as “an absolute bar against any federal action that might jeopardize a listed species.”¹⁰⁷

Section 9 is commonly referred to as the “takings clause” of the ESA and makes it illegal to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct” against fish and animal species listed as endangered.¹⁰⁸ “Harm” has been afforded a broad construction and interpreted to include activities that create a “significant environmental modification or degradation.”¹⁰⁹ In *Gibbs v. Babbitt*,

102. 16 U.S.C. § 1534(a)(1)–(2) (1973).

103. 16 U.S.C. § 1536 (1973).

104. 16 U.S.C. § 1536(a)(2).

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

106. *Id.* at 173.

107. Petersen, *supra* note 82, at 465.

108. 16 U.S.C. § 1538(a) (1973). The takings clause does not automatically apply to species listed as “threatened,” and weaker protections apply to the takings of plants. Specifically, § 1533(d) provides that threatened species are protected by regulations that the Secretary determines to be “necessary and advisable,” while § 1541 governs the takings of plants.

109. 50 C.F.R. § 17.3 (2006).

the Fourth Circuit held that the protections under section 9 extend to private property; accordingly, the ESA empowers the FWS to limit land use activities on private property that might indirectly harm a listed species.¹¹⁰ Courts have consistently upheld this broad interpretation of section 9, making the ESA “the most powerful regulatory provision in all of environmental law.”¹¹¹

III. THE ESA AS AN EFFECTIVE LEGAL FRAMEWORK FOR ADDRESSING HUMAN ADAPTATION TO CLIMATE CHANGE

Many of the issues faced by endangered species under the ESA are the same as those facing human settlements endangered by climate change—such as the loss of habitat, degraded ecological conditions, the depletion of natural resources, and increasingly volatile weather patterns.¹¹² Unfortunately, there are precious few laws that address issues faced by human communities to the degree and scope the ESA addresses animal adaptation. Instead of starting anew, policymakers must learn what they can from the ESA and similar statutes in order to prioritize resource allocation and policy formation for human adaptation to climate change. No provision of the ESA specifically addresses climate, emissions, or pollutants; instead, the statute “operates on fairly holistic levels, requiring the FWS to consider what constitutes endangerment, taking, jeopardy, and recovery of species.”¹¹³ The ESA directs the Secretary of the Interior to compile an Endangered Species List (“ESL”) that contains all species determined, either by the Secretary of the Interior or the Secretary of Commerce, to be threatened.¹¹⁴ The Secretary of the Interior then formulates and administers conservation and recovery initiatives that are tailored to the needs of each species.¹¹⁵ These initiatives must consider the manner in which climate change will pit various species against each other, but also accept when certain species have reached a point where human assistance cannot bring about their recovery.¹¹⁶ A similar list should be com-

110. *Gibbs v. Babbitt*, 214 F.3d 483 (4th Cir. 2000).

111. Petersen, *supra* note 82, at 466 n.26.

112. Hall & Weiss, *supra* note 47, at 314–17.

113. Ruhl, *supra* note 14, at 29.

114. 16 U.S.C. § 1533(c)(1) (1973).

115. *Id.*

116. Ruhl, *supra* note 14, at 30.

piled outlining states that are particularly vulnerable to the adverse effects of climate change. Once listed, these countries would be entitled to protections similar to species placed on the ESL, particularly those outlined in sections 4, 5, 7, and 9 of the ESA.

Such an Endangered States initiative could be established through an international convention, and be overseen by a multilateral institution using weighted voting in a manner similar to the World Bank.¹¹⁷ Member states would “own” the institution¹¹⁸ and shares would be divided between wealthy and poor countries. Wealthy states would be able to secure greater shares through increased financial support while poor countries’ ownership would be determined based on their respective levels of need and risk. Although many states may be more concerned with how climate change will affect their own people, climate change will not occur in a vacuum—its effects will be felt across the planet. It will spill across borders in the form of refugees, resource scarcity, and natural disasters.¹¹⁹ Because proactive adaptation is both cheaper and more effective than reactive reconstruction,¹²⁰ it is possible to use the impending effects of global warming to encourage a level of international cooperation unseen since the end of World War II.

117. See Sandro Blanco & Enrique Carrasco, *Pursuing the Good Life: The Meaning of Development as It Relates to the World Bank and the IMF*, 67 TRANSNAT'L L. & CONTEMP. PROBS. 67, 70–72, 78 (1999). Both the IMF and World Bank were born from the financial instability facing Europe after the Second World War. The Bretton Woods Conference was held in New Hampshire in the summer of 1944, where the participants’ primary goals were the promotion of currency stability, the creation of a system of international payments, and the formulation of a plan for the economic reconstruction of Europe. International development was a secondary concern. *Id.* at 70–71. We are now presented with a similar opportunity to capitalize on catastrophe; climate change has been described as a global disaster not unlike a world war. Burleson, *supra* note 4, at 26.

118. Blanco & Carrasco, *supra* note 118, at 78.

119. WORLD HEALTH ORG., PROTECTING HEALTH FROM CLIMATE CHANGE: WORLD HEALTH DAY 2008, at 5 (2008), available at http://www.who.int/world-health-day/toolkit/report_web.pdf.

120. See Frank Lecocq & Zmarak Shalizi, *Balancing Expenditures on Mitigation of and Adaptation to Climate Change: An Exploration of Issues Relevant to Developing Countries*, 1, 5 (World Bank Dev. Res. Grp. Sustainable Rural & Urb. Dev. Team Working Paper No. 4299, 2007), available at <http://elibrary.worldbank.org/doi/pdf/10.1596/1813-9450-4299>.

A. Section 4: Determining Which Countries to List

The ESA defines an “endangered species” as “any species which is in danger of extinction through all or a significant portion of its range.”¹²¹ It further defines a “threatened species” as “any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.”¹²² In deciding whether a species is threatened, section 4 directs the Secretary of the Interior to consider a set of natural or manmade factors, including the catchall, “other natural or manmade factors affecting its continued existence.”¹²³ A determination that any of these criteria have been satisfied results in the species being placed on the ESL.¹²⁴ The ESA outlines the listing procedure in great detail¹²⁵ and requires that listings be made as expeditiously as possible. Moreover, the ESA seeks to limit administrative discretion to postpone or delay in the decision-making process.¹²⁶ Once listed, the protections of the ESA automatically apply to that species. A similar listing system, something like an Endangered States List, if applied to endangered states and overseen by an administrative agency, would serve as an effective means to quickly identify states which are abnormally at risk to the adverse effects of climate change. Additionally, an Endangered States List would require other states to help enforce adaptation measures, in order to support a listed state’s response to climate change.

121. 16 U.S.C. § 1532(6) (1973).

122. 16 U.S.C. § 1532(20).

123. 16 U.S.C. § 1533(a)(1)(E) (1973).

124. 16 U.S.C. § 1533(a)(1)(A)–(E). Because of the subjective nature of § 4’s language regarding listing criteria and the uncertainty relating to the future of climate change, courts generally defer to agency expertise. Whether to list a species or not is often considered a matter of agency discretion, adding to the ESA’s flexibility. Ruhl, *supra* note 14, at 33. Listing determinations may be reversed when a species presents “such a compelling case of climate change threat that even an aggressive use of discretion could not support a decision not to list.” Ruhl, *id.* at 34.

125. 16 U.S.C. § 1533(a)(2)(B)–(D).

126. Oliver A. Houck, *The Endangered Species Act and Its Implementation by the U.S. Departments of the Interior and Commerce*, 64 U. COLO. L. REV., 277, 288 (1993).

All states will be affected by climate change to some degree,¹²⁷ but only the most imperiled states warrant the heightened protection of an Endangered States List. Listed states would be selected based on their particular vulnerability to climate change, using criteria similar to those outlined in section 4(a)(1). Such factors may include location, GDP, average per capita income, population size and proportion of population likely to be severely affected by climate change, ease of migration or integration of the affected populations into other states or other regions of their native state, key industries of the state, and regional weather patterns, among other considerations. In weighing these factors, no single criterion would be determinative, so as to better maintain the flexibility reflected in the ESA.

Once listed, states would be entitled to a series of protections based on the degree of threat they face (i.e., endangered versus threatened, as in the ESL), which would commence immediately.¹²⁸ Although Recovery Plans under the ESA are optional,

127. Feldman & Kahan, *supra* note 13, at 61. Developed nations are not immune from the effects of climate change, but they are better equipped to adapt to those effects. In the Netherlands, the Dutch have already taken extensive measures to guard against rising sea levels, including the fortification of existing dikes and floodgates, the enactment of aggressive flood plan controls, new zoning and development plans, and government acquisition of farmland. The government will use this farmland to allow controlled flooding, in order to alleviate stress on the dikes and levees. In Britain, a floodgate called the Thames Barrier has been constructed to protect London from flooding. Baldwin, *supra* note 21, at 777.

128. 16 U.S.C. § 1533(c)–(d). An FWS listing review team was established in October, 1989, to review a proposal and conservation strategy prepared by the Interagency Scientific Committee to Address the Conservation of the Northern Spotted Owl. The proposal was over 400 pages long and examined owl populations, habit trends, and the unique threats facing the owl. It also proposed a conservation strategy and a plan for the implementation of that strategy. The proposal furthermore conducted a cost-benefit and risk analysis of the implementation. The team made a final recommendation to list the Northern Spotted Owl in June, 1990, that triggered requirements that the Forrest Service and Bureau of Land Management confer with the FWS under § 7 of the ESA. Interim guidelines were then prepared by the FWS to assist agencies in evaluating timber industry practices that would impact the Northern Spotted Owl. These protections were put in place as early as 1990. See U.S. FISH & WILDLIFE SERVICE, REVISED RECOVERY PLAN FOR THE NORTHERN SPOTTED OWL (2011), available at <http://www.fws.gov/arcata/es/birds/nso/documents/USFWS2011RevisedRecoveryPlanNorthernSpottedOwl.pdf>. States would undergo a similarly extensive review process, whereby information

and are developed at the discretion of the FWS, in the case of the Endangered States List the overseeing agency would be required to develop such a plan.¹²⁹ These Recovery Plans would give priority to countries that are most likely to benefit from such plans—particularly those that are financially or developmentally unable to adapt on their own.¹³⁰ Recovery Plans would allow for the creation of customized initiatives based on the unique conditions present in the state, resulting in greater efficacy for each state.

In developing Recovery Plans, the agency would be empowered to establish “recovery teams” composed of representatives from various public and private agencies, institutions, and other persons with knowledge of the unique risks faced by that particular country.¹³¹ Recovery teams would enable endangered communities to have a greater voice in the development of their nation’s adaptation initiatives, and better allow for meaningful prioritization of the initiatives in the Recovery Plan, while also establishing an authoritative body of experts to oversee adaptive initiatives on a national level. Furthermore, listed countries would be subject to monitoring and periodic review by the governing agency, which would evaluate both the status and progress of the listed country, allowing the listed country to assess both the successes and failures of the Recovery Plan, and make alterations where necessary.¹³²

would be gathered relating to the local population, economy, and infrastructure. That information would then be used to draft a proposal, conservation strategy, and interim measures to be used until the conservation strategy could be put into full effect.

129. 16 U.S.C. § 1533(f).

130. 16 U.S.C. § 1533(f)(1)(A).

131. 16 U.S.C. § 1533(f)(2).

132. 16 U.S.C. §§ 1533(c)(2)(A) and 1533(g). An Endangered States List (“List”) would overlap, to an extent, the Adaptation Fund (the “Fund”). But, unlike the Fund, the List’s detailed and specific procedural mechanisms are unlikely to have the procedural delays and inefficiencies which remain problematic for the Fund. The Adaptation Fund currently has thirty-five projects. Of the Fund’s US\$232 million endowment, only US\$96 million has been dispersed. *Projects & Programmes*, ADAPTATION FUND, https://www.adaptation-fund.org/funded_projects/interactive (last visited Sept. 2, 2014). Another issue plaguing the Fund is that, when states apply, they must first develop their own adaptation projects, which are then reviewed by the Fund and, only then, either approved or rejected. *How to Apply*, ADAPTATION FUND, <https://www.adaptation-fund.org/page/apply-for-funding> (last visited Jan. 17, 2014). Furthermore, the Fund only deals with adaptation. It in no way affords participating

B. Section 5: Land Acquisition

Though extremely brief, section 5 is a vital, yet undervalued, component of the ESA. It requires the Secretaries of Interior, Commerce, and Agriculture to create wildlife conservation programs to protect species listed under the ESA. To that end, the Secretaries are authorized "to acquire by purchase, donation or otherwise, lands waters or interest therein."¹³³ While section 5 only makes explicit reference to noncoercive means of obtaining private property (i.e., purchase and donation), the inclusion of the word "otherwise" opens the door to the use of other, forcible means of obtaining private property, such as condemnation.¹³⁴ Although section 5 is used to acquire lands deemed necessary to the survival of an endangered or threatened species,¹³⁵ in an international context, a land acquisition provision similar to section 5 could be used to set aside invulnerable territory within endangered states both for the relocation and reestablishment of climate change refugees, and for the construction of climate-change-resistant infrastructure and other adaptive measures. Such a provision would not be used to create successor states for people, like the Tuvaluans, who are expected to lose their nation to climate change, but would be helpful in preserving threatened territory or purchasing homes for displaced persons in more secure regions.¹³⁶

states anything resembling a protected status or requires other states to take preventative or mitigative measures to protect more vulnerable communities. Helm, *supra* note 76. The Adaptation Fund is a valuable tool in helping vulnerable states to adapt to climate change, but is an insufficient solution, by itself, to the problems endangered states face.

133. 16 USC § 1534(a)(2) (1973).

134. Robert Meltz, *Where the Wild Things Are: The Endangered Species Act and Private Property*, 24 ENVTL. L. 369, 401–02 (1994) (citing 16 U.S.C. § 1534(a)(1)(2)).

135. 16 U.S.C § 1534.

136. Although most litigation involving § 5 involves attempts by states and municipalities to limit or condition federal land acquisition, cases involving other sections, such as *Tennessee Valley Authority* and *Gibbs v. Babbitt* demonstrate that economic and private property interests are unlikely to curtail federal exercise of its § 5 powers. *Tennessee Valley Auth. v. Hill*, 437 U.S. 153 (1978); *Gibbs v. Babbitt*, 214 F.3d 483 (4th Cir. 2000).

C. Section 7: Cooperation and the Division of Power between States and Agencies

Section 7 sets out elaborate consultation procedures under which the agency proposing an action that could affect an endangered species must consult with the FWS.¹³⁷ Before engaging in any major federal action, an agency must undergo an extensive review process to determine the potential impacts of the project on listed species. If the project is determined to have negative effects on the species, it cannot proceed without mitigation or negation of those effects.¹³⁸ This broad duty to cooperate has the potential to make this section the “keystone” of an effective variation of the Endangered Species Act. With its breadth, flexibility, and non-coercive approach, section 7 permits federal agencies to take the lead in national conservation efforts and enact ecosystem-wide measures, through interagency coordination and cooperation.¹³⁹ As applied to imperiled states, a provision similar to section 7 would prohibit states from permitting, funding, or carrying out any action that could jeopardize a listed country or its people.¹⁴⁰ Thus, the provision would force states to engage in an extensive consultation process before acting, and would serve both to promote international public awareness, more informed decision-making, and a more thorough examination of less intrusive, alternative actions.

Environmental litigation is both burdensome and costly. Plaintiffs in environmental litigation are often constrained by current technological capabilities in their efforts to meet evidentiary burdens.¹⁴¹ Courts look unfavorably upon attenuated chains of causation, wherein a country’s actions are alleged to

137. Ruhl, *supra* note 14, at 43.

138. Christopher H.M. Carter, *A Dual Track for Incidental Takings: Reexamining Sections 7 and 10 of the Endangered Species Act*, 19 B.C. ENVTL. AFF. L. REV. 135, 147–51 (1991).

139. J.B. Ruhl, *Section 7(a)(1) of the “New” Endangered Species Act: Rediscovering and Redefining the Untapped Power of Federal Agencies’ Duty to Conserve Species*, 25 ENVTL. L. 1107, 1110–11 (1995).

140. 16 U.S.C. § 1536(a)(1). Under § 7(a)(1), federal agencies are not obligated to promote the recovery of listed species. Rather, they must avoid taking actions that could jeopardize those species. Carter, *supra* note 138, at 138.

141. Ruhl, *supra* note 14, at 40.

have indirectly resulted in the destruction or adverse modification of critical territory in a listed state.¹⁴² This may prove problematic for section 7's broad "no jeopardy" requirement. Similarly, many states may be unwilling, or unable, to engage in the lengthy consultation process that section 7 would require when undertaking state projects. In practice, this may mean that violations of section 7 would be less frequently enforced through litigation than section 9 violations.

D. Section 9: Prohibited Actions

Section 9 of the ESA outlines various acts which cannot be taken against listed species.¹⁴³ An international treaty aimed at promoting climate change adaptation initiatives in states that are particularly vulnerable could rely on this provision to determine which actions to ban in order to assist listed countries. Section 9, commonly referred to as the "take provision," is helpful in creating a climate adaptation statute because it is an early attempt to define the various actions that can threaten not only a species, but also its critical habitat. It applies to acts which "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" protected species¹⁴⁴ as well as any act that results in the modification of its habitat or that "actually kills or injures" members of the species by "impairing essential behavioral patterns, including breeding, feeding, or sheltering."¹⁴⁵

In *Babbitt v. Sweet Home Chapter of Communities for a Greater Oregon*, the Supreme Court held that habit modification is an appropriate application of the word "harm," and that "take" can apply to both direct and indirect contact with listed species.¹⁴⁶ To avoid overly attenuated chains of causation, the Court

142. See *Babbitt v. Sweet Home Chapter of Communities for a Greater Ore.*, 515 U.S. 687, n.9 (1995).

143. 16 U.S.C. § 1538 (1973).

144. *Id.*

145. *Id.* Section 9's taking prohibition makes it a federal offense to harm or injure, or attempt to harm or injure, any listed endangered animal species in the United States, whether on public or private land. This makes § 9, arguably, the most powerful piece of wildlife legislation in the world. Federico Cheever, *An Introduction to the Prohibition against Takings in Section 9 of the Endangered Species Act of 1973: Learning to Live with a Powerful Species Preservation Law*, 62 COLO. L. REV. 109, 111 (1991).

146. *Babbitt*, 515 U.S. at 678.

determined that, in many cases, the party proposing this indirect harm theory will bear the burden of proof.¹⁴⁷ In climate change cases, current technological capabilities are usually unable to surmount such high evidentiary and proof burdens.¹⁴⁸ Plaintiffs in a climate change case brought under section 9 have typically been unable to demonstrate that the emission practices of the offending entity directly and definitively led a listed species to suffer harm.¹⁴⁹ It is probable that these evidentiary hurdles would carry over to a human-centered adaptation initiative. The evidentiary difficulty could be resolved, however, through a more tailored definition of “harm,” as related to endangered communities, including a more developed list of undesired actions or behaviors that constitute “harm.”

One reason that section 9 is powerful enough to be effective is that it is also flexible enough to allow for the complexities of species and ecosystem biology, and responsive enough to allow for the adoption of new policies and methodologies as our understanding of these species develops.¹⁵⁰ Like species, states possess various unique characteristics that must be considered in the adoption of adaptation initiatives. Thus, any such initiative would require considerable flexibility. An international covenant modeled on some of the features contained in section 9 would possess the requisite flexibility to accommodate these interstate differences. Furthermore, for many threatened communities, climate change is already bearing down, and its effects will continue without respite for the foreseeable future.¹⁵¹ The aim of a multilateral treaty, such as the one this Note describes, is to enable as many people to withstand and survive the effects of climate change as possible. For people like the Tuvaluans, the creation of a successor state in a less vulnerable part of the world is not an option. Past attempts at such state-making have failed,¹⁵² and any attempt to do so on a massive scale, as adapting to climate change would require, is impractical. Climate

147. *Id.* at 711.

148. Ruhl, *supra* note 14, at 40.

149. *Id.*

150. Cheever, *supra* note 145, at 119.

151. *A Citizen's Guide to Climate Refugees*, *supra* note 6.

152. Generally speaking, state creation, as in Palestine and Nigeria, has led to brutal regional conflict and engendered intense backlash from neighboring states. See generally, Joseph H. Weiler, *Israel and the Creation of Palestinian State: The Art of the Impossible and the Possible*, 17 TEX. INT'L L. J. 287 (1982);

change refugees must relocate to nations that will accept them, and try to make new lives for themselves in more stable regions. Drastic measures are needed to respond to the adverse effects of climate change. Section 9 should serve as an illustration of the way in which acts seen as detrimental to listed states should be prohibited and how to address infractions.

IV. LIMITS AND BARRIERS TO THE IMPLEMENTATION OF ADAPTIVE MEASURES AND THE ENDANGERED STATES LIST AS A SOLUTION

A. Uncertainty and Cost

One of the main reasons adaptation has received less attention from the scientific and legal community than mitigation has is that adaptation is the more inherently complex of the two.¹⁵³ While most scholars agree that climate change is taking place—and that human activities have exacerbated that change—there is still much disagreement among experts about what changes will occur, when those changes will occur, and what should be done in preparation for those changes.¹⁵⁴ Predicting climate change is intrinsically difficult because climate change “alters baseline ecosystem conditions in ways that are currently beyond immediate human control, regardless of mitigation efforts,”¹⁵⁵ and “complicates and even obliterates familiar ecologies, with regulatory and management consequences.”¹⁵⁶ For many years, ecologists have operated under the assumption that ecosystems have natural ranges that are both healthy and essential to the survival and evolution of the ecosystem.¹⁵⁷ But, science can no longer determine which changes are normal or naturally occurring and which are the unnatural result of human interference.¹⁵⁸

No one wants to resort to guessing, especially when time is short and financial resources are limited, but unpredictability is

Henry E. Alapiki, *State Creation in Nigeria: Failed Approaches to National Integration and Local Autonomy*, 48 AFRICAN STUDIES REV. 3, 49 (2005).

153. Feldman & Kahan, *supra* note 13, at 61.

154. Baldwin, *supra* note 21, at 776–78.

155. Craig, *supra* note 23, at 15.

156. *Id.*

157. *Id.*

158. *Id.*

routine in the world of climate change. Climate change “is creating a world of triage, best guesses, and shifting sands. The sooner we start adapting legal regimes to these new regulatory and management realities, the sooner we can marshal energy and resources into actions that will help humans, species, and ecosystems cope with the changes that are coming.”¹⁵⁹ To further complicate the matter, climate change will not have a uniform effect on all regions of the planet.¹⁶⁰ While some regions will experience a rise in sea levels, others may experience a decline;¹⁶¹ some species will face extinction or be forced to relocate, whereas others may thrive under the new conditions created by climate change, particularly in the short term.¹⁶² While some areas experience drought, others will experience an increase in rainfall;¹⁶³ some crops will fail while others prosper. Millions of people will become impoverished, hundreds of thousands will be forced to relocate as climate change refugees, and a much smaller number of people will prosper.¹⁶⁴ Such a wide array of outcomes makes the application of a single, universal rule extremely difficult; climate change adaptation must take a localized approach.¹⁶⁵ The measures described in this Note allow an international treaty to combine broad compliance with narrowly-tailored initiatives designed to reflect the individual needs of each listed country. Using the broad provisions outlined above,¹⁶⁶ states would be able to use the funding and expertise of the international community to address climate change impacts unique to their respective country.

Cost serves as another obstacle to adaptation programs. Climate change adaptation is expensive. Massive financial resources are needed to respond to the damage caused by climate

159. *Id.* at 16.

160. Nicholas Stern, *What is the Economics of Climate Change?*, 7 *WORLD ECON.* 1, 2 (2006).

161. J.X. Mitrovika et al., *The Sea-Level Fingerprint of West Arctic Collapse*, 323 *SCI.* 753 (2009) (suggesting that, although the world generally may experience a sea-level rise, some areas may actually experience a net decrease in sea-level).

162. Eric Post et al., *Ecological Dynamics Across the Arctic Associated with Recent Climate Change*, 325 *SCI.* 1355 (2009).

163. Synthesis Report, *supra* note 20.

164. Ruhl, *supra* note 49, at 378–80.

165. Craig, *supra* note 23, at 16–17.

166. *See* Section III.

change, and to fund “climate-proofing” infrastructure.¹⁶⁷ The estimated cost of global protection against one meter of sea level rise will exceed one trillion dollars.¹⁶⁸ Most funding for climate change adaptation is currently derived from international donors.¹⁶⁹ The funding is then redistributed through agencies like the World Bank, the Adaptation Fund, and the Global Environmental Facility.¹⁷⁰ Measures like those proposed in this Note may cut costs by tailoring initiatives to the state in which they are applied and allowing for regular progress evaluations, which would redirect funds from unsuccessful initiatives to those which showed more promise. Initiatives created under an Endangered States List would also be more successful than those created under the Adaptation Fund because they would be developed after a state has been afforded protection. Additionally, they would take a holistic approach to the implementation of initiatives throughout the state, rather than just focusing on one or two specific projects. Protection under an Endangered States List would allow efforts to be concentrated in the areas where they are most needed, most likely to yield considerable success, and most beneficial to the greatest number of people.

B. Societal Resistance and International Cooperation

Societal resistance among industrialized nations has served as another obstacle to broad acceptance of adaptation initiatives.¹⁷¹ As with many market issues, externalities play a vital role in the reduction of GHGs. Developed nations, and the industries on which their economies depend, emit large quantities of GHGs with little to no regulation. Those GHGs, in turn, cause damage to others, with no direct cost to the emitters.¹⁷² The states responsible for emissions have few incentives to reduce them, and the states that are most affected by the emissions lack the political power to affect policy decisions. For example, all 193 member states have an equal voice in U.N. negotiations, so it is easy for those opposed to mitigative or adaptive measures to obstruct

167. Baldwin, *supra* note 21, at 779.

168. *Improve Predictions of Future Land-ice Loss and Impacts on Sea Level*, STUDY ENVTL. ARCTIC CHANGE (Oct. 2012), <http://www.arcus.org/search/land-ice>.

169. Hall & Weiss, *supra* note 46, at 328.

170. *Id.*

171. Stern, *supra* note 160, at 4.

172. *Id.*

and prevent any meaningful initiatives from being adopted.¹⁷³ In many respects, the UNFCCC's Kyoto Protocol puts forth inadequate targets, ineffective or insufficient instruments for meeting those targets, and implementation systems that are poorly conceived and lack any real means of enforcement.¹⁷⁴ The Protocol is plagued by these complications because few nations would agree to stricter measures. Governments generally lack "the political will to impose tough lifestyle sacrifices on people in general,"¹⁷⁵ leading to international environmental agreements that rarely have enough force to produce real change. Furthermore, externalities are often solved through taxation of an undesirable activity, the allocation of property rights over an affected area, and direct regulation,¹⁷⁶ but the international community has time and again demonstrated its unwillingness to submit to this level of environmental regulation.¹⁷⁷

The initiatives proposed in this Note will not meet staunch resistance in developed nations, because they do not require any substantive reduction of emissions or any other major lifestyle changes. Rather, this Note proposes a balanced approach that contains adaptive as well as mitigative measures. States can participate through donations and restricting harmful commercial or industrial activity and thereby receive all of the soft power benefits without any major drawbacks. The Endangered States Act would be a "harm-preventing law," not a benefit mandating one.¹⁷⁸ The ESA would not require parties to take extensive proactive action; its emphasis, rather, is on refraining from acting in a manner likely to have adverse consequences for states that are at an elevated risk.

173. See generally, J. Robinson & J. Tinker, *Reconciling Ecological, Economic and Social Imperatives*, in *THE CORNERSTONE OF DEVELOPMENT: INTEGRATING ENVIRONMENTAL, SOCIAL AND ECONOMIC POLICIES*, 9, 9–13 (Feb. 5, 2014), available at http://www.seachangecop.org/files/documents/1998_IDRC_The_Cornerstone_of_Development_-_Integrating_Environmental_Social_Economic_Policies.pdf.

174. Cameron, *supra* note 21, at 10.

175. Ruhl, *supra* note 49, at 368.

176. Stern, *supra* note 160, at 4.

177. See Carsten Helm, *Measuring the Effectiveness of International Environmental Regimes*, 44 *J. CONFLICT RESOLUTION* 630, 652 (2000).

178. Ruhl, *supra* note 63, at 141.

CONCLUSION

The impending effects of global climate change are rightly likened to those of a world war,¹⁷⁹ and the Tuvaluans are among the first casualties.¹⁸⁰ Recent increases in global surface temperatures are both unprecedented and irreversible.¹⁸¹ Mitigation and reactionary measures are incomplete solutions;¹⁸² proactive, adaptive measures must also be adopted to fully cope with climate change. The ESA, as modified to fit the needs of human adaptation, would serve as a meaningful step in the right direction. An Endangered States List would offer a means of coping with climate change through proactive, adaptive measures by providing long-term solutions to the long-term problem that is global climate change. An examination of sections 4, 5, 7, and 9 of the ESA demonstrates how human adaptation to climate change on an international scale could proceed in an effective, manageable way.¹⁸³ Such a program would be invaluable in helping vulnerable countries to develop climate change adaptation plans, while enlisting the help of the broader international community to alleviate costs and facilitate implementation.

Although it is easy to feel removed from the plight of Tuvalu, one must not fall into the trap of believing that the rest of us are beyond the reach of climate change. Global climate change is just that, a *global* epidemic that will cross international borders and national boundaries indiscriminately. Tuvalu "might just be one

179. Burleson, *supra* note 4, at 26.

180. Duong, *supra* note 2, at 1239.

181. NPR, *supra* note 6.

182. Craig, *supra* note 23, at 9.

183. See Ruhl, *supra* note 14. Sections 4, 5, 7, and 9 are just some of the ESA sections with the potential for international application. Others, such as section 8, are also promising and warrant further exploration. Section 8 of the ESA provides guidelines on how to promote international cooperation through financial assistance, the encouragement of adaptation programs, supplying useful personnel, and conducting necessary research and investigations. 16 U.S.C. § 1537 (1973). In an Endangered States Act, a governing body, established by party nations, would replace the President in the ESA by "assisting in the development and management of programs," in listed countries that the agency determines are "necessary or useful" for the conservation of any endangered or threatened state. 16 U.S.C. § 1537(a). This governing body would also make available any officer or employee of the governing body who would be useful in facilitating the adaptation initiatives in listed countries. 16 U.S.C. § 1537(a).

little canary, but we are all in the same coal mine.”¹⁸⁴ It may be too late for certain island nations, like Tuvalu, but through the implementation of a proactive, adaptive, and mitigative treaty, many endangered states can be saved from extinction, and we may be able to preserve the planet both for ourselves and for future generations. There is but one Earth. The actions we take today will shape the world of tomorrow; a world we will all have to live in.

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184. *National Geographic*, INSTAGRAM, <http://instagram.com/p/kIAXcroVaw/> (last visited Feb. 9, 2014).

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