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BIODIVERSITY BAKING AND BOILING: ENDANGERED SPECIES ACT TURNING DOWN THE HEAT

Anna T. Moritz,* Kassie R. Siegel,** Brendan R. Cummings***
& William H. Rodgers, Jr.****

I. INTRODUCTION

Today the Earth faces an extinction event on a scale second only to Earth's largest mass extinction, the Permian-Triassic event, which occurred 250 million years ago.¹ Upwards of 70 percent of the Earth's species could be at risk of extinction with a 3.5°C (6.3°F) rise in temperature, which could occur by the end of this century.² The driver is global warming, caused by anthropogenic greenhouse gas emissions.³ As such, a rational climate policy is needed immediately to prevent the complete collapse of biodiversity. Yet, the United States—the world's largest cumulative contributor to emissions—is in a state of paralysis when it comes to implementing climate solutions. This paralysis arises from a complex of cultural, political, and economic origins. It is perhaps understandable that “persons,” be they individual humans or corporations, would not respond readily. Humans' ability to fundamentally alter our environs has far outstripped our limited ability to calculate cost/benefit in the abstract and over the long-term.⁴ On the other hand, there is no excuse for inaction on the part of government. One of the primary purposes of government is social order.⁵ Implicit in the organization of society is that at a collective, governmental level we are better at calculating abstract long-term cost/benefit. The government must therefore take definitive steps in the face

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1. Peter D. Ward, *Under a Green Sky* 177 (HarperCollins Publishers Inc. 2007).

2. Intergovernmental Panel on Climate Change, *Climate Change 2007: Summary for Policymakers* 7, 13–14 (Nov. 2007) (available at http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf) [hereinafter IPCC].

3. *Id.*

4. See e.g. Tobias Kalenscher & Cyriel M.A. Pennartz, *Is a Bird in the Hand Worth Two in the Future? The Neuroeconomics of Intertemporal Decision-Making*, 84 *Progress in Neurobiology* 284 (2008).

5. See e.g. Celeste Friend, *The Internet Encyclopedia of Philosophy, Social Contract Theory* (2006) (available at <http://www.iep.utm.edu/s/soc-cont.htm>).

of the climate crisis.

Although the federal government has to date spectacularly failed to address the climate crisis, an unprecedented number⁶ of comprehensive climate bills were introduced in the 110th Congress. In one sense, the number of bills reveals substantial progress from 1997 when the Senate passed the infamous Resolution 98, declaring that the U.S. should not become a signatory to the Kyoto Protocol as long as developing nations are not held to the same standards.⁷ On the other hand, the Warner-Lieberman Climate Security Act⁸ was the first comprehensive climate bill since 2005 to make it to the floor of the Senate before failing to gain enough votes to invoke cloture and end debate. Certainly, a comprehensive and fully coordinated regulatory scheme would be welcome, but the need is far greater for rapid action. It is worth questioning why, as a nation, we have allowed ourselves to be led down a truly disastrous path of inaction in anticipation of a single comprehensive response.

There is no debate among top scientists that avoiding catastrophic climate change requires immediate responses. Thus, as a nation, we need to re-focus from waiting for “the magic bullet” to the immediate dispatch of a thousand arrows. Many of those arrows come from our quiver of existing environmental laws. In particular, these laws must be applied to address one of the most pressing victims of climate change: biodiversity.

Biodiversity is the collective canary in the coal mine: current and near-term climate impacts to biodiversity are harbingers of additional future harm to human health and welfare. It is estimated that a 3.5°C rise in temperature will place up to 70 percent of all species on Earth at risk of extinction.⁹ Even this value may be too low: extinctions will continue beyond the period modeled and a recent study¹⁰ declares that most modeling methods do not properly account for population variables when predicting extinction rates. While humans are not likely to be one of the unlucky extirpated species, we will feel the loss profoundly. Unfortunately, most people will not realize the true importance of biodiversity until it is gone.

Congress recognized and codified the treasure of biodiversity with the enactment of the Endangered Species Act of 1973 (“ESA”).¹¹ This sweeping legislation is an example of government at its best. The ESA is our nation’s safety net for plants and animals on the brink of extinction, and our strongest and best law for the protection of imperiled wildlife. The language of the Act is intentionally broad and well suited to addressing new challenges as they arise. The Supreme Court recognized the

6. Pew Ctr. on Global Climate Change, *Legislation in the 110th Congress Related to Global Climate Change*, http://www.pewclimate.org/what_s_being_done/in_the_congress/110thcongress.cfm (accessed Mar. 31, 2009) (A total of 235 climate-related bills, amendments, and resolutions were introduced in the 110th Congress as of July 2008, with 7 economy-wide cap-and-trade proposals).

7. Sen. Res. 98, 105th Cong. (July 25, 1997) (Passed by the Senate 95–0).

8. Sen. 3036, 110th Cong. (June 6, 2008) (received 48 votes in favor of cloture). See e.g. Pew Ctr. on Global Climate Change, *Daily Updates: Lieberman-Warner Climate Security Act*, <http://www.pewclimate.org/analysis/l-w/updates> (accessed Mar. 31, 2009).

9. IPCC, *supra* n. 2.

10. Brett A. Melbourne & Alan Hastings, *Extinction Risk Depends Strongly on Factors Contributing to Stochasticity*, 454 Nat. 100 (2008).

11. 16 U.S.C. § 1531–1540 (2006).

applicability of broad environmental statutes in *Massachusetts v. EPA*:¹² “[T]he fact that a statute can be applied in situations not expressly anticipated by Congress does not demonstrate ambiguity. It demonstrates breadth.”¹³ Similarly, the Ninth Circuit in *Center for Biological Diversity v. National Highway Traffic Safety Administration*,¹⁴ recognized that another sweeping environmental statute, the National Environmental Policy Act (“NEPA”), also applies to climate change.¹⁵

An agency must regulate even if the result of the regulation will be only an “incremental” step towards solving the climate crisis. The Supreme Court noted that “[a]gencies, like legislatures, do not generally resolve massive problems in one fell regulatory swoop. . . . They instead whittle away at them over time”¹⁶ While the Clean Air Act is the most central existing statutory tool for the regulation of greenhouse gas emissions, the ESA is an important part of the “incremental” response to global warming. The regulation of greenhouse gas emissions under the ESA through the Section 7 consultation process is legally required and of great practical importance. The full implementation of existing law with respect to greenhouse gases is particularly important given the Bush administration’s obstructionism on greenhouse gas regulation, as well as Congress’s failure to act.

We begin by providing a brief overview of biodiversity, the threats global warming poses to it, and the economic and social costs that the loss of biodiversity will exact on human society. We then review four key examples of ways in which the ESA operates, or should operate, to address global warming and greenhouse gas emissions and confer substantial benefits on species threatened by the climate crisis: the listing process, the section 7 consultation process required of federal agencies, the designation of critical habitat, and the preparation and implementation of recovery plans.¹⁷

12. 549 U.S. 497 (2007).

13. *Id.* at 532 (quoting *Pa. Dept. Corrects. v. Yeskey*, 524 U.S. 206, 212 (1998)).

14. 538 F.3d 1172 (9th Cir. 2008)

15. *Id.* at 1214.

16. *Mass. v. EPA*, 549 U.S. at 499.

17. Professor Rodgers believes that a key tool in the legal kit to protect the polar bear and other marine mammals is to secure Native “subsistence” entitlements. Enforceable reserved treaty rights figured importantly in the legal struggles to protect salmon populations in the Pacific Northwest. See Joseph C. Dupris, Kathleen S. Hill & William H. Rodgers, Jr., *The Si'lailo Way: Indians, Salmon and Law on the Columbia River* (Carolina Academic Press 2006). These “right to take fish” treaties have gone seven times to the U.S. Supreme Court. The treaties have taken a remarkable protective turn in the decision in *U.S. v. Washington*, No. C-70-9213, Sub-Proceeding No. 01-01 (Aug. 22, 2007) (road culverts that obstruct salmon passage and impair habitat are treaty violations). Unfortunately, “subsistence” protection in Alaska has been squeezed into mild procedural frameworks. Robert T. Anderson et al., *American Indian Law: Cases and Commentary* 802–19 (Thomson West 2008); William H. Rodgers, Jr., *Environmental Law in Indian Country* vol. 1, § 1.7 (Thomson West 2005); David S. Case, *Subsistence and Self-Determination: Can Alaska Natives Have a More “Effective Voice”?* 60 U. Colo. L. Rev. 1009 (1989). Right now, in the midst of Alaska’s current melt-down, Native subsistence claims are treated as just another NEPA-related factor to be brushed aside and glossed over. See *Native Village of Point Hope v. Minerals Mgt. Serv.*, 2008 WL 2736040 (D. Alaska July 9, 2008); *Native Village of Point Hope v. Minerals Mgt. Serv.*, 564 F. Supp. 2d 1077, 1080 (D. Alaska 2008) (denying relief in NEPA/Marine Mammal Protection Act/Outer Continental Shelf Lands Act/Administrative Procedure Act challenge to issuance of permits to oil companies for seismic surveys in the Chukchi and Beaufort Seas; the Natives say “a single survey may harm tens of thousands of marine mammals” and these losses will adversely affect subsistence).

II. BIODIVERSITY IMPERILED BY GLOBAL WARMING

A. Biodiversity Overview

“Biodiversity is the sum of the species, ecosystems, and genetic diversity of Earth.”¹⁸ Global warming is likely to surpass habitat loss as the leading danger to biodiversity by mid-century.¹⁹ It is estimated that global warming will put at risk of extinction up to 70 percent of species by the end of this century.²⁰ Furthermore, global warming will hasten the extinction rates due to synergies with other stresses on species, such as disease, chemical pollution, and habitat fragmentation.²¹

In a broad sense, biodiversity faces two climate-change hazards. First, inexorable and relatively linear changes in atmospheric and ocean temperatures, snow melt, ocean pH, and sea level will result from the continual accumulation of anthropogenic carbon dioxide. These linear changes will be associated with a decrease in the viability of current habitat for a variety of species.

Second, as atmospheric carbon dioxide concentrations increase, there will be certain threshold events that trigger rapid and uncontrolled feedbacks within the system. These “tipping points” will be non-linear and could potentially induce large shifts in the environment. For example, rapid climate change already appears well underway in the Arctic, where sea ice hit a stunning record low in 2007, with a similarly low level repeated in 2008. Sea ice is important because its bright white surface reflects radiation from the sun back into the atmosphere, thereby cooling the Earth. In contrast, the dark ocean that is exposed upon melt of sea ice is highly absorptive of incoming radiation. As sea ice melts due to the accumulation of greenhouse gases, the balance of reflection and absorption is shifted towards greater absorption and heating, which in turn increases the rate of sea ice melt. This vicious cycle poses another problem: it increases the rate of permafrost melting, which releases methane. Methane is a greenhouse gas with a “global warming potential” that is approximately 25 times²² that of the same volume of carbon dioxide over 100 years. Thus, releasing methane further amplifies the warming cycle.

It is well-established that global warming will induce movement towards higher elevation, or “escalation,” and northern migration of species.²³ Parmesan and Yohe have shown that a “fingerprint” for climate change can be detected from global trends.²⁴ Through a meta-analysis of the literature, Parmesan and Galbraith report that 59 percent of 1,598 species surveyed exhibited one or more of the following: a shift in range, earlier spring events, or a change in the abundance of cold-adapted/warm-adapted species.²⁵

18. Lee Hannah, Thomas E. Lovejoy & Stephen H. Schneider, *Biodiversity and Climate Change in Context*, in *Climate Change and Biodiversity* 3, 3 (Thomas E. Lovejoy & Lee Hannah eds., Yale U. Press 2005).

19. *Id.* at 10.

20. IPCC, *supra* n. 2.

21. Thomas E. Lovejoy, *Conservation with a Changing Climate*, in *Climate Change and Biodiversity*, *supra* n. 18, at 325.

22. *Changes in Atmospheric Constituents and in Radiative Forcing* in IPCC, *Climate Change 2007: The Physical Science Basis* 129, 212 (Susan Solomon et al. eds., Cambridge U. Press 2007).

23. Emma Marris, *The Escalator Effect*, 1 Nat. Rpts. Climate Change 94 (2007).

24. Camille Parmesan & Gary Yohe, *A Globally Coherent Fingerprint of Climate Change Impacts across Natural Systems*, 421 Nat. 37, 37 (2003).

25. Camille Parmesan & Hector Galbraith, *Observed Impacts of Global Climate Change in the U.S.* 16

The statistical likelihood of obtaining this pattern by chance is one in one billion.

B. *The Importance of Biodiversity*

Despite the imminent threat to biodiversity posed by global warming, the impending diminishment of biodiversity usually receives little attention from decision makers. This likely reflects a systematic undervaluation by society. Hsiung and Sunstein have argued that biodiversity is substantially undervalued both for its own sake and for its significance to human health and welfare.²⁶ These authors acknowledge that valuation of life, both human and animal, is highly debated but nonetheless come to the conclusion that even under conservative estimates the costs of climate-change induced loss of biodiversity could run to the “hundreds of billions annually.”²⁷

Even without taking into account Hsiung and Sunstein’s valuation of biodiversity, the Stern Review of the Economics of Climate Change estimates that the guaranteed costs of climate change are likely to be on the order of five percent of global GDP per year, with costs rising to 20 percent GDP per year.²⁸ In contrast, the Stern Review estimates that these negative impacts could be mitigated for a mere one percent GDP. The logical conclusion is to spend the one percent needed to save the world from global economic and ecological disaster. Notably, the Stern Review finds that this investment must be made now to avoid irreversible climate change.²⁹

Economic valuations do not of course capture the full value of biodiversity. For example, as the Arctic Climate Impact Assessment (“ACIA”) explains, “[t]he living resources of the Arctic not only sustain Indigenous Peoples in an economic and nutritional sense, but also provide a fundamental basis for social identity, spiritual life, and cultural survival.”³⁰ Because the Arctic is warming at twice the rate of the rest of the Earth,³¹ the Arctic peoples are among the first to be affected by global warming-induced loss of biodiversity. A recent petition to the Inter American Commission on Human Rights explained that the “Inuit culture is inseparable from the condition of their physical surroundings.”³² This subsistence-based culture will be destroyed if significant sea ice loss causes extirpation or diminution of the species upon which the Inuit rely. The protection of subsistence is therefore inseparable from the protection of the biodiversity. Absent immediate action to address global warming, biodiversity, and the human communities dependent upon it, will suffer greatly. The ESA can play an

(2004) (available at http://www.pewclimate.org/docUploads/final_ObsImpact.pdf) (Report prepared for the Pew Center on Global Climate Change).

26. Wayne Hsiung & Cass R. Sunstein, *Climate Change and Animals*, 155 U. Pa. L. Rev. 1695 (2007).

27. *Id.* at 1699, 1740.

28. Nicholas Stern, *The Economics of Climate Change: The Stern Review* (Cambridge U. Press 2007).

29. *Id.*

30. Susan Joy Hassol, *Impacts of a Warming Arctic: Arctic Climate Warming Assessment* 94 (Oct. 21, 2004) (available at <http://amap.no/acia/path>) *Impacts of a Warming Arctic: Arctic Climate Impact Assessment, path Key Finding 8*.

31. *Id.* at 27 (available at <http://amap.no/acia/path>) *Impacts of a Warming Arctic: Arctic Climate Impact Assessment, path Key Finding 1*.

32. Sheila Watt-Cloutier et al., *Petition to the Inter American Commission on Human Rights Seeking Relief from Violations Resulting from Global Warming Caused by Acts and Omissions of the United States* 5 (Dec. 7, 2005) (available at http://www.earthjustice.org/library/legal_docs/petition-to-the-inter-american-commission-on-human-rights-on-behalf-of-the-inuit-circumpolar-conference.pdf).

important role in forcing the U.S. to squarely address greenhouse gas emissions and take necessary steps towards preventing the complete unraveling on biodiversity.

III. THE ESA IS AN IMPORTANT PART OF THE U.S. REGULATORY RESPONSE TO GLOBAL WARMING

A. ESA Overview

In the seminal ESA case, *Tennessee Valley Authority v. Hill*,³³ the Supreme Court held that the ESA's unequivocal mandate that federal agencies "insure" that their actions do not "jeopardize" any species protected by the statute, meant that a multimillion-dollar dam project nearly built could not proceed because its completion threatened the existence of the snail darter, a small endemic fish of no known economic value.³⁴ In the three decades since *Tennessee Valley Authority* was decided, courts enforcing the ESA have halted such activities as logging to protect threatened owls,³⁵ commercial fishing to protect Hawaiian monk seals,³⁶ military activities to protect endangered whales,³⁷ oil and gas development to protect grizzly bears,³⁸ off-road vehicles to protect imperiled plants,³⁹ pesticide authorizations to protect imperiled salmon,⁴⁰ and numerous other habitat-damaging activities that threatened a particular protected species. In granting such injunctive relief, courts repeatedly have found that "[g]iven a substantial procedural violation of the ESA in connection with a federal project, the remedy must be an injunction of the project pending compliance with the ESA."⁴¹ Regardless of the economic consequences of halting a given project, protection of the species must receive precedence.⁴²

The two primary mechanisms by which the ESA protects listed species are contained in sections 7 and 9 of the statute. Section 7, at issue in *Tennessee Valley Authority*, directs all federal agencies to insure through consultation with the Secretary⁴³ that all actions authorized, funded, or carried out by such agencies are "not likely to jeopardize the continued existence . . . or result in the destruction or adverse modification of [critical] habitat" of any listed species.⁴⁴ Section 7 of the ESA contains both

33. 437 U.S. 153 (1978).

34. *See id.* at 171-93.

35. *Silver v. Babbitt*, 924 F. Supp. 972, 976 (D. Ariz. 1995); *Lane Co. Audubon Socy. v. Jamison*, 958 F.2d 290, 295 (9th Cir. 1992).

36. *Greenpeace Found. v. Mineta*, 122 F. Supp. 2d 1123, 1138 (D. Haw. 2000).

37. *Nat. Resources Def. Council v. Evans*, 279 F. Supp. 2d 1129 (N.D. Cal. 2003).

38. *Conner v. Burford*, 848 F.2d 1441 (9th Cir. 1988).

39. *Ctr. for Biological Diversity v. Bureau of Land Mgt.*, 422 F. Supp. 2d 1115 (N.D. Cal. 2006).

40. *Wash. Toxics Coalition v. EPA*, 413 F.3d 1024 (9th Cir. 2005).

41. *Thomas v. Peterson*, 753 F.2d 754, 764 (9th Cir. 1985); Rodgers, Jr., *supra* n. 17, at § 1:27 n. 301 (Thomson West Supp. Winter 2008) (collecting recent ESA injunctions).

42. *Sierra Club v. Marsh*, 816 F.2d 1376, 1387 (9th Cir. 1987).

43. 16 U.S.C. § 1532(15) (The "Secretary" refers to either the Secretary of Interior or the Secretary of Commerce depending on the species at issue. The Secretaries have delegated authority to the U.S. Fish and Wildlife Service ("FWS") and National Marine Fisheries Service ("NMFS") respectively.); 50 C.F.R. § 402.01(b) (2008) (FWS has authority over all terrestrial species, while NMFS manages most marine species. However, several marine mammals, including the polar bear, are managed by FWS).

44. 16 U.S.C. § 1536(a)(2). To "jeopardize" a species is defined by regulation as "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the

procedural (“through consultation”) and substantive (“insure” the action does not “jeopardize”) mandates for federal agencies. As such, the statute, and litigation under it, can force analysis through the consultation process of the environmental effects of a given project, and if the project is determined to jeopardize a listed species or adversely modify its critical habitat, trigger modification or cancellation of the project so as to avoid such impacts.

While section 7 applies only to the actions of federal agencies, the prohibitions of section 9⁴⁵ apply to “any person,” including federal, state, and local agencies and entities, individuals, and corporations.⁴⁶ Section 9 prohibits, *inter alia*, the “taking” of any endangered species in the United States or upon the high seas.⁴⁷ Regulations promulgated pursuant to section 4(d) apply most of the take prohibitions applicable to endangered species to threatened species as well.⁴⁸ “‘Take’ means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.”⁴⁹ “Harass” is further defined as any “act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering.”⁵⁰ “Harm” includes “significant habitat modification or degradation where it . . . injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.”⁵¹

The ESA’s legislative history supports “the broadest possible” reading of “take,”⁵² and courts have consequently found violations of section 9 from activities ranging from direct intentional killing of a listed species,⁵³ harm resulting from habitat degradation,⁵⁴ to government authorizations of activities that inevitably would result in prohibited take,

survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species.” 50 C.F.R. § 402.02 (2008). A similar regulatory definition of “destroy or adversely modify critical habitat” has been struck down by several courts as not properly encompassing recovery of the species. *See e.g. Gifford Pinchot Task Force v. U.S. Fish & Wildlife Serv.*, 378 F.3d 1059, 1069–71 (9th Cir. 2004). While no replacement regulatory definition has yet been promulgated, courts have made clear that an agency action in critical habitat cannot compromise the species’ recovery and still rationally be deemed to have not “adversely modified” that habitat. *See e.g. Ctr. for Biological Diversity v. Bureau of Land Mgt.*, 422 F. Supp. 2d at 1136.

45. 16 U.S.C. § 1538.

46. *Id.* at § 1532(13) (defining the term “person”). The statute contains an exception for hunting by residents of Alaskan native villages. *Id.* at § 1539(e).

47. *Id.* at § 1538. In contrast to Section 7, which should apply to any federal agency action, no matter where it occurs, Section 9 is explicitly limited in its geographical scope to the United States and high seas.

48. 50 C.F.R. § 17.31(a) (2008). (FWS’s rule applying Section 9 prohibitions to all Threatened species); *id.* at §§ 17.40–17.48 (FWS’s rules modifying take prohibitions for certain species); *id.* at § 223 (NMFS’s rules applying take prohibitions to Threatened species on a species by species basis). As discussed *infra* in Section III(2)(b), the lack of a blanket 4(d) rule applying Section 9 prohibitions to all Threatened species under NMFS’s jurisdiction has significant consequences for the two listed coral species, which, as of this writing, are subject of no specific 4(d) rule, and hence receive none of the protections against “take” provided by Section 9.

49. 16 U.S.C. § 1532(19).

50. 50 C.F.R. § 17.3 (2008) (FWS’s definition of “harass”). NMFS has no corresponding definition of “harass.”

51. *Id.* at § 17.3 (FWS’s definition of “harm”); *see also id.* at § 222.102 (2008) (NMFS’s near-identical definition of “harm”).

52. *Babbitt v. Sweet Home Chapter of Communities for a Great Ore.*, 515 U.S. 687, 704–05 (1995).

53. *U.S. v. Billie*, 667 F. Supp. 1485 (S.D. Fla. 1987).

54. *Palila v. Haw. Dept. of Land & Nat. Resources*, 852 F.2d 1106 (9th Cir. 1988).

such as pesticide use⁵⁵ or fishing.⁵⁶ In perhaps the most expansive reading of section 9's reach to date, one court found that "inadequate regulation" of light pollution could make a local government liable for the take of listed sea turtles.⁵⁷

In addition to the prohibitions against jeopardy and take provided by sections 7 and 9, the ESA mandates an array of affirmative conservation actions for listed species. These include the designation of "critical habitat,"⁵⁸ the development and implementation of recovery plans,⁵⁹ the acquisition of land,⁶⁰ and the release of federal funding for domestic⁶¹ and international⁶² conservation programs. The ESA contains a "citizen suit" provision allowing interested parties, such as NGOs, to bring suit against both private and government entities to enjoin violations of the statute.⁶³

However, no matter how imperiled a species might be, none of the protections of the ESA apply to it unless it is officially listed, via regulation, as Threatened or Endangered under the statute. A species is "Endangered" if it "is in danger of extinction throughout all or a significant portion of its range"⁶⁴ A species is "Threatened" if it "is likely to become an endangered species within the foreseeable future"⁶⁵

The listing process for a given species may be initiated either by the Fish and Wildlife Service ("FWS") or the National Marine Fisheries Service ("NMFS") on the agency's own volition or by petition from an interested party.⁶⁶ All listing decisions are to be made "solely on the basis of the best scientific . . . data available"⁶⁷ Furthermore, the failure to list a petitioned species is subject to judicial review.⁶⁸

It is important to note that a "take" of listed species by Alaska Natives is generally exempted from the prohibitions of the ESA.⁶⁹ This exemption applies only to species taken for subsistence use by any Alaska Native or non-native who resides in an Alaskan native village.⁷⁰ Furthermore, the taking must not be wasteful.⁷¹ Takings for subsistence purposes may be curtailed only if the Services determine such takings "materially and negatively" affect the listed species, and must be designed to minimally impact subsistence uses.⁷² Thus, listing of Arctic species will enhance the chances for

55. *Defenders of Wildlife v. EPA*, 420 F.3d 946 (9th Cir. 2005).

56. *Strahan v. Cox*, 127 F.3d 155 (1st Cir. 1997).

57. *Loggerhead Turtle v. Co. of Volusia*, 120 F. Supp. 2d 1005 (M.D. Fla. 2000).

58. 16 U.S.C. § 1533(a)(3).

59. *Id.* at § 1533(f).

60. *Id.* at § 1534.

61. *Id.* at § 1535(d).

62. *Id.* at § 1537(a).

63. 16 U.S.C. § 1540(g).

64. *Id.* at § 1532(6).

65. *Id.* at § 1532(20). The ESA does not define "foreseeable future."

66. See D. Noah Greenwald, Kieran F. Suckling & Martin Taylor, *The Listing Record*, in *The Endangered Species Act at Thirty: Renewing the Conservation Promise* vol. 1, 51 (Dale D. Goble, J. Michael Scott & Frank W. Davis eds., Is. Press 2006). In practice, virtually all listing actions since the mid-1980s have been initiated by petition rather than independent agency initiative.

67. 16 U.S.C. § 1533(b)(1)(A).

68. *Id.* at § 1533(b)(3)(C)(ii).

69. *Id.* at § 1539(e).

70. *Id.* at § 1539(e)(1).

71. *Id.* at § 1539(e)(2).

72. 16 U.S.C. § 1539(e)(4).

future survival of species important to Alaska Natives while at the same time allowing for the continued present-day subsistence uses.⁷³

B. The Endangered Species Act Is Well Designed to Address Greenhouse Gas Emissions and Global Warming

The U.S. Endangered Species Act is without a doubt the nation's, and the world's, strongest and most successful statute for the protection of plants and animals on the brink of extinction. The broadly protective nature of the Act demonstrates congressional intent to provide a safety net for species from any and all factors threatening their existence. The ESA is remarkably well suited, nearly four decades later, to dealing with the greatest threat to species since the law was enacted. Under the ESA, the Services are legally obligated to conduct a variety of actions with regard to global warming. Below we review four key examples of ways in which the ESA operates, or should operate, to address global warming and greenhouse gas emissions and confer substantial benefits on species threatened by the climate crisis. First, the Services are required to list species that are threatened or endangered due to climate change. Second, the Services must ensure that greenhouse gas emissions from a project will not take or cause jeopardy to the species. Third, critical habitat must be designated to allow for recovery in the face of global warming. Fourth, the Services must consider the impacts of global warming in recovery plans.

The sections below review examples of actions that have been taken or should be taken in compliance with these statutory mandates. The trend in the Services' response to each legal obligation is similar: in each case it is clearly feasible to apply the ESA with respect to greenhouse gas emissions and global warming; yet in most instances the Services have failed to do so for political, as opposed to scientific or valid legal reasons.

1. Listing Global-Warming Endangered and Threatened Species

To date, two listing rules have occurred that are a direct result of global warming: (1) elkhorn and staghorn corals and (2) the polar bear.⁷⁴ The corals listing was relatively low-profile, while the polar bear listing received extensive scholarly⁷⁵ and media⁷⁶ attention.

73. Secretarial Order No. 3206 (June 5, 1997) (available at <http://www.fws.gov/endangered/tribal/Esatribe.htm>) (covering American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act). Although not required by the text of the statute, as a matter of administrative policy the Services must also consult with affected tribes regarding actions under the ESA. Secretarial Order No. 3206 sets out a process for government-to-government consultation with affected tribes in the lower 48 states, but only calls for a future study to develop a similar bilateral process for Alaska Natives. See also Charles Wilkinson, *The Role of Bilateralism in Fulfilling the Federal-Tribal Relationship: The Tribal Rights-Endangered Species Executive Order*, 72 Wash. L. Rev. 1063 (1997); Rodgers, Jr., *supra* n. 17, at § 1:8(2)(b) (Thomson West Supp. Summer 2008) (tribal consultation).

74. Both listings were initiated by petitions from the Center for Biological Diversity, a national nonprofit conservation organization dedicated to the protection of endangered species and wild places.

75. A Westlaw keyword search of "polar bear" and "Endangered Species Act" within the Journals and Law Reviews database returns 90 articles since March 2006.

76. The petition and litigation has been the subject of thousands of newspaper and web articles, hundreds of television and radio reports, and more than 250 editorials.

a. *Elkhorn and Staghorn Corals*

Elkhorn coral (*Acropora palmata*) and staghorn coral (*Acropora cervicornis*) were, for at least the past 3,000 years, the dominant reef-building corals in the Caribbean.⁷⁷ Virtually every reef, from the Florida Keys across the Caribbean to the Mesoamerican Reef in Belize, was comprised largely of one or the other (or both) of these formerly ubiquitous species.⁷⁸ However, over the past 30 years the two species have declined by upwards of 90 percent.⁷⁹

Massive die-off of these corals was caused by several severe bleaching episodes. Bleaching results from the expulsion of symbiotic algal zooxanthellae from coral triggered, *inter alia*, by elevated sea temperatures.⁸⁰ Global warming is the cause of increased ocean temperatures and increases the frequency and severity of coral bleaching events.⁸¹ In addition, corals around the world face severe threat from ocean acidification, a phenomenon caused by a decrease in carbonate ions due to the absorption of atmospheric carbon dioxide.⁸² The decreased carbonate concentrations result in a decrease in ocean pH.

The regional or global loss of coral reefs will have a devastating impact on global biodiversity.⁸³ “Coral reefs are the oldest and most diverse [ecological] communities on Earth.”⁸⁴ They occupy less than 0.1 percent of the area of the world’s oceans yet harbor about one-third of all described ocean species.⁸⁵ Moreover, most coral reef species remain undescribed, with estimates of an additional one million or more reef-dependent species yet to be catalogued.⁸⁶

Given the massive decline in the elkhorn and staghorn coral population, there was no real dispute that the species should be listed under the ESA. The listing process was completed with relatively little controversy and relatively few delays. This was due not only to the severely depleted state of the populations, but also due to the fact that the decline could be attributed to bleaching, disease, and other factors. As a result, even though both bleaching and disease are linked to global warming, the causes could be cited without a discussion of the underlying climate change mechanism. In the final rule listing the species, which only conferred “threatened” rather than “endangered” status despite the massive population losses, “global warming” appears nowhere in the 10,000-word document. Nor does mention of “greenhouse gases” occur. The phrase “climate

77. Terence P. Hughes, *Catastrophes, Phase Shifts, and Large-Scale Degradation of a Caribbean Coral Reef*, 265 *Sci.* 1547 (1994).

78. *Id.*

79. *Id.*

80. Ove Hoegh-Guldberg, *Climate Change, Coral Bleaching and the Future of the World’s Coral Reefs*, 50 *Marine & Freshwater Research* 839, 861 (1999).

81. Tim P. Barnett et al., *Penetration of Human-Induced Warming into the World’s Oceans*, 309 *Sci.* 284 (2005).

82. O. Hoegh-Guldberg et al., *Coral Reefs under Rapid Climate Change and Ocean Acidification*, 318 *Sci.* 1737 (2007).

83. Kent E. Carpenter et al., *One-Third of Reef-Building Corals Face Elevated Extinction Risk from Climate Change and Local Impacts*, 321 *Sci.* 560 (2008).

84. James W. Porter & Jennifer I. Tougas, *Reef Ecosystems: Threats to Their Biodiversity*, in *Encyclopedia of Biodiversity* vol. 5, 73, 74 (Simon Asher Levin ed., Academic Press 2001).

85. *Id.* at 74–75.

86. *Id.* at 75–77.

change” appears only twice, both times in reference to literature submitted by the public rather than as an actual phenomenon relevant to the rulemaking.⁸⁷ Instead, the phrase “elevated sea surface temperature” is sprinkled throughout the document, and is used a total of eleven times with no ascription of causal mechanisms.

b. The Polar Bear

In sharp contrast to the listing of the corals, the polar bear listing has been highly politicized and fraught with delay. The Center for Biological Diversity filed a petition to list the polar bear on February 16, 2005, the same day that the Kyoto Protocol entered into force without the participation of the U.S. The petition cited the extensive sea ice loss in the Arctic projected at the time as the reason that polar bears are under threat of imminent extinction. The polar bear (*Ursus maritimus*) is completely dependent upon Arctic sea-ice habitat for survival. Polar bears need sea ice as a platform from which to hunt ringed seals and other prey, to make seasonal migrations between the sea ice and their terrestrial denning areas, and for other essential behaviors such as mating.⁸⁸

Canada’s Western Hudson Bay population, at the southern edge of the species’ range, was the first to show the impacts of global warming.⁸⁹ Break-up of the annual ice in Western Hudson Bay is now occurring on average 2.5 weeks earlier than it did 30 years ago.⁹⁰ Earlier ice break-up is resulting in polar bears having less time on the ice to hunt seals. Polar bears must maximize the time they spend on the ice feeding before they come ashore, as they must live off built-up fat reserves for up to eight months before ice conditions allow a return to hunting on the ice. The reduced hunting season has translated into thinner bears, lower female reproductive rates, and lower juvenile survival rates.⁹¹ Polar bear scientists predict that if sea-ice trends continue, most female polar bears in the Western Hudson Bay population will be unable to reproduce by the end of the century, and possibly as early as 2012.⁹²

Even short of complete disappearance of sea ice, projected impacts to polar bears from global warming will affect virtually every aspect of the species’ existence.⁹³ For instance, the timing of ice formation and break-up will determine how long and how efficiently polar bears can hunt seals. Reductions in sea ice will in some areas result in increased distances between the ice edge and land, making it more difficult for female bears that den on land to reach their preferred denning areas. Reductions in sea-ice

87. 71 Fed. Reg. 26852, 26855 (May 9, 2006) ((1) “Several comments and journal articles addressing climate change and coral bleaching were received”; and (2) “In addition to the comments relating to the proposed listing, the following were also received: (1) peer-reviewed journal articles regarding climate change”)

88. Andrew E. Derocher, Nicholas J. Lunn & Ian Stirling, *Polar Bears in a Warming Climate*, 44 *Integrative & Comp. Biology* 163 (2004).

89. *Id.*; *Polar Bears: Proceedings of the 14th Working Meeting of the IUCN/SSC Polar Bear Specialist Group* 44-45 (Jon Aars, Nicholas J. Lunn & Andrew E. Derocher eds., World Conserv. Union 2006) [hereinafter *Polar Bears*].

90. *Id.*

91. *Id.*

92. Derocher, Lunn & Stirling, *supra* n. 88, at 165.

93. Alaska Natives have a rich tradition of observing sea ice quantity and quality and its impacts on local species. For a discussion of the intersection of traditional native knowledge and scientific observation, see Dan Whipple, *Breaking the Ice*, 2 *Nat. Rpts. Climate Change* 54 (May 2008).

thickness and concentration will likely increase the energetic costs of traveling as moving through fragmented sea ice and open water is more energy-intensive than walking across consolidated sea ice. Global warming will likely increase the rates of human-bear interactions, as greater portions of the Arctic become more accessible to people and as polar bears are forced to spend more time on land waiting for ice formation. Increased human-bear interactions will almost certainly lead to increased polar bear mortality. Reduced sea-ice extent will likely result in reductions in the availability of ice-dependent prey such as ringed seals. Impacts will be most severe on female reproductive rates and juvenile survival. In time, reduction in these key demographic factors will translate into population declines and extirpations.⁹⁴

Unlike the coral populations, most polar bear populations were not classified as declining at the time the petition was filed, and population declines as a result of global warming had not yet been published. And while the polar bear faces many other threats, some of which operate in synergistic ways with global warming, in the absence of global warming no single one or combination of these other factors threatened the global polar bear population with extinction. As a result, the listing process placed the science and impacts of global warming squarely before the agency. For the first time, the Bush administration was forced between a rock and a hard place: either acknowledge the reality and severity of the climate crisis and list the polar bear, or refuse to acknowledge the science, refuse to protect the bear, and face a lawsuit challenging the decision under the ESA's "best available science" standard, a lawsuit that the administration could not expect to win.

In the more than three years since the petition was filed, new reports of polar bear drownings,⁹⁵ cannibalism,⁹⁶ starvation,⁹⁷ and population decline⁹⁸ have been published with alarming frequency. The status of the polar bear has grown more dire, and with it, the need for protection all the more compelling.

In addition, Arctic sea ice reached an all-time low in the summer of 2007, shattering all previous records and model predictions.⁹⁹ In 2007 the sea ice minimum was one million square miles less than the average minimum between 1979 and 2000, and perhaps most worrisome, this was less than more than half the world's leading climate models projected will be there in 2050. This devastating loss was nearly repeated in the summer of 2008, with sea ice loss only nine percent less than the 2007 record. The minimum sea ice extent in 2008 was 33 percent less than the average minimum between 1979 and 2000.¹⁰⁰ Thus, the disturbing sea ice melt in 2007 and 2008 appears to indicate that a critically important climate tipping point has been

94. Derocher, Lunn & Stirling, *supra* n. 88; Hassol, *supra* n. 30, at 58.

95. Charles Monnett & Jeffrey S. Gleason, *Observations of Mortality Associated with Extended Open-Water Swimming by Polar Bears in the Alaskan Beaufort Sea*, 29 *Polar Biology* 681 (2006).

96. Steven C. Amstrup et al., *Recent Observations of Intraspecific Predation and Cannibalism among Polar Bears in the Southern Beaufort Sea*, 29 *Polar Biology* 997 (2006).

97. Eric V. Regehr, Steven C. Amstrup & Ian Stirling, *Polar Bear Population Status in the Southern Beaufort Sea*, U.S. Geological Survey Open-File Rpt. 2006-1337, 13-14 (available at <http://pubs.usgs.gov/of/2006/1337/pdf/ofr20061337.pdf>).

98. *Polar Bears*, *supra* n. 89, at 41, 44.

99. J. Stroeve et al., *Arctic Sea Ice Extent Plummets in 2007*, 89 *Eos* 13 (Jan. 8, 2008).

100. Natl. Snow & Ice Data Ctr., *Arctic Sea Ice Settles at Second-Lowest, Underscores Accelerating Decline*, <http://nsidc.org/arcticseaicenews/2008/091608.html> (Sept. 16, 2008).

crossed.¹⁰¹ In light of the ESA's requirement to base all listing decisions "solely on the basis of the best scientific . . . data available,"¹⁰² it became increasingly untenable for the administration to deny the science and refuse to protect the polar bear.

Perhaps most significantly, in 2007, at the request of the FWS as part of the listing process, the Department of Interior's U.S. Geological Survey ("USGS") addressed a series of research questions relating to the future status of the polar bear in a warming Arctic. The USGS conducted polar bear population modeling based on 10 general circulation models that most accurately simulate future ice conditions.¹⁰³ The USGS used the IPCC A1B "business as usual" scenario of future emissions, in which atmospheric carbon dioxide concentrations reach 717 parts per million by 2100, to run the climate models.¹⁰⁴

The USGS then projected the future status of polar bears in each of the four ecological regions in which they occur: (1) the Seasonal Ice Ecoregion that includes Hudson Bay and occurs mainly at the southern extreme of the polar bear range, (2) the Archipelago Ecoregion of the Canadian Arctic, (3) the Polar Basin Divergent Ecoregion where ice is formed and then advected away from near-shore areas, and (4) the Polar Basin Convergent Ecoregion where sea ice formed elsewhere tends to collect against the shore.¹⁰⁵

The USGS projects that polar bears will be extinct in the Seasonal Ice and Divergent Ice Ecoregions by the middle of this century.¹⁰⁶ These two ecoregions account for two-thirds of the world's polar bears, including all of the bears in Alaska. The "good news" is that polar bears may survive in the high Canadian Archipelago and portions of the Convergent Ice Ecoregion through the end of this century. However, their extinction risk is still extremely high: over 40 percent in the Archipelago and over 70 percent in Northwest Greenland.¹⁰⁷ Moreover, the most likely outcome for each of these ecoregions by the end of this century is also extinction.¹⁰⁸

In addition, the USGS emphasized that because all of the available climate models have, to date, underestimated the actual observed sea-ice loss, the assessment of risk to the polar bear is conservative.¹⁰⁹ Perhaps most worrisome is the observation that part of an area in the Canadian Archipelago that was expected to provide an icy refuge for the polar bear in 2100 lost its ice in the summer of 2007.¹¹⁰

Faced with the grim scientific reality, the administration first attempted to avoid what was to it a Hobson's choice by simply refusing to take any action at all on the petition. Due to the ESA's mandatory deadlines for responding to a petition to list a

101. Seth Borenstein & Dan Joling, *Low Level of Arctic Sea Ice Indicates a "Tipping Point"*, Seattle Times A8 (Aug. 28, 2008) (available at http://seattletimes.nwsources.com/html/nationworld/2008143445_ice28.html).

102. 16 U.S.C. § 1533(b)(1)(A).

103. Steven C. Amstrup, Bruce G. Marcot & David C. Douglas, *Forecasting the Range-Wide Status of Polar Bears at Selected Times in the 21st Century*, U.S. Geological Survey Administrative Rpt. (2007) (available at http://www.usgs.gov/newsroom/special/polar_bears/docs/USGS_PolarBear_Amstrup_Forecast_lowres.pdf).

104. *Id.*

105. *Id.* at 1.

106. *Id.*

107. *Id.* at 66–67 tbl. 8.

108. Amstrup, Marcot & Douglas, *supra* n. 103, at 66–67 tbl. 8.

109. *Id.* at 34, 36.

110. *Id.* at 35, 96.

species, however, the Center, now joined by Greenpeace and the Natural Resources Defense Council, successfully sued to compel each of the three required petition findings. The litigation related to these mandatory deadlines culminated with the publication of the final rule listing the polar bear as threatened on May 15, 2008.¹¹¹

Secretary of Interior Dirk Kempthorne accompanied his announcement of the polar bear listing with images showing the rapid melting of the Arctic sea ice.¹¹² The announcement was remarkable, given both the fact that the administration had spent nearly eight years denying and downplaying the science of global warming and the fact that the administration has shown unprecedented hostility to endangered species and listed far fewer species under the Act than any other.¹¹³ The polar bear was, in fact, the first species listed by Secretary Kempthorne in the U.S. in over two years.

The decision also was a watershed moment in the administration's approach to the science of global warming. The final listing decision clearly and unambiguously adopts the consensus view of the world's scientists on global warming and Arctic melting and rejects arguments propounded by a tiny number of industry-funded spokespeople.¹¹⁴ The portions of the rule dealing with climate science and polar bear biology are well written, and the importance of these conclusions being included in the binding and precedential final regulation listing the polar bear cannot be overstated.¹¹⁵

Not surprisingly, however, the polar bear listing decision did not include everything that the law requires. First, the administration listed the polar bear as "threatened," rather than as "endangered." While threatened status would have been appropriate as of February 2005 when the Petition was first filed, by the time of the listing decision, the science clearly mandated endangered status. A species that is expected to decline by two-thirds in number, disappear from half of its range, and for which the most likely status by the end of the century is global extinction must be

111. Compl. Declaratory Judm. & Injunctive Relief, *Ctr. for Biological Diversity v. Norton* (Dec. 15, 2005) (suit to compel 90-day finding) (available at <http://www.biologicaldiversity.org/swcbd/SPECIES/polarbear/Complaint12-15-05.pdf>); *Ctr. for Biological Diversity v. Kempthorne*, 2008 WL 1902703 (N.D. Cal. Apr. 28, 2008) (granting summary judgment and ordering a final listing by May 15, 2008); see 73 Fed. Reg. 28212 (May 15, 2008) (to be codified at 50 C.F.R Part 17).

112. Dirk Kempthorne, Press Conference, *Remarks of Secretary Kempthorne: Press Conference on Polar Bear Listing*, (D.C., May 14, 2008) (available at http://www.doi.gov/secretary/speeches/081405_speech.html).

113. Noah Greenwald, *Politicizing Extinction: The Bush Administration's Dangerous Approach to Endangered Wildlife* 11 (2007) (available at <http://www.biologicaldiversity.org/publications/papers/PoliticizingExtinction.pdf>).

114. See generally 73 Fed. Reg. at 28219–28234 (discussion of Arctic sea ice and climate change).

We have consistently relied on synthesis documents (e.g., [IPCC's Fourth Assessment Report and the Arctic Climate Impact Assessment]) that present the consensus view of a very large number of experts on climate change from around the world. We have found that these synthesis reports, as well as the scientific papers used in those reports or resulting from those reports, represent the best available scientific information we can use to inform our decision and have relied upon them and provided citation within our analysis.

Id. at 28246.

115. That the polar bear decision marked a turning point was reinforced by the administration's release, just two weeks later, of the scientific assessment of climate change impacts in the U.S. required by the Global Change Research Act of 1990. The release of this report was also required by a court order. *Ctr. for Biological Diversity v. Brennan*, 2007 WL 2408901 (N.D. Cal. Aug. 21, 2007). The scientific assessment, released on May 29, 2008, comprehensively affirms the best available science on climate change that the administration has long sought to question. Comm. Env. & Nat. Resources, *Scientific Assessment of the Effects of Global Change on the United States.*, Natl. Sci. & Tech. Council, 1 (May 2008) (available at <http://www.ostp.gov/galleries/NSTC%20Reports/Scientific%20Assessment%20FULL%20Report.pdf>).

considered “in danger of extinction throughout all or a significant portion of its range.”¹¹⁶ Second, having listed the polar bear as threatened rather than endangered, the administration attempted to reduce protections to the polar bear through an Interim Final Section 4(d) (“4(d) Rule”), which authorizes activities that would otherwise be prohibited by the ESA and its implementing regulations.¹¹⁷ The 4(d) Rule also purports to exempt all greenhouse gas emitting projects from the ambit of Section 7 of the ESA. Finally, the administration failed to designate critical habitat for the polar bear, stating nonsensically that it is currently impossible to determine what habitat is essential to the species.¹¹⁸

The Center for Biological Diversity, Greenpeace, and NRDC are challenging these and other shortcomings of the final rulemaking in the ongoing litigation.¹¹⁹

While the coral listing process occurred with relatively little fanfare and virtually no opposition, the listing process for the polar bear has been far more contentious. The State of Alaska, the Alaska Oil and Gas Association, various other fossil fuel industry associations, as well as sport hunting groups all came out publicly in opposition to the listing, and, in response, the administration instituted a policy prohibiting agency employees from discussing polar bears or global warming while traveling abroad.¹²⁰ As of the time of writing, three separate lawsuits have been filed by listing opponents, including the Safari Club International¹²¹ (a trophy-hunting advocacy organization), the State of Alaska,¹²² and the American Petroleum Institute.¹²³

Despite differences in the timing and public attention to the coral and polar bear listing, both exemplify the strength of the ESA and its applicability to global warming. These precedential listings should pave the way for future listings. The FWS has demonstrated its ability successfully to incorporate the climate literature into a listing decision, and so there is simply no basis for claiming that the Services lack the expertise to do so.

c. Benefits of the Section 4 Listing Process

The ESA does not confer regulatory benefits upon imperiled species until they are officially listed as threatened or endangered. Nonetheless, the section 4 listing process can itself confer substantial non-regulatory benefits on species threatened by global warming. These benefits are well-illustrated by the polar bear case study.

First, the listing process itself helped raise awareness of the polar bear’s plight and

116. 16 U.S.C. § 1532(6) (defining “endangered species”).

117. 73 Fed. Reg. 28306, 28306–28318 (May 15, 2008) (Endangered and Threatened Wildlife and Plants; Special Rule for the Polar Bear) (codified at 16 U.S.C. § 1538(a); 50 C.F.R. § 17.31).

118. 73 Fed. Reg. at 28297–28299.

119. *Kemphorne*, 2008 WL 1902703.

120. Dan Joling, *Threat of Polar Bear Listing Stirs Politicians—Opposition: State’s Case against Federal Protection Slammed by Green Groups*, Anchorage Daily News B5 (May 6, 2007); Dan Joling, “Threatened” Polar Bear Listing Debated—Global Warming: Sea Ice Shrinks; Critics Call That Insufficient, Anchorage Daily News B2 (Mar. 2, 2007); Andrew C. Revkin, *Memos Tell Officials How to Discuss Climate*, N.Y. Times A17 (Mar. 8, 2007).

121. *Safari Club Intl. v. Kemphorne*, No. 08-881 (D.D.C. May 23, 2008).

122. *Alaska v. Kemphorne*, No. 08-1352 (D.D.C. Aug. 4, 2008).

123. *Am. Petroleum Inst. v. Kemphorne*, No. 08-1496 (D.D.C. Aug. 27, 2008).

of the urgency of the climate crisis. The listing process evoked strong and widespread reactions, with the announcement of the proposed rule alone generating more than 1,000 news articles, several hundred television reports, and more than 200 editorials, virtually all of which discussed the decision as an important recognition of the reality of global warming by the Bush administration.¹²⁴ The FWS received about 670,000 comments on the proposed rule, far more than had been received on any previous ESA proposal.¹²⁵ The press attention and public interest triggered by the listing process helped elevate the polar bear to an international symbol of the very real impacts of global warming.¹²⁶

This is an important benefit, as the “climate change commitment” due to the lag time in the climate system creates a unique and extraordinarily difficult challenge.¹²⁷ In many parts of the world, global warming to date may still appear relatively minor and non-threatening, despite the monumental changes underway in the Arctic and other areas. Humanity is “sleepwalk[ing towards] disaster,”¹²⁸ largely oblivious to the gathering storm. This problem is particularly acute in the U.S., where a successful disinformation campaign funded by Exxon Mobil and other opponents of greenhouse gas regulation¹²⁹ has been embraced and propagated by the Bush administration¹³⁰ and has resulted in widespread confusion regarding the science. For instance, Naomi Oreskes found that out of 928 peer-reviewed scientific articles, 0 percent expressed doubt at to the basic causes of global warming.¹³¹ In contrast, Boykoff and Boykoff surveyed 636 articles in the “prestige media” and found that 53 percent contained some expression of doubt about anthropogenic climate change (often a statement from one of a handful of industry-funded “climate deniers”).¹³²

The widespread media coverage of the polar bear listing process counters the results of the industry disinformation campaign with a concrete example of a real-world impact of the climate crisis. Many Americans who may never read an IPCC report now understand the urgent nature of the climate crisis through its impact on the polar bear. Fostering greater understanding and awareness of global warming is an extremely important step in solving, or at least ameliorating, this great challenge.

The ESA listing process also has already benefited the species by prompting additional research and analysis on the future of the polar bear, its sea-ice habitat, and the

124. *Id.*

125. 73 Fed. Reg. at 28235.

126. The polar bear was featured on the cover of the April 3, 2006, issue of Time magazine accompanying a cover story about global warming. Similarly, an animation showing a drowning polar bear appears in Al Gore’s documentary *An Inconvenient Truth*. *An Inconvenient Truth* (Lawrence Bender Prod. 2006) (documentary).

127. James Hansen et al., *Earth’s Energy Imbalance: Confirmation and Implications*, 308 *Sci.* 1431 (2005).

128. Geoffrey Lean, *Apocalypse Now: How Mankind Is Sleepwalking to the End of the Earth*, Indep. Sun. (London, Eng.) (Feb. 6, 2005).

129. Union Concerned Scientists, *Smoke, Mirrors & Hot Air: How ExxonMobil Uses Big Tobacco’s Tactics to Manufacture Uncertainty on Climate Science* (Jan. 2007) (available at http://www.ucsusa.org/assets/documents/global_warming/exxon_report.pdf).

130. See Chris Mooney, *Storm World: Hurricanes, Politics, and the Battle over Global Warming* (Harcourt, Inc. 2007) (discussing the administration’s inept response and propaganda following Hurricane Katrina).

131. Naomi Oreskes, *Beyond the Ivory Tower: The Scientific Consensus on Climate Change*, 306 *Sci.* 1686 (2004); Naomi Oreskes, *Global Warming—Signed, Sealed and Delivered*, L.A. Times (July 25, 2006).

132. Maxwell T. Boykoff & Jules M. Boykoff, *Balance as Bias: Global Warming and the US Prestige Press*, 14 *Global Envtl. Change* 125, 128–29 (2004) (“Prestige press” refers to the New York Times, Washington Post, Los Angeles Times, and the Wall Street Journal).

Arctic more generally. Most important among these research efforts are the reports released by the USGS in 2007, discussed *supra*. In the nine reports produced for the polar bear listing process, the USGS significantly advanced the understanding of sea-ice loss and its implications for polar bears.

The ESA's "best available science" standard also forced the Bush administration to confront the science of global warming in a precedential administrative rulemaking. This is particularly important since the administration consistently denied and downplayed the science of global warming for so many years.

The benefits that the listing process bestowed on the polar bear should be extended to other species. The elkhorn and staghorn coral and the polar bear are only the tip of the biodiversity iceberg threatened by the climate crisis. Other species also very much in need of the ESA's protection from the ravages of global warming include 12 species of penguins,¹³³ the American pika,¹³⁴ and four ice-dependent seals,¹³⁵ all of which are at various stages of the listing process.¹³⁶

Unfortunately, further litigation is a certainty as activists struggle to convince wildlife agencies reluctant to acknowledge the climate crisis and carry out their stewardship duties to protect the species most urgently threatened by global warming. For example, while scientists as well as legal commentators have acknowledged that "the pika is toast,"¹³⁷ the California Fish and Game Commission sees things very differently. In rejecting a petition to list the pika under the California Endangered Species Act due to global warming, the Commission stated that "realistic assessment of the scope of the threat to the species is impossible," and surmised, contrary to the scientific evidence, that California's pika will be able to "reduce mid-day activity as a means [of] avoiding the heat."¹³⁸ The Commission's findings are currently being litigated.¹³⁹

133. Ctr. for Biological Diversity, *Before the Secretary of the Interior: Petition to List 12 Penguin Species under the Endangered Species Act* (Nov. 28, 2006) (available at <http://www.biologicaldiversity.org/species/birds/penguins/pdfs/PenguinPetition.pdf>). 72 Fed. Reg. 37695 (July 11, 2007) (positive 90-day finding for 10 species issued). The Center for Biological Diversity filed suit on February 27, 2008 to compel a 12-month status review. Pursuant to a court-ordered settlement agreement dated September 8, 2008, the FWS must have published its 12-month review by December 19, 2008.

134. Ctr. for Biological Diversity, *Before the Secretary of Interior: Petition to List the American Pika (Ochotona princeps) As Threatened or Endangered under the United States Endangered Species Act* (Oct. 1, 2007) (http://www.biologicaldiversity.org/species/mammals/American_pika/pdfs/American-pika-federal-petition-10-01-2007.pdf). The Center for Biological Diversity filed suit August 19, 2008 to compel the FWS to make a 90-day finding in response to the petition.

135. Ltr. from W. Env'tl. L. Ctr. to U.S. Depts. Energy, Int. & Commerce, *Re: Notice of Intent to Sue for Violations of the Endangered Species Act in Connection with the Department of Energy's Designation of the Southwest National Interest Electric Transmission Corridor (Docket No. 2007-OE-02)* (Dec. 20, 2007) (available at <http://www.biologicaldiversity.org/campaigns/esa/pdfs/60-day-notice-sw-corridor.pdf>). The NMFS issued a positive 90-day finding for the ribbon seal. 73 Fed. Reg. 16617 (Mar. 28, 2008). The NMFS also issued a positive 90-day finding for ringed, bearded, and spotted seals. 73 Fed. Reg. 51615 (Sept. 4, 2008).

136. One critique leveled regarding the attention focused on the polar bear and other climate-imperiled species is that we care more about polar bears than people. However, we believe that the increased attention focused on the melting Arctic as a result of the polar bear listing can only help the efforts of Arctic residents in bringing attention to the impacts of global warming on human communities. See e.g. *Native Village of Kivalina v. ExxonMobil Corp.*, 2008 WL 2951517 (N.D. Cal. June 16, 2008).

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

138. Cal. Fish & Game Commn., *Notice of Findings* 5, 6 (June 27, 2008) (available at <http://www.fgc.ca.gov/regulations/new/2008/apfindingsreject.pdf>) (rejecting the Center for Biological

Ultimately, there can be no question that the Services must continue to list species threatened by global warming. As one commentator stated recently, “[t]he effects of climate change, therefore, are unambiguously within the ambit of the listing criteria, leaving no room for the FWS to argue that it may leave climate change out of the listing calculus.”¹⁴⁰

Some commenters have expressed concern that the sheer number of species imperiled by the climate crisis will overwhelm the Services’ listing programs or that the ESA’s species-by-species process cannot address widespread threats such as global warming.¹⁴¹ Yet the polar bear listing in particular illustrates that it is entirely feasible to evaluate the threat to a species from global warming in order to add it to the list of protected species.

2. *Responding to Global Warming and Regulating Greenhouse Gas Emissions to Avoid Jeopardy and Take*

Two sections of the ESA require the services to prevent the “take” of listed species. Section 7 applies to all federal actions while section 9 applies to federal and private actions. Below we explore how these provisions provide protection to species threatened by global warming and how they apply to activities that result in significant levels of greenhouse gas emissions.

a. *Section 7 Consultation*

As noted above, the section 7 consultation process is the heart of the ESA. Section 7 directs all federal agencies to insure through consultation with the FWS or NMFS, that all actions authorized, funded, or carried out by such agencies are “not likely to jeopardize the continued existence . . . or result in the destruction or adverse modification of [critical] habitat” of any listed species.¹⁴² The result of the consultation process is a biological opinion produced by the FWS or NMFS concluding whether the action can go forward and suggesting alternatives to the action as necessary to avoid jeopardy to the species or adverse modification of critical habitat, and/or mitigation measures to minimize the harm to the affected species.¹⁴³

Section 7 consultations must address two key aspects with regard to global warming: (1) the observed and projected effects of global warming on the species otherwise affected by the action; and (2) the impact of major sources of greenhouse gas emissions resulting from the federal action under review. While federal agencies and the Services have been slow to comply with these requirements, there is evidence that this is changing.

While the first part of this two-part analysis is potentially more scientifically and technically challenging than the second, it was in fact the first to be litigated. In May

Diversity’s petition to list the pika as threatened under the California Endangered Species Act).

139. *Ctr. for Biological Diversity v. Cal. Fish & Game Commn.*, 166 Cal. App. 4th 597 (Cal App. 2008).

140. Ruhl, *supra* n. 137, at 32.

141. See e.g. John Kostyack & Dan Rohlf, *Conserving Endangered Species in an Era of Global Warming*, 38 ELR 10203, 10211 (2008).

142. 16 U.S.C. § 1536(a)(2).

143. *Id.* at § 1536(b).

2007, a biological opinion analyzing the impact of water withdrawals on the delta smelt, a fish that occurs in California's San Joaquin Delta and is impacted by massive water pumping for agricultural and urban purposes, was overturned for failure to consider the impact of global warming on water levels for the fish.¹⁴⁴

Fortunately, there is now little argument that the agencies may ignore the very real impacts of the climate crisis in their section 7 consultations, because incorporating such information into management decisions is extraordinarily important. For example, a finding that allowing the destruction of certain coastal wetlands relied upon by a listed species will not equate to jeopardy because sufficient other wetlands still exist in a nearby preserve utterly fails to protect the species if the preserve will no longer exist in 50 years following another half-meter or more of sea level rise. Considering impacts that operate in cumulative and synergistic ways with global warming is also vital. Incorporating the changing conditions caused by global warming into agency decision-making is essential if already imperiled species are to survive given the amount of warming to which we are already committed, even under the best scenarios.

Considering the impact of federal agencies' greenhouse gas emissions, while potentially more straightforward, has caused far more controversy. Yet despite concerns expressed by both opponents and supporters of endangered species protection, once again the law is quite clear that federal agencies must consider such emissions and then consider measures to reduce or eliminate them.

Section 7 consultation is required for "any action [that] may affect listed species or critical habitat."¹⁴⁵ Agency "action" is defined in the ESA's implementing regulations to include "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas."¹⁴⁶ Notably, this includes "actions directly or indirectly causing modifications to the land, water, or air."¹⁴⁷

This regulatory definition of "action" is clearly sufficiently broad to encompass actions that result in greenhouse gas emissions, as no real argument can be made that such emissions are not "causing modification to the land, water, or air." The remaining question with respect to the triggering of these requirements for an action resulting in greenhouse gas emissions is whether that action "may affect" the listed species.

Because the goal of section 7 consultation is to avoid jeopardizing any listed species, the regulatory definition of "jeopardy" offers some guidance as to how the consultation requirement for a greenhouse gas emitting action may be interpreted. To "jeopardize" a species means "to engage in an action that reasonably would be expected, directly or indirectly, to reduce *appreciably* the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species."¹⁴⁸ If an action "appreciably" contributed to global warming, that action could then be found to jeopardize a listed species.¹⁴⁹

144. *Nat. Resources Def. Council v. Kempthorne*, 506 F. Supp. 2d 322 (E.D. Cal. 2007).

145. 50 C.F.R. § 402.14(a) (2008).

146. *Id.* at § 402.02.

147. *Id.*

148. *Id.* (emphasis added).

149. This analysis assumes the validity of the current consultation regulations. An argument can be made

“Appreciably” has been defined as being to the degree that can be estimated,¹⁵⁰ while something is “appreciable” if it is “large or important enough to be noticed.”¹⁵¹ So if an action contributes an appreciable amount of greenhouse gas emissions to the atmosphere, that action should undergo the consultation process.

While some federal actions may not contribute appreciable amounts of greenhouse gases to the atmosphere, many clearly do so. For example, the corporate average fuel economy (“CAFE”) standards for cars and light trucks are set via regulation by the National Highway Traffic Safety Administration. The enormous amount of emissions from all passenger cars and trucks nationally must certainly be deemed “appreciable.” Similarly, every five years the Minerals Management Service approves a program for all offshore oil and gas leasing for the entire United States. While the ongoing litigation over the most recent five-year planning process challenges the agency’s refusal to disclose the greenhouse gas emissions that would flow from the decision making process, a “back of the envelope” calculation reveals that using the 10 billion barrels of oil and 45 trillion cubic feet of natural gas anticipated to be produced under the leasing program would result in approximately 5,646 million metric tons of carbon dioxide equivalent gases (CO₂e). This figure excludes the emissions generated from the production activities themselves and is of a similar order as the emissions from the entire U.S. economy in 2004—6,294 million metric tons of CO₂e¹⁵²—again, clearly an “appreciable” amount. The greenhouse gas emissions from numerous other actions, ranging from the approval of new coal-fired power plants, oil shale leasing programs, or limestone mines for cement manufacturing, and dozens, perhaps hundreds, of other projects are individually and cumulatively having an appreciable effect on the atmosphere. These are all agency “actions” as defined by the ESA, which “may affect” listed species and therefore trigger the consultation requirements of section 7.¹⁵³

that the regulations improperly narrow the reach of the consultation requirements of section 7. However, such a critique of the regulation is beyond the scope of this chapter.

150. See *Webster’s New World Dictionary* 67 (Victoria Neufeld ted., 3d college ed., Simon & Schuster, Inc. 1988) (defining “appreciable” as “enough to be perceived or estimated; noticeable; measurable”).

151. Compact Oxford English Dictionary, *Appreciable*, www.askoxford.com/concise_oed/appreciable?view=uk (accessed Apr. 14, 2009).

152. EPA, *The U.S. Inventory of Greenhouse Gas Emissions and Sinks: Fast Facts*, 2004 col. (Apr. 2006) (available at [http://yosemite.epa.gov/OAR/globalwarming.nsf/UniqueKeyLookup/RAMR6P5M5M/\\$File/06FastFacts.pdf](http://yosemite.epa.gov/OAR/globalwarming.nsf/UniqueKeyLookup/RAMR6P5M5M/$File/06FastFacts.pdf)).

153. Many of these actions are also “major federal actions” under NEPA (42 U.S.C. §§ 4321-4347 (2006)), and the impacts of their emissions should be analyzed under those statutory provisions as well. See e.g. *Found. on Econ. Trends v. Watkins*, 794 F. Supp. 395 (D.D.C. 1992) (attempting to force analysis of global warming impacts under NEPA); *Ctr. for Biological Diversity v. Natl. Hwy. Traffic Safety Administration*, 508 F.3d 508 (9th Cir. 2007) (opinion vacated and withdrawn in *Ctr. for Biological Diversity v. Natl. Hwy. Traffic Safety Administration*, 538 F.3d 1172 (9th Cir. 2008)) (Judge Fletcher joined by Hawkins, C.J., with Siler, C.J. concurring in part and dissenting in part in a brief opinion). In *National Highway Traffic Safety Administration*, the court held that the National Highway Traffic Safety Administration violated NEPA when it failed to consider the impact of greenhouse gas emissions under revised CAFE standards, causing “severe impacts in the Arctic” and stating that “[g]lobal warming has already affected plants, animals, and ecosystems around the world.” *Id.* at 523. “The impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct.” *Id.* at 550. This court also cited to an earlier case brought against the National Highway Traffic Safety Administration in stating that “[a]ny given rule setting a CAFÉ standard might have an ‘individually minor’ effect on the environment, but these rules are ‘collectively significant actions taking place over a period of time.’” *Id.* (citing *City of L.A. v. Natl. Hwy. Traffic Safety Administration*, 912 F.2d 478, 501 (D.C. Cir. 1990) (Wald, C.J., dissenting) (“[W]e cannot afford to ignore even modest contributions to global warming. If global warming is the result of the cumulative

With the listing of the polar bear, the pressure for federal agencies to comply with the law should increase. For example, the Center for Biological Diversity has sent 60-Day Notice Letters of Intent to sue to various agencies for their failure to reinstate consultation on numerous actions relating to oil and gas exploration in the Beaufort and Chukchi Seas.¹⁵⁴ The law is quite clear that greenhouse gas emissions must be considered in such consultations. Indeed, as early as 2007, the FWS required consideration of greenhouse gas emissions and global warming in a section 7 consultation for a new coal-fired power plant in New Mexico.¹⁵⁵ There is simply no reason greenhouse gas emissions that jeopardize polar bears should be treated any differently than pesticides that harm salmon or logging that harms owls.

The section 7 consultation process in fact presents a fabulous opportunity for federal agencies, which are responsible for a large portion of the country's overall emissions, to analyze and implement solutions to reduce those emissions. There is absolutely no reason why we should not require these agencies to adopt all feasible measures to reduce emissions immediately through the section 7 process. These consultations are particularly important and relevant today because Congress has yet to pass comprehensive climate legislation and the Bush administration has blocked the implementation of the Clean Air Act that would otherwise regulate most major greenhouse emission sources in the U.S. As humanity sleepwalks towards disaster, it is incumbent upon those paying attention to work for the implementation of laws that already require emissions reductions. Yet the ESA section 7 process will almost certainly retain its relevance and importance once Congress does act. Even the best climate legislation cannot result in instantaneous reductions, and emissions reductions on the scale now required will be extremely challenging in any event. We absolutely must require the analysis and adoption of solutions in every context available.

Section 7 consultations that consider not only carbon dioxide, but also short-lived greenhouse pollutants including black carbon, methane, and ozone are desperately needed today if we are to save the polar bear. The bad news is that a tipping point has almost certainly been crossed in the Arctic, and it is not possible to save the Arctic sea ice and the polar bear through carbon dioxide emissions reductions alone, even if those cuts were deep and rapid. The good news is that with up to about half of the warming in the Arctic attributable to the short-lived or "non-CO₂" pollutants, it is possible to achieve a short-term climate benefit in the Arctic through immediate reductions in black carbon, methane, and ozone.¹⁵⁶ These short-lived pollutants are not explicitly capped in any of the comprehensive climate bills in the 110th Congress.¹⁵⁷ Black carbon has a

contributions of myriad sources, any one modest in itself, is there not a danger of losing the forest by closing our eyes to the felling of the individual trees?," overruled on other grounds by *Fla. Audubon Soc. v. Bentsen*, 94 F.3d 658 (D.C. Cir. 1996) (other citations omitted).

154. Ltr. from Ctr. for Biological Diversity to Sec. of Int. et al. (June 9, 2008) (copy on file with author).

155. Memo. from Supervisor N.M. Ecological Servs., FWS, to Regl. Dir., Navajo Regl. Off., Bureau of Indian Affairs (July 2, 2007) (copy on file with author).

156. James Hansen et al., *Climate Change and Trace Gases*, 365 *Phil. Transactions Royal Socy. A* 1925 (2007); James Hansen & Makiko Sato, *Global Warming: East-West Connections* (Sept. 2007) (available at www.columbia.edu/~jeh1/2007/EastWest_20070925.pdf).

157. H.R. 6739, 110th Cong. (July 31, 2008). This legislation, introduced by Representative Inslee, would require a black carbon abatement study. *Id.* at Title V. A similar black carbon study bill was introduced to the Senate. Sen. 3489, 110th Cong. (Sept. 15, 2008).

particularly strong warming impact in the Arctic, and unlike carbon dioxide, within-Arctic and near-Arctic sources have a much stronger warming impact there than sources further away. The section 7 consultation process for polar bears is currently the best regulatory mechanism for controlling black carbon and truly a critically important part of saving the species from extinction.

Despite the clarity of the requirement for federal agencies to consider greenhouse gas emissions in the section 7 consultation process, or perhaps more accurately because of this clarity, the Bush administration has engaged in several attempts to exempt greenhouse gas pollution from section 7 of the ESA. In the polar bear section 4(d) regulation, the administration alleges

the best scientific data currently available does not draw a causal connection between GHG emissions resulting from a specific Federal action and effects on listed species or critical habitat by climate change, nor are there sufficient data to establish the required causal connection to the level of reasonable certainty between an action's resulting emissions and effect on species or critical habitat.¹⁵⁸

Following issuance of the 4(d) Rule, the administration proposed sweeping changes to the ESA section 7 regulations that also purport to exempt greenhouse gas emissions through a series of similar assertions.¹⁵⁹

The notion that there is no causal connection between greenhouse gas emissions and the decline of the polar bear (or other species) is demonstrably incorrect. The connection between greenhouse gas emissions and sea ice reductions—and the effect that sea ice decline has on polar bears—is supported by voluminous scientific literature and, indeed, is the central reason for the decision to place the polar bear on the list of threatened and endangered species. Just as there is no requirement to link the thinning of any particular bald eagle egg to any particular molecule of DDT to demonstrate that authorization of the use of DDT may result in a taking of bald eagles, there is no requirement to link any particular molecule of carbon dioxide or other greenhouse pollutant to the death of an individual bear. As the Supreme Court stated in *Tennessee Valley Authority*, section 7 “admits of no exception,” and affords endangered species “the highest of priorities.”¹⁶⁰ The administration's attempt to create an exception for the most important threat to biodiversity the Earth has ever seen is almost certainly doomed to failure.

Even some commenters that support endangered species protection, while acknowledging the legal obligation to address greenhouse gas emissions through the section 7 consultation process, have expressed reservations about the mechanics of such consultations.¹⁶¹ Concerns range from the practical and political ramifications of the wildlife agencies exercising such authority to the assertion that because so many species are doomed, all ESA resources should be focused on adaptation, and none on mitigation. Representative concerns are perhaps expressed most strongly and succinctly by this statement from the editor of this volume:

158. 73 Fed. Reg. at 28313.

159. 73 Fed. Reg. 47868, 47872 (Aug. 15, 2008).

160. *Tenn. Valley Auth. v. Hill*, 437 U.S. at 173–74.

161. See e.g. Ruhl *supra* n. 137, at 59; Kostyack & Rohlf, *supra* n. 141, at 10211.

Going for the jugular by regulating greenhouse gas emissions is *not* where the ESA can be of most help to imperiled species. There is little to be gained for the FWS or for climate-threatened species by having the agency go down this road. The agency has no explicit authority to do so, does not have the expertise to do so, and would risk undermining the political viability of the ESA by doing so. Rather, the FWS can provide expert assistance to the agencies more appropriately charged with regulating greenhouse gas emissions, such as the EPA, by advising them about the effects of climate change on species.¹⁶²

We respectfully disagree with these perspectives. As discussed throughout, it is abundantly clear that the Services have not only the authority, but an obligation to address greenhouse gases in section 7 consultations. Any assertion that the Services do not have such a mandate is more of a rationalization for a preferred policy approach than a meritorious legal argument.

We find the assertion that scientists and managers within the Services do not have the expertise to analyze greenhouse gas emissions in section 7 consultations particularly puzzling. One could just as easily argue that biologists have no inherent expertise in pesticides or dam construction, but that does not mean that the Services may ignore these impacts to species! In fact, scientists and managers in all the federal agencies will be tasked with increasing their proficiency with the climate literature, and with the management challenges of global warming. Scientists in the Alaska office of the FWS have already demonstrated their excellent ability to do so in drafting large sections of the polar bear listing rule. We should support scientists and managers throughout the Services in these efforts for which they are extremely well-suited. We should not sell them short nor demand any less from those in biological agencies than, for example, the Environmental Protection Agency (“EPA”).

Scientists and managers within the Services must be empowered to examine the global warming impacts of federal actions on listed species and take steps to reduce those impacts. Who could possibly be better suited to this task than these individuals, who will be required to deal with the complex climate literature in listing rules, recovery plans, five-year reviews, and other ESA processes? While it is certainly true that not each and every one of our biological managers is completely proficient in all aspects of the climate literature, this merely means that the Services must continue to build capacity in this regard.

Doing so will almost certainly leverage other benefits beyond the section 7 consultation process itself. Initial steps to regulate greenhouse pollutants under the ESA could provide a valuable test ground for different emissions reduction methodologies. Moreover, implementation of emissions reductions through the ESA and other existing laws has great potential to inform development of climate legislation. Traditionally, laws which develop out of the framework of bright lines established by implementation of previous laws are more likely to reflect scientifically established goals than laws which are developed without clear legal precedent. ESA implementation is in fact a superb context in which to continue to develop both climate change adaptation and mitigation expertise and capacity. Perhaps most importantly, in contrast to voluntary

162. Ruhl, *supra* n. 137, at 59 (emphasis in original).

programs, which the EPA recently found to be ineffective,¹⁶³ the strong and mandatory provisions of the ESA actually work.¹⁶⁴

A somewhat related concern that has been expressed is the difficulty of deciding how large the federal action's greenhouse gas emissions must be before the requirement to consult is triggered.¹⁶⁵ While it is true that there is currently no bright line rule, this is simply not an argument against the need to consult on greenhouse emissions. The Services could set a threshold level for consultation, as long as it was reasonable and sufficiently protective of listed species. While it is always possible to continue to point to difficulties and complexities in any scientific and legal analysis, the practical barriers to effective section 7 consultation on greenhouse gas emissions are actually quite low.

Commenters are clearly quite concerned about the political challenges of enforcement of the ESA's regulation of greenhouse gas emissions, and of "render[ing] the ESA and the FWS political targets in the first degree."¹⁶⁶ Yet the ESA and FWS have been political targets of the first degree for over two decades. And the Clean Air Act, the first tier regulator of most major emissions sources in the U.S., if only it were enforced, is currently the greatest political target precisely because the EPA's duty to regulate is so clear. The political challenges of regulating greenhouse gas emissions under the ESA are no more daunting than those posed by enforcing the Clean Air Act, National Environmental Policy Act, California Environmental Quality Act, or any other statute that already regulates greenhouse pollution. We must meet these challenges head-on by continuing to educate Americans and build support for solutions to the climate crisis. While any conceivable strategy for environmental protection carries some political risk, we submit that the physical risks associated with continued inaction on greenhouse emissions are far greater and demand action today.

The industry lobby against regulation is a powerful one. In contrast to the open and honest dialogue among scholars and activists on this issue, the anti-regulatory lobby has invented and will continue to promote a whole range of disingenuous arguments why section 7 consultation should not occur for greenhouse pollutants. This is not an isolated tactic, but part of a larger strategy in which regulated industries claim that each existing or proposed regulatory tool, from the ESA to the Clean Air Act to the Kyoto Protocol, is "not suited," "inappropriate," or "not the best way" to regulate greenhouse emissions. This is more strategic, and unfortunately, likely more successful, way to oppose regulation than to continue blanket opposition to action in the face of the climate crisis.

163. EPA, Off. Inspector Gen., *Voluntary Greenhouse Gas Reduction Programs Have Limited Potential: Report No. 08-P-0206* (July 23, 2008) (available at <http://www.epa.gov/oig/reports/2008/20080723-08-P-0206.pdf>).

164. Martin F.J. Taylor, Kieran F. Suckling & Jeffrey J. Rachlinski, *The Effectiveness of the Endangered Species Act: A Quantitative Analysis*, 55 *Bioscience* 360 (2005). That is, they work when political corruption is not the administrative driver. See U.S. Dept. Int., Off. Inspector Gen., *Investigative Report: On Allegations against Julie MacDonald, Deputy Assistant Secretary, Fish, Wildlife and Parks* (available at http://wyden.senate.gov/DOIG_Report.pdf); *W. Watersheds Project v. Fish & Wildlife Serv.*, 535 F. Supp. 2d 1173 (D. Idaho 2007) (successful challenge to FWS rejection of petition to list greater sage-grouse under the ESA). "[T]he FWS decision was tainted by the inexcusable conduct of one of its own executives." *Id.* at 1176. [Julie] MacDonald had extensive involvement in the sage-grouse listing decision, used her intimidation tactics in this case, and altered the 'best science' to fit a not-warranted decision." *Id.* at 1188.

165. See Kostyack & Rohlf, *supra* n. 141, at 10209.

166. Ruhl, *supra* n. 137, at 47.

It is important for those concerned with biodiversity protection to distinguish between these politically motivated talking points, and the legitimate dialogue amongst scholars, activists, and managers. While the raw power and destructiveness of the anti-regulation lobby can certainly be intimidating at times, the reality of the climate crisis, particularly in the Arctic, demands that those concerned with biodiversity protection move forward with enforcement of existing laws which clearly and unambiguously require the regulation of greenhouse pollution and respond directly to industry arguments against regulation where it is productive to do so.

Finally, there is a tendency among many commenters to focus on living with the worst-case climate scenario rather than doing everything we can to avoid it. The reality is that we simply must avoid the worst-case, rapid climate change scenario. We must find a way to reduce atmospheric greenhouse gas concentrations back to below 350 ppm as leading climate scientists advise in order to avoid the most severe impacts.¹⁶⁷ If we do not do so quickly and retreat from the precipice of a planetary “point of no return,” we will commit ourselves to living on what Dr. James Hansen, the nation’s top climate scientist, has called “a different planet.”¹⁶⁸

The warming that has already occurred, the positive feedbacks that have been set in motion, and the additional warming in the pipeline together have brought us to the precipice of a planetary tipping point. We are at the tipping point because the climate state includes large, ready positive feedbacks provided by the Arctic sea ice, the West Antarctic ice sheet, and much of Greenland’s ice. Little additional forcing is needed to trigger these feedbacks and magnify global warming. If we go over the edge, we will transition to an environment far outside the range that has been experienced by humanity, and there will be no return within any foreseeable future generation. Casualties would include more than the loss of indigenous ways of life in the Arctic and swamping of coastal cities. An intensified hydrologic cycle will produce both greater floods and greater droughts. In the US, the semiarid states from central Texas through Oklahoma and both Dakotas would become more drought-prone and ill suited for agriculture, people, and current wildlife. Africa would see a great expansion of dry areas, particularly southern Africa. Large populations in Asia and South America would lose their primary dry season freshwater source as glaciers disappear. A major casualty in all this will be wildlife.¹⁶⁹

Ruhl states:

A worst-case scenario would have the global community utterly fail to contain greenhouse gas emissions and, as a result, climate change spiraling into chaos for centuries. In that scenario, the FWS might as well pack up its bags and close shop, as climate change will become an unassailable force in ecological reshuffling, overwhelming any management of ecosystems or species. Exercising the ESA, in other words, is pointless in this scenario.¹⁷⁰

But it is clearly not necessary for society to “utterly fail to contain greenhouse gas

167. James Hansen et al., *Target Atmospheric CO₂: Where Should Humanity Aim?* (available at <http://arxiv.org/ftp/arxiv/papers/0804/0804.1126.pdf>).

168. *Id.* at 12; James Hansen et al., *Global Temperature Change*, 103 Proc. Natl. Acad. Sci. 14293, 14293 (2006).

169. James Hansen, *Tipping Point: Perspective of a Climatologist* 9 (available at http://www.columbia.edu/~jeh1/2008/StateOfWild_20080428.pdf).

170. Ruhl, *supra* n. 137, at 58–59.

emissions” in order for the worst-case scenario to occur. We have increased atmospheric greenhouse gas concentrations so much and so rapidly, that anything short of moving to “fundamentally different energy pathway within a decade,”¹⁷¹ and reducing atmospheric carbon dioxide concentrations back to below 350 ppm in short order will lead to climate chaos. Avoiding this scenario will be a challenging undertaking, to say the least, and there is no magic bullet. Rather, we must launch a thousand arrows immediately. Full enforcement of the ESA is a very important, though certainly not the only, arrow to launch. Only by fully implementing the ESA to help avoid rapid and catastrophic climate change can we keep it the strongest and most relevant biodiversity protection statute that the world has ever seen.

In sum, section 7 of the ESA carries with it the mandate to force actual reductions in greenhouse gas emissions because the federal agencies approving the actions responsible for such emissions have a duty to ensure against jeopardizing all listed species. Moreover, even in instances where section 7 ultimately does not result in actual emissions mitigation, it will force climate-informed decision-making on actions affecting listed species, such that these species have greater hope of surviving in a greenhouse world.

b. Section 9 Take Prohibition

While section 7 only applies to federal actions and agencies, the prohibitions of section 9 apply far more broadly, reaching the actions of private entities and corporations. Section 9 prohibits the “take” of endangered species, which includes “harming” and “harassing” listed species in addition to simply killing them directly.¹⁷² Both the legislative history and case law support “the broadest possible” reading of “take.”¹⁷³ Whether cases will be successfully brought against major polluters or groups of polluters pursuant to section 9 remains to be seen.

Global warming is increasing and will continue to increase the number of polar bears that starve and drown—impacts that clearly qualify as “take.” Many other sub-lethal impacts polar bears are currently experiencing and will continue to experience clearly meet the definition of “harm” and “harass.”¹⁷⁴ Temperature-induced bleaching of elkhorn and staghorn corals often results in mortality, and, therefore, also fits within the definition of “take.” The problem is one of causation. While it is clear that global warming is causing prohibited take of listed species, current warming is the product of past emissions. Under the citizen suit provision of the ESA, one can only enjoin ongoing or future take.¹⁷⁵ However, since past take is often the best evidence of the likelihood of future take, an appropriate defendant (or group of defendants) in a section 9 climate case would be an entity that has already contributed measurably to anthropogenic greenhouse gas emissions, and absent regulation, is likely to do so in the future. The utility company

171. Hansen, *supra* n. 169, at 8.

172. 16 U.S.C. § 1538(a).

173. *Babbitt*, 515 U.S. at 704–05.

174. Courts have generally treated “harm” and “harass” as complimentary provisions, with an action found to “harm” a species usually also found to “harass” the species as well.

175. 16 U.S.C. § 1540(g); *Natl. Wildlife Fedn. v. Burlington N. R.R.*, 23 F.3d 1508, 1511 (9th Cir. 1994).

defendants in *Connecticut v. American Electric Power Co.*¹⁷⁶ or any of the major oil companies are responsible for enough greenhouse gas emissions that they individually, and certainly collectively, are the proximate cause of the take of listed species.¹⁷⁷

The section 9 take prohibition, for the most part, applies only to species listed as Endangered.¹⁷⁸ However, section 4(d) of the ESA requires the FWS or NMFS to promulgate regulations applying any of the prohibitions of section 9 to threatened species if such regulations are “necessary and advisable” for the conservation of the species.¹⁷⁹ While the FWS has promulgated a blanket 4(d) Rule applying section 9 to all threatened species,¹⁸⁰ NMFS has not done so. The elkhorn and staghorn corals were listed as threatened rather than endangered. NMFS has yet to promulgate species-specific 4(d) Rules for these species, and therefore, at present, none of the prohibitions of section 9 apply to them. In the 4(d) Rule for the polar bear, the FWS has attempted to exempt greenhouse gas emissions from regulation pursuant to section 9, but as described above, this regulation is currently being challenged.

3. Critical Habitat Designation Must Provide for Global Warming

Most commenters agree on the crucial role that the ESA can play in habitat conservation and management.¹⁸¹ The ESA requires the designation of “critical habitat” for a species concurrently with listing, or in limited circumstances, within a year of listing.¹⁸² Critical habitat is defined as:

(i) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 1533 of this title, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and

(ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 1533 of this title, upon a determination by the Secretary that such areas are essential for the conservation of the species.¹⁸³

As evident from the definition of critical habitat, the ESA explicitly grants the authority to designate areas outside of a species’ current range as critical habitat if those areas are “essential for the conservation of the species.”¹⁸⁴ For many species undergoing rapid range shifts, protection of such areas as critical habitat will be one of the most important regulatory actions that will allow them to persist in a changing climate.

176. 406 F. Supp. 2d 265 (S.D.N.Y. 2004).

177. For a discussion of the application of section 9 to takings resulting from the combined impacts of multiple independent actors, see Federico Cheever & Michael Balster, *The Take Prohibition in Section 9 of the Endangered Species Act: Contradictions, Ugly Ducklings, and Conservation of Species*, 34 *Envtl. L.* 363 (2004).

178. 16 U.S.C. § 1538(a).

179. *Id.* at § 1533(d).

180. 50 C.F.R. § 17.31(a).

181. See e.g. Kostyack & Rohlf, *supra* n.141; Ruhl, *supra* n. 137.

182. 16 U.S.C. § 1533(a)(3)(A), (b)(6)(C). As a practical matter, critical habitat designation rarely happens in the absence of litigation to compel such designation. For an example of tribal action to protect “critical habitat,” see *Nez Perce Tribe v. NOAA Fisheries*, 2008 WL 938430 (D. Idaho Apr. 7, 2008).

183. 16 U.S.C. § 1532(5).

184. *Id.*

The FWS and NMFS have been slow to take changes in species' distribution and habitat that will result from global warming into account when designating critical habitat, but this is beginning to change. Proposals for species including the Quino checkerspot butterfly,¹⁸⁵ and elkhorn and staghorn corals¹⁸⁶ include reference to climate change, though it remains to be seen whether the agencies will correct deficiencies in these proposals.

Critical habitat designations for the two species of butterfly illustrates both that it is eminently feasible to analyze a species' habitat needs in a changing climate and that the failure to designate adequate critical habitat is due to political rather than scientific or practical reasons.

The proposed rule for the Quino checkerspot butterfly refers to studies of the negative impacts of "current climate trends" on similar butterfly species, the documented climate-induced changes that have occurred for the Quino checkerspot, and those that are predicted to occur.¹⁸⁷ The proposed rule includes a discussion of the current and likely habitat needs of the Quino checkerspot butterfly, including climate-induced migration to higher latitudes and elevations and the need for "landscape connectivity to other habitat patches and ecological connectivity"¹⁸⁸ Although the proposed critical habitat includes two new "units," which, *inter alia*, are expected to help prevent against global warming-induced extirpations,¹⁸⁹ the total habitat was drastically cut from a total of 171,605 acres¹⁹⁰ to 59,558 acres,¹⁹¹ with no consideration of the need for ecological connectivity or northern/higher-elevation units in many portions of the range.

The analysis contained in the proposed rule for the Quino checkerspot butterfly exemplifies the potential for reasonable prediction of climate impacts and the corresponding alterations in critical habitat that would be necessary for recovery of the species. Yet adequate implementation is glaringly absent. This suggests that while FWS scientists are fully capable of predicting habitat needs in a changing climate, these needs are being ignored for political reasons. Despite their clear effectiveness, the critical habitat provisions have long been underutilized.¹⁹² The Bush administration has dealt with a string of court orders requiring such designations by consistently minimizing the areas protected.¹⁹³ With removal of the political obstacles, the future is hopeful for critical habitat designations that account for climate change.

Despite the Quino checkerspot butterfly example, numerous other critical habitat designations have failed to make any concessions.¹⁹⁴ In response to public comments

185. 73 Fed. Reg. 3328, 3328–3373 (Jan. 17, 2008).

186. 73 Fed. Reg. 6895 (Feb. 6, 2008).

187. 73 Fed. Reg. 3328, 3331–3332.

188. *Id.* at 3332.

189. *Id.* at 3339.

190. 67 Fed. Reg. 18356, 18364 (Apr. 15, 2002).

191. 73 Fed. Reg. at 3338.

192. Taylor, Suckling & Rachlinski, *supra* n. 164.

193. Greenwald, *supra* n. 113.

194. At least six recent critical habitat designations have failed to address climate change: 73 Fed. Reg. 47326 (Aug. 13, 2008) (northern spotted owl); 73 Fed. Reg. 46988 (Aug. 12, 2008) (Devils River minnow); 73 Fed. Reg. 17762 (Apr. 1, 2008) (Pecos Sunflower); 73 Fed. Reg. 8748 (Feb. 14, 2008) (Peirson's milk-vetch); 73 Fed. Reg. 5920 (Jan. 31, 2008) (tidewater goby); 72 Fed. Reg. 73092 (Dec. 26, 2007) (Bear Valley sandwort, Ash-gray Indian paintbrush, & southern mountain wild-buckwheat).

calling for consideration of climate impacts, in each case the Services claimed that the unpredictability of climate change made habitat planning impossible.¹⁹⁵ This is demonstrably incorrect. As mentioned above, the science is quite clear that there will be increasingly devastating effects with each degree of warming. Furthermore, general regional predictions exist for each area of the Earth.¹⁹⁶

One example of the failure to address climate change is the recent designation of critical habitat for the Bay checkerspot butterfly. In sharp contrast to the analysis contained in the Quino checkerspot proposal, the proposed critical habitat for the Bay checkerspot butterfly completely failed to mention climate change¹⁹⁷ despite scientific studies that have linked the extinctions of two Bay checkerspot butterfly populations to climate change.¹⁹⁸ In response to public comment, the final rule invoked adaptive management as an excuse for failing to include habitat that would allow climate-induced migration.¹⁹⁹ This response simply ignores the scientific reality that additional habitat and habitat connectivity is needed for successful adaptation to a warming world. At some point, adaptive management will become useless if habitat has changed so much that it can simply no longer support a species. Particularly in locations such as the Bay Area that are undergoing rapid habitat conversion due to development, it is imperative proactively to protect lands *now* that will become critical to a species under changing climate conditions in the future. The final rule also claims that the “uncertain” effects of climate change prevent habitat planning for a warming climate.²⁰⁰ As discussed above, however, there do in fact exist ways to reasonably predict future climate and habitat needs at the spatial and temporal scales relevant to the Bay checkerspot. Not only did the final designation fail to include habitat to accommodate climate change, but it actually reduced the habitat by 23 percent from the proposed area.²⁰¹

Climate risks to elkhorn and staghorn corals have been similarly underestimated and ignored. The final critical habitat designation for the elkhorn and staghorn corals,²⁰² issued on November 26, 2008 pursuant to a court ordered settlement agreement, contains the same contorted logic regarding water temperatures as the proposed designation. Ultimately, the courts will likely decide whether and how federal actions resulting in greenhouse emissions “adversely modify” coral critical habitat.

4. *Recovery Plans Must Account for Global Warming*

The ESA also requires the preparation, periodic update, and implementation of recovery plans to outline the steps necessary to conserve each listed species.²⁰³ The first recovery plan to mention global climate change was published in 1990. Recovery plans

195. *Id.*

196. For an overview, see *Climate Change 2007: Impacts, Adaptation and Vulnerability* (Parry et al., eds., Cambridge U. Press 2007) (available at <http://www.ipcc.ch/ipccreports/ar4-wg2.htm>).

197. 72 Fed. Reg. 48178 (Aug. 22, 2007).

198. John F. McLaughlin et al., *Climate Change Hastens Population Extinctions*, 99 Proc. Natl. Acad. Sci. 6070 (2002).

199. 73 Fed. Reg. 50406, 50408 (Aug. 28, 2008).

200. *Id.* at 50416.

201. *Id.* at 50406.

202. 73 Fed. Reg. 72210 (Nov. 26, 2008).

203. 16 U.S.C. § 1533(f).

with such references were sporadic, but issued in most years between 1991 and 1999. Recently the percentage of recovery plans with global climate change references has increased. At least 48 percent of plans issued in all years between 2004 and May 2008 referenced global climate change. Of those that address global climate change, most call for monitoring and/or mitigation. Few call for reductions in global warming or greenhouse gasses. None specify how reductions should be accomplished, either generally or in the context of the ESA (i.e., through section 7 consultation, etc.). As recovery plans for the corals and polar bear are developed, the role of recovery planning in addressing the threat of global warming will likely be the center of significant contention. Similarly, as the FWS and NMFS revise recovery plans for already listed species, these plans must, if they are to withstand legal scrutiny, analyze the effects of global warming on any such species likely to be harmed by such warming and lay out a plan for both mitigation of and adaptation to those threats.²⁰⁴

Finally, the ESA also requires that every five years, the status of all listed species be assessed to determine if they still warrant the protections of the Act, or if a change from Threatened to Endangered status (or the reverse) is warranted.²⁰⁵ Such reviews open the door to the consideration of global warming's effects on all currently listed species, an essential step if they are to survive under even the most optimistic future scenarios for warming.

IV. CONCLUSION

Anthropogenic global warming may bring biodiversity—and society as we know it—to its knees. The effects of increased atmospheric greenhouse gas concentrations have already begun to degrade the habitat on which many species rely. These impacts will only accelerate with increased greenhouse gas concentrations, and we are perilously close to crossing several climate tipping points and triggering accelerated and abrupt climate change.

If the climate system crosses tipping points and reaches a point of no return, it will be impossible to avoid catastrophic results. Further delay in reducing emissions in the face of these physical facts is completely irrational. In light of the Bush administration's obstructionism and Congress's continuing failure to act, we should increase our focus on the enforcement of all existing laws that already regulate greenhouse gas emissions. Certainly, a science-based climate bill that comprehensively reduces greenhouse gases in the U.S. is long overdue. But we cannot afford to wait for a unitary solution, nor should we accept any attempt to eviscerate existing law through a new climate bill. The ESA and other regulatory tools currently available are critically important in the near-term but will also retain their relevance once a federal climate bill is enacted.

The Services have exhibited both their technical ability to address global warming within the context of the ESA and, at the same time, extreme reluctance to comply with the statutory mandate for political reasons. Fortunately, the ESA requires most decisions to be based solely on the best available science and contains strong prohibitions against political interference. The ESA has been our strongest and most successful law for the

204. *Id.*

205. *Id.* at § 1533(c)(2).

protection of plants and animals on the brink of extinction for the past four decades, and if fully implemented to address both the impact of current warming and new greenhouse gas emissions, it will remain strong and relevant in the future. The ESA is one of our most important rapid response mechanisms, and may be our best hope for preserving the rich biodiversity that we take for granted every day.

