

CRITICAL HABITAT DESIGNATIONS UNDER THE
ENDANGERED SPECIES ACT IN AN ERA OF CLIMATE
CRISIS

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Over the coming decades, experts estimate that twenty-five percent of all plant and animal species may go extinct. Climate change directly contributes to species extinction through ecosystem shift, and accelerates other drivers of extinction such as destruction of habitat and pollution. The Endangered Species Act is the only legal tool in the United States to directly protect against the threat of species extinction, and critical habitat designations under the Endangered Species Act provide a way for the government to protect a species’ habitat and preserve biodiversity. Unfortunately, the Trump Administration’s recently promulgated regulations hinder, rather than bolster, federal agencies’ efforts to save endangered species. By severely restricting the designation of critical habitat, the government has suppressed its own ability to respond to the effects of climate change on endangered and threatened species. This Note proposes a definition of the term “habitat” in the Endangered Species Act that comports with current scientific understandings of the term and would allow federal agencies to account for climate change when designating critical habitat. The definition reflects the dynamic and temporally variable nature of species’ habitats, allowing for the designation of currently unoccupied areas that will support species’ existence in the future. This definition would clarify the government’s role in protecting species’ habitats while also complying with the text and purpose of the Endangered Species Act.

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INTRODUCTION

The dusky gopher frog, a spotted, stocky amphibian named for its dark color and tendency to live underground, resides in longleaf pine forests that were once abundant in coastal Alabama, Louisiana, and Mississippi.¹ Unfortunately for the frog, humans have cleared over ninety-eight percent of its habitat for farming, development, and timber plantations,² and it now holds the unhappy distinction of being one of the hundred most endangered species in the world.³ By 2001, when the U.S. Fish and Wildlife Service (FWS) listed the species as endangered under the

1. *Weyerhaeuser Co. v. U.S. Fish & Wildlife Serv.*, 139 S. Ct. 361, 365 (2018).

2. *Id.*

3. Recovery Plan for Endangered Frog Available, U.S. Fish & Wildlife Serv. (Sept. 9, 2015), <https://www.fws.gov/southeast/news/2015/09/recovery-plan-for-endangered-frog-available> [<https://perma.cc/Q9DF-L32F>] (last updated Sept. 19, 2018).

Endangered Species Act (ESA), the frog's wild population had dwindled to a hundred individuals occupying a single pond in Mississippi.⁴ Ten years later, when FWS designated critical habitat for the frog, the agency determined that solely protecting existing areas where the frog lived would not "adequately ensure the frog's conservation" because an extreme weather event or infectious disease could wipe out the whole species.⁵ To combat this risk, FWS also designated private land in Louisiana as unoccupied critical habitat, essential for the species' survival.⁶ The dusky gopher frog had not been seen in this Louisiana area since 1965, but with restoration efforts, FWS felt the land could serve as suitable habitat for the species in the future.⁷ The private landowners, who had hoped to develop the site, sued the government, arguing that their land could not be designated as "critical habitat" for the frog if the frog could not currently live there.⁸

At the end of 2018, the dispute about the dusky gopher frog's habitat had advanced to the Supreme Court as *Weyerhaeuser Co. v. U.S. Fish & Wildlife Service*.⁹ However, in its decision, the Court failed to clarify whether an area must be currently habitable by a species to be designated as "critical habitat."¹⁰ The Court determined only that the ESA "does not authorize the Secretary to designate the area as *critical* habitat unless it is also *habitat* for the species."¹¹ The Court remanded the case to the Court of Appeals for it to interpret the meaning of the word "habitat."¹²

Following the Court's decision, FWS settled with the landowners and entered into a consent decree vacating the designation of the disputed area as critical habitat for the dusky gopher frog.¹³ Therefore, the lower

4. *Weyerhaeuser*, 139 S. Ct. at 365.

5. *Id.* at 366; see also Adam Liptak, *The Dusky Gopher Frog Loses a Round in the Supreme Court*, N.Y. Times (Nov. 27, 2018), <https://www.nytimes.com/2018/11/27/us/politics/supreme-court-gopher-frog.html> (on file with the *Columbia Law Review*).

6. *Weyerhaeuser*, 139 S. Ct. at 366.

7. *Id.*

8. *Id.* at 367.

9. *Id.* at 361.

10. *Id.* at 368–69 (“[T]he statutory definition of ‘critical habitat’ tells us what makes habitat ‘critical,’ not what makes it ‘habitat.’ . . . The court . . . had no occasion to interpret the term . . . Accordingly, we vacate the judgment below and remand . . .”).

11. *Id.* at 368.

12. *Id.* at 369.

13. Consent Decree at 3, *Markle Interests, LLC v. U.S. Fish & Wildlife Serv.*, No. 13-cv-234 (E.D. La. July 3, 2019). The original critical habitat designation for the dusky gopher frog was promulgated during the Obama Administration, but by the time the case had advanced to the Supreme Court, the Trump Administration was in power. The Trump Administration's support for private property rights likely influenced FWS's willingness to settle with the landowners. See Tate Watkins, *After 8 Years of Dusky Gopher Frog Drama, Court Settlement Provides Relief for Louisiana Landowner*, Prop. & Env't Rsch. Ctr. (July 9, 2019), <https://www.perc.org/2019/07/09/after-8-years-of-dusky-gopher-frog-drama-court-settlement-provides-relief-for-louisiana-landowner> [<https://perma.cc/9JPA-ZUF4>].

courts did not interpret the definition of “habitat” in the critical habitat provision of the ESA.

In August 2019, FWS and the National Marine Fisheries Service (NMFS) (together, “the Services”) issued new rules severely weakening protections for endangered species.¹⁴ The regulations pertained in part to critical habitat designations.¹⁵ Though the 2019 regulations leave the term “habitat” undefined, they severely curtail the Services’ ability to designate unoccupied areas as critical habitat for an endangered species, and they make it more difficult for the Services to designate critical habitat in general.¹⁶ The regulations reference *Weyerhaeuser* as support for the new restrictions on critical habitat designations,¹⁷ and are being challenged by two lawsuits, one brought by environmental groups¹⁸ and another brought by state attorneys general.¹⁹ These rules come a few months after the UN released a report showing that within decades, nearly one million species risk extinction.²⁰ In December 2020, the Services supplemented these regulations with a newly promulgated rule specifically defining “habitat” for critical habitat designations.²¹ Like the 2019 regulations, this rule impedes the Services’ capabilities to conserve endangered species by protecting their habitats.

The ESA is the nation’s strongest law protecting endangered species and the often-fragile biodiversity in the United States.²² As climate change rapidly changes environments and puts ever more species at risk, critical habitat designations could serve as an effective tool in the fight to protect

14. Darryl Fears, *New Trump Rules Weaken Wildlife Protections*, Wash. Post (Aug. 12, 2019), <https://www.washingtonpost.com/climate-environment/2019/08/12/new-trump-rules-weaken-wildlife-protections> (on file with the *Columbia Law Review*).

15. Zack Strong, *Critical Habitat: The Next Endangered Species?*, Nat’l Rsch. Def. Council (Sept. 25, 2019), <https://www.nrdc.org/experts/zack-strong/critical-habitat-next-endangered-species> [<https://perma.cc/D3S8-YX4T>].

16. *Id.*

17. *Endangered and Threatened Wildlife and Plants; Regulations for Listing Species and Designating Critical Habitat*, 84 Fed. Reg. 45,020, 45,022 (Aug. 27, 2019).

18. *Second Amended Complaint for Declaratory & Injunctive Relief, Ctr. for Biological Diversity v. Bernhardt*, No. 19-cv-05206 (N.D. Cal. filed June 4, 2020); *Complaint for Declaratory & Injunctive Relief, Ctr. for Biological Diversity*, No. 19-cv-05206 (N.D. Cal. filed Aug. 21, 2019) [hereinafter *Ctr. for Biological Diversity Complaint*].

19. *Complaint for Declaratory & Injunctive Relief, California v. Bernhardt*, No. 19-cv-06013 (N.D. Cal. filed Sept. 25, 2019) [hereinafter *California Complaint*].

20. *World Is ‘On Notice’ as Major UN Report Shows One Million Species Face Extinction*, UN News (May 6, 2019), <https://news.un.org/en/story/2019/05/1037941> [<https://perma.cc/SX5C-W9ZS>].

21. *Endangered and Threatened Wildlife and Plants; Regulations for Listing Endangered and Threatened Species and Designating Critical Habitat*, 85 Fed. Reg. 81,411 (Dec. 16, 2020) (to be codified at 50 C.F.R. pt. 424). Although the timing of this finalized rule precludes an in-depth analysis in this Note, section II.C.4 briefly discusses the rule.

22. Anna T. Moritz, Kassie R. Siegel, Brendan R. Cummings & William H. Rodgers, Jr., *Biodiversity Baking and Boiling: Endangered Species Act Turning Down the Heat*, 44 *Tulsa L. Rev.* 205, 213 (2008).

biodiversity. Instead, the new regulations weaken and flout the ESA's conservation mandate. This Note proposes a definition of the term "habitat" in the ESA that would allow the Services to account for climate change when designating critical habitat and therefore protect land essential for the conservation of endangered and threatened species in the future. This definition, along with more progressive implementation regulations for critical habitat designations, would clarify the Services' role in protecting species' habitats, while also complying with the text and purpose of the ESA and the Court's decision in *Weyerhaeuser*.

Part I provides background and legislative history about the ESA and the role of critical habitat designations within the ESA, and discusses past agency regulations and case law concerning critical habitat designations. Part I also summarizes and addresses the *Weyerhaeuser* decision. Part II discusses the growing threat of mass extinction around the world and the associated need for legal regimes protecting biodiversity. Part II presents examples of ESA agency actions that have taken climate change into account. These examples demonstrate the scientific approach necessary to conserve species endangered by climate change, and Part II contrasts these actions with an analysis of recent regulations crippling the Services' powers under the ESA. Part III argues that "habitat" must be defined broadly in order to allow the Services to fulfill their conservation mandate under the ESA, and proposes a scientifically supported definition of "habitat" that could be adopted by a future administration. This definition and related implementation regulations would allow the Services to make effective and forward-looking critical habitat designations, a necessary step to protect endangered and threatened species in an era of mass extinction. Part III also presents two case studies of species that may soon be listed as threatened or endangered and would benefit from the proposed definition, as climate change will likely cause their habitats to shift in the coming decades. These case studies epitomize the need for a definition of "habitat" that will allow the Services to utilize climate science and modeling in their conservation strategies.

I. CRITICAL HABITAT DESIGNATIONS IN THE PAST AND PRESENT

This Part outlines the basics of the ESA, including legislative history and purpose, and discusses the role of critical habitat designations within the ESA. Section I.A first provides an overview and history of the ESA and critical habitat designations. Section I.A then examines critical habitat-related regulations promulgated by the Services, and discusses the legal and practical implications of critical habitat designations. Section I.B reviews case law interpreting the definition of critical habitat, including *Weyerhaeuser*.

A. *The Endangered Species Act and Critical Habitat Designations*

This section introduces the legislative history and purpose of the ESA and summarizes its main provisions. It then discusses critical habitat designations in the ESA and examines the legal power and practical effect of these designations. In order to carry out their duties under the ESA, the Services promulgate regulations interpreting various aspects of the law and guiding their implementation of the statute. This section tracks the evolution of the Services' view of critical habitat and of their corresponding regulations.

1. *History of the Endangered Species Act.* — The Endangered Species Act of 1973 passed with a level of bipartisan support that stands in stark contrast to the conflict surrounding the ESA today.²³ The national environmental movement of the 1960s fostered widespread support for legislation protecting wildlife, and several predecessor statutes were passed in the years leading up to 1973.²⁴ However, by 1972, many called for stronger protections, including President Nixon, who noted: “[E]ven the most recent act to protect endangered species, which dates only from 1969, simply does not provide the kind of management tools needed to act early enough to save a vanishing species.”²⁵

The final Act passed unanimously in the Senate,²⁶ and President Nixon signed the Act into law on December 28, 1973.²⁷ The Act garnered an impressive level of support for several reasons.²⁸ First, many politicians sought to capitalize on the intense popularity of environmentalism at the time.²⁹ Second, only a few outside groups opposed the Act, such as state fish and game agencies concerned about preemption, and supporters of the fur industry.³⁰ Finally, and perhaps most importantly, there was little recognition of the potentially far-reaching consequences of the various provisions of the Act, as Congress, the media, and the public mostly

23. See Shannon Petersen, Note, Congress and Charismatic Megafauna: A Legislative History of the Endangered Species Act, 29 *Env't L.* 463, 473–76 (1999) (describing a lack of congressional conflict and concern over the passage of the ESA).

24. *Id.* at 467–73, 476. These statutes included the Endangered Species Preservation Act of 1966, the Endangered Species Conservation Act of 1969, and the Marine Mammal Protection Act. *Id.* at 471–73.

25. Special Message to the Congress Outlining the 1972 Environmental Program, 51 *Pub. Papers* 173, 183 (Feb. 8, 1972).

26. Petersen, *supra* note 23, at 476. Only four Congressmen voted against the Act in the House of Representatives. *Id.*

27. Endangered Species Act, Pub. L. No. 93-205, 87 Stat. 884 (1973) (codified as amended at 16 U.S.C. §§ 1531–1544 (2018)).

28. Petersen, *supra* note 23, at 477–83.

29. *Id.* at 477–78.

30. *Id.*

focused on the Act's protection of "charismatic megafauna" such as wolves, cougars, and bald eagles.³¹

The main procedural and substantive requirements of the ESA are set out in Sections 4, 7, and 9 of the Act.³² Section 4 lays out the procedure for "listing" threatened and endangered species.³³ This Section also describes the procedure for a concurrent designation of critical habitat³⁴ and the development of "recovery plans" for each species,³⁵ although the 1973 version of the ESA did not define "critical habitat" or provide direction on how critical habitat designations should be implemented.³⁶ Section 7, titled "Interagency Cooperation," provides that "any action authorized, funded, or carried out" by a federal agency must not "jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species."³⁷ Section 9 prohibits any "take" of an endangered species and also prohibits any transport or sale of an endangered species.³⁸

Private and public lands may be designated as critical habitat under Section 4, although "[o]nly activities that involve a federal permit, license, or funding, and that may affect the area of critical habitat will be affected" by a critical habitat designation under Section 7.³⁹ Although the designation of critical habitat does not in itself halt development in an area, activities such as dam and highway construction and wetland filling often require federal permits, and are thus restricted by Section 7.⁴⁰

31. *Id.* at 478–80.

32. 16 U.S.C. §§ 1533, 1536, 1538 (2018); 1 *The Endangered Species Act at Thirty: Renewing the Conservation Promise* 7–8 (Dale D. Goble, J. Michael Scott & Frank W. Davis eds., 2005).

33. 16 U.S.C. § 1533.

34. This designation of critical habitat is "concurrent" in theory only. The ESA directs the Services to designate critical habitat "to the maximum extent prudent and determinable" when a species is listed as endangered or threatened. 16 U.S.C. § 1533(a)(3)(A). The Services have often failed to designate critical habitat for listed species, claiming that the designation would not be prudent, determinable, or practical due to fiscal restraints. Josh Thompson, *Critical Habitat Under the Endangered Species Act: Designation, Re-Designation, and Regulatory Duplication*, 58 *Ala. L. Rev.* 885, 890–94 (2007). Environmental advocacy groups often sue the Services in an attempt to compel them to designate critical habitat in these situations. *Id.*

35. 16 U.S.C. § 1533(f).

36. Dashiell Farewell, *Revitalizing Critical Habitat: The Ninth Circuit's Pro-Efficiency Approach*, 46 *Env't L.* 653, 661 (2016); Katherine Simmons Yagerman, *Protecting Critical Habitat Under the Federal Endangered Species Act*, 20 *Env't L.* 811, 828–29 (1990).

37. 16 U.S.C. § 1536(a)(2).

38. *Id.* § 1538.

39. *Listing and Critical Habitat: Critical Habitat*, U.S. Fish & Wildlife Serv., <https://www.fws.gov/endangered/what-we-do/critical-habitats.html> [<https://perma.cc/MXZ4K9R>] (last updated Sept. 8, 2020).

40. James Salzman, *Evolution and Application of Critical Habitat Under the Endangered Species Act*, 14 *Harv. Env't L. Rev.* 311, 339 (1990).

2. *Tennessee Valley Authority v. Hill and the 1978 Amendments to the ESA*. — After the passage of the ESA, a few years passed during which “the scope of the ESA remained untested, and the ESA continued to enjoy almost unqualified support.”⁴¹ However, that changed in 1978 with *Tennessee Valley Authority v. Hill*, in which the Supreme Court interpreted the ESA for the first time.⁴²

The case centered around the snail darter, a “three-inch, tannish-colored fish” that was listed as an endangered species in 1975, and the Tellico Dam and Reservoir Project.⁴³ By 1977, more than \$100 million had been spent on the dam’s construction, and the project was three-quarters complete.⁴⁴ However, as noted by the Court, FWS “determined that the snail darter apparently lives only in that portion of the Little Tennessee River which would be completely inundated by the reservoir created as a consequence of the Tellico Dam’s completion,” and therefore that section of the river was designated as “critical habitat” for the snail darter.⁴⁵ Referencing the legislative history and background of the bill, the Court held that “[t]he plain intent of Congress in enacting this statute was to halt and reverse the trend toward species extinction, *whatever the cost*,” and affirmed the circuit court’s decision to enjoin construction on the dam.⁴⁶

The Court’s decision stopped all construction on the Tellico Dam and provoked public outcry to amend the ESA, and Congress set about evaluating and debating critical habitat designations.⁴⁷ The final 1978 amendments, while leaving the Section 7 language intact, restricted the designation of critical habitat in several ways.⁴⁸ First, the amendments added a statutory definition of critical habitat and a cost-benefit analysis to critical habitat designations.⁴⁹ The 1978 amendments define two categories of critical habitat: *occupied* critical habitat, where a species currently lives and “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 *unoccupied* critical

41. Petersen, *supra* note 23, at 484.

42. 437 U.S. 153 (1978).

43. *Id.* at 157–58, 161. The Tellico Dam was “a multipurpose regional development project designed principally to stimulate shoreline development, generate sufficient electric current to heat 20,000 homes, and provide flatwater recreation and flood control, as well as improve economic conditions.” *Id.* at 157 (footnote omitted).

44. Salzman, *supra* note 40, at 317.

45. *Tenn. Valley Auth.*, 437 U.S. at 161–62.

46. *Id.* at 184, 195 (emphasis added).

47. Salzman, *supra* note 40, at 317.

48. *Id.* at 320.

49. *Id.* This cost-benefit analysis marked Congress’s retreat from the objective of protecting species without regard to cost. This weighing of economic effects is only prohibited if the Secretary “determines, based on the best scientific and commercial data available, that the failure to designate such area as critical habitat will result in the extinction of the species concerned.” 16 U.S.C. § 1533(b)(2) (2018).

habitat, where a species does not currently reside.⁵⁰ The statutory definition for “unoccupied” critical habitat, unlike the definition for “occupied” habitat, does not require the presence of essential physical and biological features, but does necessitate that the unoccupied habitat be *essential for the conservation of the species*.⁵¹

The amendments also created an exception to critical habitat designations if the designations were not “prudent”—for example, if a designation would provide too much information to poachers, or if the Services could not determine a species’ habitat.⁵² Instead of solely a scientific assessment, each critical habitat designation was now “a social policy decision.”⁵³

Finally, the 1978 amendments, along with additional amendments in 1979, created an exemption process to allow agencies to override Section 7 of the ESA for specific agency actions,⁵⁴ as well as an “Endangered Species Committee” that has final say in determining whether or not to grant an exemption.⁵⁵ In the case of the Tellico Dam, however, the Committee refused to exempt the project from Section 7 requirements, partly because the dam made no sense economically.⁵⁶ Frustrated lawmakers finally turned to adding a rider on a House appropriation bill to legislatively exempt the Tellico Dam from Section 7, and the dam was completed in 1979.⁵⁷ Happily for the snail darter, several additional natural populations were discovered after the dam’s completion, and the species was reclassified from endangered to threatened in 1984.⁵⁸

50. 16 U.S.C. § 1532(5)(A).

51. *Id.*

52. Salzman, *supra* note 40, at 321.

53. *Id.* at 320.

54. Jared des Rosiers, Note, Exemption Process Under the Endangered Species Act: How the “God Squad” Works and Why, 66 *Notre Dame L. Rev.* 825, 843–45 (1990).

55. 16 U.S.C. § 1536(e). The Committee is commonly referred to as the “God Squad” for its role in determining the future of species. The Committee may grant an exemption upon the determination that:

- (i) there are no reasonable and prudent alternatives to the agency action;
- (ii) the benefits of such action clearly outweigh the benefits of alternative courses of action consistent with conserving the species or its critical habitat, and such action is in the public interest; (iii) the action is of regional or national significance.

Id. § 1536(h). This analysis assumes that there have been no prohibited commitments of resources during the consultation process and that the final action will be mitigated to minimize adverse effects. *Id.*

56. Petersen, *supra* note 23, at 486.

57. *Id.*; see also Energy and Water Development Appropriation Act of 1979, Pub. L. No. 96-69, 93 Stat. 437, 449–50 (codified as amended in scattered titles of the U.S.C.).

58. 50 C.F.R. § 17.11 (2019); see also James D. Williams & Zygmunt Plater, Ctr. for Biological Diversity, Petition to Delist the Snail Darter Under the Endangered Species Act 6 (July 16, 2019), <https://www.biologicaldiversity.org/species/fish/pdfs/Center-Williams-and-Plater-2019-Snail-Darter-Delisting-Petition.pdf> [<https://perma.cc/RB5M-GEAZ>]. While

3. *Critical Habitat Designations and Section 7.* — Section 7 of the ESA prohibits any “adverse modification” to the designated critical habitat of a species.⁵⁹ Section 7 also prohibits agency actions that likely “jeopardize the continued existence of any endangered species or threatened species.”⁶⁰ In the past, considerable debate existed over the difference between the “jeopardy” and “adverse modification” standards, and whether the courts treated the standards differently.⁶¹ By 1986, the Services promulgated regulations that essentially removed the prohibition on adverse modification as a separate consideration from the ESA, by defining adverse modification in terms relating to the “survival” of a species rather than in terms of “conservation” of a species.⁶² Under these regulations, if an agency action adversely modifying critical habitat did not “jeopardize” a species entirely, it would be permissible under Section 7.⁶³

This “crabbed” reading of the adverse modification standard paralleled the low priority the Services placed on designating critical habitat at all during the 1980s and 1990s.⁶⁴ As of early 1992, the Services had designated critical habitat for only sixteen percent of listed species.⁶⁵ In the following years, the Services also declined to designate critical habitat on the basis that a designation would provide no additional benefit to a species.⁶⁶

an endangered species “is in danger of extinction throughout all or a significant portion of its range,” a threatened species “is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” Gray Wolves—Western Great Lakes States: What Is the Difference Between Endangered and Threatened?, U.S. Fish & Wildlife Serv., <https://www.fws.gov/midwest/wolf/history/e-vs-t.html> [<https://perma.cc/3E3W-ETSN>] (last updated Jan. 2, 2020).

59. 16 U.S.C. § 1536(a)(2).

60. *Id.*

61. Compare Oliver A. Houck, *The Endangered Species Act and Its Implementation* by the U.S. Departments of Interior and Commerce, 64 U. Colo. L. Rev. 277, 307–15 (1993) (“At bottom, what the case law illustrates beyond question is that the ESA’s prohibition on modification of critical habitat is interpreted by courts as strong and unyielding; the prohibition on jeopardy is viewed as discretionary and flexible.”), with Salzman, *supra* note 40, at 324–27 (“In practice, however, adverse modification has merged into jeopardy analysis, ceasing to be an independent protection.”), and Chuckie Sullivan, *Adverse Modification of the Endangered Species Act: Regulatory Impediment or Tool*, 12 U. Mass. L. Rev. 166, 173 (2017) (“In the past, the jeopardy and adverse modification definitions were nearly substantively identical.”).

62. Houck, *supra* note 61, at 298–99.

63. *Id.* at 299.

64. *Id.* at 299–301.

65. *Id.* at 302. The Services had avoided designating critical habitat for a large number of these species by determining that the designation of critical habitat would not be “prudent.” From 1980 to 1988, FWS declined to designate critical habitat for 320 species, and stated in 317 of those cases that designation would not be “prudent,” citing reasons such as vandalism, poaching, and tourism. Salzman, *supra* note 40, at 332–33.

66. Houck, *supra* note 61, at 303 (describing a review of Federal Register notices from 1988 to 1992 concerning critical habitat designations). In nearly one-third of the listings

However, in 2001 and 2004, two circuit courts held that the regulations equating the adverse modification and jeopardy standards exceeded the Services' discretion, stating that critical habitat was defined in relation to the "conservation" of a species, rather than the mere survival of a species.⁶⁷ Based on these decisions, the Services discontinued the use of the 1986 definition,⁶⁸ and began designating critical habitat more regularly and broadly.⁶⁹

In 2016, the Services promulgated a new definition of "destruction or adverse modification" that echoed the Fifth and Ninth Circuit decisions.⁷⁰ The regulations define adverse modification as an alteration "that appreciably diminishes the value of critical habitat for the *conservation* of a listed species."⁷¹ These regulations maintained the distinction between "adverse modification" and "jeopardy" originally set out in the ESA, and reflected the Services' expansive critical habitat designations in the previous few years.⁷²

4. *Effectiveness of Critical Habitat Designations.* — A 2012 empirical review of four thousand "biological opinions" prepared by the Services for Section 7 consultations casts some doubt on the effectiveness of critical habitat designations in the consultation process. Biological opinions prepared by the Services have often treated the prohibition against adverse

reviewed, the Services reasoned that there was "no additional benefit/lack of any benefit by designating (including using § 7 to afford adequate protection)." *Id.* at 303 n.178 (internal quotation marks omitted). The Services' view during this time was that "in most circumstances, the designation of 'official' critical habitat is of little additional value for most listed species, yet it consumes large amounts of conservation resources." Endangered and Threatened Wildlife and Plants; Notice of Intent to Clarify the Role of Habitat in Endangered Species Conservation, 64 Fed. Reg. 31,871, 31,872 (June 14, 1999).

67. See *Gifford Pinchot Task Force v. U.S. Fish & Wildlife Serv.*, 378 F.3d 1059, 1070 (9th Cir. 2004) ("Congress, by its own language, viewed conservation and survival as distinct, though complementary, goals . . ."); *Sierra Club v. U.S. Fish & Wildlife Serv.*, 245 F.3d 434, 441–42 (5th Cir. 2001). In *Sierra Club*, the court declared that "[t]he ESA's definition of 'conservation' speaks to the recovery of a threatened or endangered species," and that "[r]equiring consultation only where an action affects the value of critical habitat to both the recovery *and* survival of a species imposes a higher threshold than the statutory language permits." 245 F.3d at 441–42; see also Interagency Cooperation—Endangered Species Act of 1973, as Amended; Definition of Destruction or Adverse Modification of Critical Habitat, 81 Fed. Reg. 7214, 7215 (Feb. 11, 2016).

68. Interagency Cooperation—Endangered Species Act of 1973, as Amended; Definition of Destruction or Adverse Modification of Critical Habitat, 81 Fed. Reg. at 7215–16.

69. Murray Feldman & Bailey K. Schreiber, *Critical Thinking: ESA Critical Habitat's Ongoing Redefinition*, ABA Trends, Nov.–Dec. 2017, at 2, 4.

70. Interagency Cooperation—Endangered Species Act of 1973, as Amended; Definition of Destruction or Adverse Modification of Critical Habitat, 81 Fed. Reg. at 7215–16.

71. Interagency Cooperation—Endangered Species Act of 1973, as Amended; Definitions, 50 C.F.R. § 402.02 (2019) (emphasis added).

72. Feldman & Schreiber, *supra* note 69, at 2, 4.

modification standard “as a redundant add-on to the ESA’s other protective measures,” and the agencies “have consistently treated small-scale habitat degradation as exempt from the adverse modification prohibition, even though no such exemption appears in the ESA itself.”⁷³ However, critical habitat designations have affected a growing number of lawsuits, and these designations also influence negotiations between the Services and other federal agencies.⁷⁴

Critical habitat designations also provide other benefits, such as warning actors about the presence of endangered and threatened species, and providing valuable information that aids the Services in implementing other statutory requirements.⁷⁵ Habitat designations give notice to both public and private actors of the existence of important habitat and potential land use restrictions.⁷⁶ Critical habitat designations may influence development and investment by encouraging developers to avoid designated habitat for their projects in order to bypass the consultation process.⁷⁷ Habitat designations also provide rhetorical value for environmental advocacy groups working to protect natural areas.⁷⁸

Critical habitat designations may also affect Section 9 of the Act, which prohibits the “take” of an endangered species.⁷⁹ ESA case law indicates that a court is more likely to find violations of other sections of the ESA if an action affects designated critical habitat.⁸⁰

73. Dave Owen, *Critical Habitat and the Challenge of Regulating Small Harms*, 64 *Fla. L. Rev.* 141, 146 (2012).

74. *Id.* at 180.

75. *Id.* at 180–81.

76. Farewell, *supra* note 36, at 663; see also Amy Armstrong, *Critical Habitat Designations Under the Endangered Species Act: Giving Meaning to the Requirements for Habitat Protection*, 10 *S.C. Env’t. L.J.* 53, 76 (2002). Interested parties and landowners may not have actual notice of critical habitat designations, but may request a “species list” identifying listed species and critical habitat areas that should be considered for a proposed project. Information for Planning and Consultation, U.S. Fish & Wildlife Serv., <https://ecos.fws.gov/ipac> [<https://perma.cc/8ZP4-RT3D>] (last visited Sept. 28, 2020).

77. Farewell, *supra* note 36, at 663. A recent empirical study measuring the impacts of critical habitat designations for two species “resulted in large and statistically significant decreases in the value of parcels sold.” Maximilian Auffhammer, Maya Duru, Edward Rubin & David L. Sunding, *The Economic Impact of Critical-Habitat Designation: Evidence from Vacant-Land Transactions*, 96 *Land Econ.* 188, 205 (2020).

78. Salzman, *supra* note 40, at 330.

79. 16 U.S.C. § 1538(a) (2018). “The term ‘take’ means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” *Id.* § 1532(19). An action that degrades or modifies undesignated habitat can still result in a “take,” but “actions that impact critical habitat deserve more scrutiny because harm to listed species is likely to result from those actions.” Farewell, *supra* note 40, at 660.

80. Salzman, *supra* note 44, at 330 (noting that courts may be influenced by the “rhetorical power” of critical habitat designations, the existing foundation of information provided by a critical habitat designation, or “the increasing redundancy of section 7 and 9 regulatory standards”); see, e.g., *Palila v. Haw. Dep’t of Land & Nat. Res.*, 649 F. Supp. 1070,

5. *Unoccupied and Occupied Critical Habitat.* — The 1978 amendments to the ESA define two types of critical habitat: occupied and unoccupied.⁸¹ For unoccupied habitat to be designated, it must be “essential for the conservation of the species.”⁸² Prior to 2016, the Services’ implementation regulations provided for the designation of unoccupied habitat only if the designation of occupied habitat alone would not allow for a species’ recovery, greatly restricting the designation of unoccupied habitat.⁸³ In 2016, the Services promulgated new regulations that allowed for occupied and unoccupied habitat to be considered concurrently for designation.⁸⁴ The Services stated that the “rigid step-wise approach” mandated by the previous regulations was “an unnecessary and redundant limitation on the use of an important conservation tool.”⁸⁵

The 2016 regulations gave the Services greater flexibility in designating critical habitat and also allowed for more efficient designations. The changes were particularly important when designating habitat for species affected by climate change and allowed for designations of unoccupied areas “even though the functions the habitat is expected to provide may not be used by the species until a point in the foreseeable future.”⁸⁶

B. *Case Law Addressing the Definition of “Critical Habitat”*

This section examines recent federal cases that evaluate critical habitat designations. After the FWS or NMFS designates (or elects not to designate) critical habitat for a species, a plaintiff may challenge the agency’s action (or lack thereof) in federal court. The courts’ decisions in these cases guide and limit the Services in how they define and determine critical habitat. Section I.B.1 describes recent cases prior to *Weyerhaeuser*, and section II.B.2 discusses the *Weyerhaeuser* Supreme Court decision and the case’s history in the lower courts.

1. *Recent Cases Prior to Weyerhaeuser.* — The federal courts have addressed the definition of critical habitat in several cases since *Tennessee*

1073–77, 1082–83 (D. Haw. 1986), *aff’d*, 852 F.2d 1106 (9th Cir. 1988); *Palila v. Haw. Dep’t of Land & Nat. Res.*, 471 F. Supp. 985, 988–91, 995 (D. Haw. 1979), *aff’d*, 639 F.2d 495 (9th Cir. 1981).

81. 16 U.S.C. § 1532(5)(A); see also *supra* section I.A.2.

82. 16 U.S.C. § 1532(5)(A)(ii). Unlike unoccupied habitat, designated occupied habitat must contain “physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection.” *Id.* § 1532(5)(A)(i).

83. See Listing Endangered and Threatened Species and Designating Critical Habitat; Implementing Changes to the Regulations for Designating Critical Habitat, 81 Fed. Reg. 7414, 7415 (Feb. 11, 2016).

84. *Id.*

85. *Id.* The Services additionally noted that their previous approach could “result in a designation that is geographically larger, but less effective as a conservation tool.” *Id.*

86. *Id.* at 7426.

Valley Authority v. Hill.⁸⁷ One of the most important recent cases to address critical habitat designations is *Alaska Oil & Gas Ass'n v. Jewell*, which examined the critical habitat designation for the polar bear.⁸⁸

FWS listed the polar bear as threatened in 2008, and after extensive litigation, the D.C. Circuit upheld the listing in 2013.⁸⁹ In 2010, FWS designated approximately 187,000 square miles as occupied critical habitat for the polar bear in a final rule.⁹⁰ The district court invalidated two of the three “Units” of designated critical habitat, but the Ninth Circuit reversed this holding.⁹¹ The circuit court held that the ESA did not require the level of specificity that the plaintiffs and the district court demanded, stating that “such a narrow construction of critical habitat runs directly counter to the Act’s conservation purposes.”⁹² The court noted that occupied habitat could be designated “without proof of a species’ activity.”⁹³ The court also held that FWS needed only to rely on the best scientific data available, not the best data possible, stating that the ESA “requires use of the best available technology, not perfection.”⁹⁴ Importantly, the court approved of FWS’s consideration of scientific studies and models predicting the effects of climate change, noting that the D.C. Circuit took the same

87. 437 U.S. 153 (1978).

88. 815 F.3d 544 (9th Cir. 2016). See generally Amy Fudenberg, Note, *Alaska Oil & Gas Ass'n v. Jewell*: The Ninth Circuit Court of Appeals Upholds the Designation of Polar Bear Critical Habitat and Stays True to the Heart of the Endangered Species Act, 30 Tul. Env't L.J. 137 (2016) (overview of the Ninth Circuit's decision).

89. In re Polar Bear Endangered Species Act Listing & Section 4(d) Rule Litig., MDL No. 1993, 709 F.3d 1, 2–3 (D.C. Cir. 2013).

90. *Alaska Oil & Gas*, 815 F.3d at 552. FWS did not designate any unoccupied areas as critical habitat for the polar bear in their final regulations. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Polar Bear (*Ursus maritimus*) in the United States, 75 Fed. Reg. 76,086, 76,091 (Dec. 7, 2010).

91. *Alaska Oil & Gas*, 815 F.3d at 550. The court affirmed the remainder of the district court's holdings, which included the approval of the Unit 1 designation.

92. *Id.* at 555 (“[W]ith respect to terrestrial denning habitat, the [district] court suggested that FWS could designate only areas containing actual den sites, as opposed to designating areas containing habitat suitable for denning. No such limitation to existing use appears in the ESA . . .”).

93. *Id.* at 556. The court cited other cases that had reached similar conclusions. See *Ariz. Cattle Growers' Ass'n v. Salazar*, 606 F.3d 1160, 1165–67 (9th Cir. 2010) (determining that the term “occupied habitat” should be defined “more broadly than merely the area where an individual or species ‘resides’”); *Alliance for the Wild Rockies v. Lyder*, 728 F. Supp. 2d 1126, 1134–35 (D. Mont. 2010) (“While it is rational to conclude areas with evidence of reproduction contain the primary constituent elements and should be designated as critical habitat, the Service could not flip that logic so it means critical habitat only exists where there is evidence of reproduction.”).

94. *Alaska Oil & Gas*, 815 F.3d at 555 (citing *San Luis & Delta-Mendota Water Auth. v. Jewell*, 747 F.3d 581, 602 (9th Cir. 2014)); see also *Bldg. Indus. Ass'n of Superior Cal. v. Norton*, 247 F.3d 1241, 1246–47 (D.C. Cir. 2001) (holding that the ESA requires FWS to use “the best scientific . . . data available, not the best scientific data possible” (internal quotation marks omitted)).

climate science into account when approving the listing of the polar bear.⁹⁵

In *Bear Valley Mutual Water Co. v. Jewell*, the Ninth Circuit upheld FWS's designation of unoccupied critical habitat for the Santa Ana sucker, "a small freshwater fish native to several California rivers and streams."⁹⁶ The court deemed the unoccupied area essential to the conservation of the sucker because it was necessary to provide spawning and feeding ground for the fish and helped to preserve temperature and water quality in the occupied portion of the river.⁹⁷ Thus, the court found that the unoccupied areas met the ESA's statutory definition of unoccupied critical habitat. Although the sucker did not reside in the areas at issue, the areas could still be viewed as part of the species' habitat—functioning as part of the biological setting for the sucker at a broad, landscape level.⁹⁸

A more recent case in the D.C. District Court invalidated FWS's 2012 designation of unoccupied habitat for the Riverside fairy shrimp as arbitrary and capricious.⁹⁹ In this case, the plaintiffs owned property containing "a one-acre vernal pool that was formerly a cattle stock pond and is now home to endangered Riverside fairy shrimp."¹⁰⁰ In 2012, FWS designated the 56 acres surrounding this pool as occupied critical habitat, or alternatively, as unoccupied critical habitat.¹⁰¹ The court rejected both

95. *Alaska Oil & Gas*, 815 F.3d at 558–59 (citing *In re Polar Bear Endangered Species Act Listing & Section 4(d) Rule Litig.*, MDL No. 1993, 709 F.3d 1, 4–6 (D.C. Cir. 2013)).

96. 790 F.3d 977, 978, 981 (9th Cir. 2015). FWS designated unoccupied portions of the Santa Ana River as critical habitat for the sucker because they entailed "the primary sources of high quality coarse sediment for the downstream occupied portions of the Santa Ana River." *Id.* at 994.

97. *Id.* at 993–94 (citing *Endangered and Threatened Wildlife and Plants; Revised Critical Habitat for Santa Ana Sucker*, 75 Fed. Reg. 77,961, 77,972–73, 77,977–78. (Dec. 14, 2010)).

98. See Brief of Amici Curiae Scientists in Support of Respondents at 13–21, *Weyerhaeuser Co. v. U.S. Fish & Wildlife Serv.*, 139 S. Ct. 361 (2018) (No. 17-71), 2018 WL 3375001 ("Habitat is confined neither to those areas currently occupied by species, nor to the current conditions of those areas [Habitat] should be viewed at a landscape scale; may vary in suitability or quality, and this variance itself may change over time") [hereinafter *Weyerhaeuser* Brief of Amici Curiae Scientists].

99. *Otay Mesa Prop., L.P. v. U.S. Dep't of the Interior*, 344 F. Supp. 3d 355, 359 (D.D.C. 2018).

100. *Id.* at 360. Vernal pools are defined by the EPA as "seasonal depressional wetlands that occur under the Mediterranean climate conditions of the West Coast and in glaciated areas of northeastern and midwestern states. They are covered by shallow water for variable periods from winter to spring, but may be completely dry for most of the summer and fall." Vernal Pools, EPA, <https://www.epa.gov/wetlands/vernal-pools> [<https://perma.cc/64KH-ZN2A>] (last visited Oct. 1, 2020).

101. *Otay Mesa*, 344 F. Supp. 3d at 360. FWS had already designated the pool as occupied critical habitat in 1993. *Id.*

the occupied and unoccupied determinations.¹⁰² In dismissing the unoccupied habitat designation, the court found that FWS had not adequately substantiated the finding that the preservation of the area was “*actually* essential to support the Riverside fairy shrimp.”¹⁰³ The court’s holding reflects the high standard imposed by the “essential for the conservation of the species” limitation for unoccupied critical habitat.

2. *Weyerhaeuser and the Case of the Dusky Gopher Frog*. — In 2018, the Supreme Court considered the designation of unoccupied critical habitat for the dusky gopher frog,¹⁰⁴ which was listed as endangered in 2001.¹⁰⁵ In this case, FWS proposed to designate a 1,544-acre site in Louisiana as *unoccupied* critical habitat.¹⁰⁶ Although the frog species had once lived in the Louisiana site (“Unit 1”), the area had since been used as a timber plantation, and no frogs had been seen there since 1965.¹⁰⁷ The site would need restoration for the frogs to live there—“replacing the closed-canopy timber plantation encircling the ponds with an open-canopy longleaf pine forest.”¹⁰⁸ FWS designated the area as unoccupied critical habitat “because its rare, high-quality breeding ponds and distance from existing frog populations made it *essential* for conservation of the species.”¹⁰⁹ The owners of Unit 1 sued FWS, arguing that their land could not serve as critical habitat if the dusky gopher frog could not *currently* survive there.¹¹⁰ The District Court upheld the critical habitat designation,¹¹¹ and the Fifth Circuit affirmed.¹¹² The Fifth Circuit held that “[t]here is no habitability requirement in the text of the ESA or the implementing regulations.”¹¹³

The Supreme Court, in an 8–0 opinion by Chief Justice Roberts, vacated and remanded the Fifth Circuit’s decision.¹¹⁴ While “critical habitat” is defined in the ESA, the Court noted that there “is no baseline definition of habitat . . . [The statute] allows the Secretary to identify the

102. *Id.* at 359. In invalidating the occupied habitat designation, the court noted that the fairy shrimp was not a “mobile species” and therefore could not occupy dry land or isolated pools where they had never been observed. *Id.* at 368–74.

103. *Id.* at 375–77.

104. *Weyerhaeuser Co. v. U.S. Fish & Wildlife Serv.*, 139 S. Ct. 361 (2018).

105. *Endangered and Threatened Wildlife and Plants; Final Rule to List the Mississippi Gopher Frog Distinct Population Segment of Dusky Gopher Frog as Endangered*, 66 Fed. Reg. 62,993 (Dec. 4, 2001).

106. *Weyerhaeuser*, 139 S. Ct. at 366.

107. *Id.*

108. *Id.* at 367.

109. *Id.* at 366.

110. *Id.* at 367.

111. *Markle Interests, L.L.C. v. U.S. Fish & Wildlife Serv.*, 40 F. Supp. 3d 744, 760–62, 769 (E.D. La. 2014).

112. *Markle Interests, L.L.C. v. U.S. Fish & Wildlife Serv.*, 827 F.3d 452, 458 (5th Cir. 2016).

113. *Id.* at 468.

114. *Weyerhaeuser*, 139 S. Ct. at 369.

subset of habitat that is critical, but leaves the larger category of habitat undefined.”¹¹⁵ Using a textualist approach, the Court noted that “[a]ccording to the ordinary understanding of how adjectives work, ‘critical habitat’ must also be ‘habitat,’” and further explained that critical habitat existed as a subset of habitat within Section 4 of the ESA.¹¹⁶ The Court concluded the ESA does not authorize the Services “to designate [an] area as *critical* habitat unless it is also *habitat* for the species.”¹¹⁷ The Court thus vacated the Fifth Circuit’s judgment and remanded the case for the Court of Appeals to interpret the meaning of the word “habitat.”¹¹⁸

However, following the Court’s decision, FWS settled with the landowners and entered into a consent decree vacating the designation of Unit 1 and critical habitat for the dusky gopher frog.¹¹⁹ With the consent decree issued, neither the Services nor the courts were obligated to formally interpret the definition of the term “habitat” in regards to critical habitat designations under the ESA.

II. HABITAT PROTECTION IN AN ERA OF MASS EXTINCTION

This Part discusses the impact of climate change on species’ habitats and the role of critical habitat designations in protecting species imperiled by climate change. Around one million species are now threatened with extinction,¹²⁰ and the federal government should utilize the ESA as a tool to help avoid this devastation. However, uncertainty over the meaning of “habitat” in the ESA after *Weyerhaeuser* and the recent regulations promulgated by the Trump Administration have crippled the Services’ ability to designate critical habitat. Because climate change is currently reshaping, and will continue to reshape, entire ecosystems through changes such as sea level rise and variation in vegetation, designating only currently suitable habitat as critical habitat under the ESA is inefficient and may do little to protect species in the near future. Section II.A discusses the rising threat of mass extinction and threats to biodiversity over the last fifty years,

115. *Id.*

116. *Id.* at 368 (“Section 4(a)(3)(A)(i), which the lower courts did not analyze, is the sole source of authority for critical habitat designations. That provision states that when the Secretary lists a species as endangered he must also ‘designate any *habitat of such species* which is then considered to be critical habitat.’” (emphasis added by the Court) (quoting 16 U.S.C. § 1533(a)(3)(A)(i) (2012))).

117. *Id.*

118. *Id.* at 369.

119. Consent Decree at 3, *Markle Interests, L.L.C. v. U.S. Fish & Wildlife Serv.*, No. 13-cv-234 (E.D. La. July 3, 2019).

120. Intergovernmental Sci.-Pol’y Platform on Biodiversity & Ecosystem Servs., *The Global Assessment Report on Biodiversity and Ecosystem Services: Summary for Policymakers* 11–12 (Manuela Carneiro da Cunha, Georgina M. Mace & Harold Mooney eds., 2019), https://ipbes.net/sites/default/files/2020-02/ipbes_global_assessment_report_summary_for_policymakers_en.pdf [<https://perma.cc/QKC2-PFQZ>] [hereinafter IPBES Summary for Policymakers].

highlighting the need for more progressive critical habitat designations. Section II.B provides an overview of agency actions under the ESA that have taken climate change into account, along with courts' reactions to those actions. The Services have increasingly accounted for climate change in ESA actions, and defining "habitat" broadly would allow the Services to continue this pattern of effective regulations. Finally, section II.C discusses the Services' 2019 regulations relating to critical habitat designations, how those regulations violate the conservation mandate of the ESA, and why the designation of unoccupied habitat is an invaluable tool in protecting species threatened by climate change.

A. *The "Anthropocene" and a New Era of Mass Extinction*

Humanity has so widely affected life on our planet that a number of scientists have pushed to designate our present geological epoch as the "Anthropocene," distinct from the Holocene era, which began approximately 11,700 years ago.¹²¹ Beginning in the mid-twentieth century, "a confluence of major trends—population explosion, new technological advances, and booming rates of consumption—triggered changes that will be unmistakable in geologic records."¹²² As our population grew by over four billion people over the past century, we transformed the environment through our use and manipulation of natural resources, developed nuclear technologies, and exponentially increased the release of carbon into the atmosphere.¹²³

This new era is not without victims: An estimated one million species on Earth are now threatened with extinction.¹²⁴ This is not the first event of this kind on our planet. Over the last 500 million years, five mass extinction events have been so calamitous as to warrant their own category.¹²⁵ In our time, the rate of species extinction has rapidly exceeded

121. See Paul J. Crutzen, *Geology of Mankind*, 415 *Nature* 23, 23 (2002); Colin N. Waters, Jan Zalasiewicz, Colin Summerhayes, Anthony D. Barnosky, Clément Poirier, Agnieszka Gałuszka, Alejandro Cearreta, Matt Edgeworth, Erle C. Ellis, Michael Ellis, Catherine Jeandel, Reinhold Leinfelder, J. R. McNeill, Daniel deB. Richter, Will Steffen, James Syvitski, Davor Vidas, Michael Wagreich, Mark Williams, An Zhisheng, Jacques Grinevald, Eric Odada, Naomi Oreskes & Alexander P. Wolfe, *The Anthropocene Is Functionally and Stratigraphically Distinct from the Holocene*, 351 *Science* aad2622-1, aad2622-1 to -2 (2016); Chris Mooney, *Scientists Say Humans Have Now Brought on an Entirely New Geologic Epoch*, *Wash. Post* (Jan. 7, 2016), <https://www.washingtonpost.com/news/energy-environment/wp/2016/01/07/scientists-say-humans-have-now-brought-on-an-entirely-new-geologic-epoch> (on file with the *Columbia Law Review*).

122. Mooney, *supra* note 121; see also Waters et al., *supra* note 121 at aad2622-2.

123. Mooney, *supra* note 121.

124. IPBES Summary for Policymakers, *supra* note 120, at 12.

125. Elizabeth Kolbert, *The Sixth Extinction?*, *New Yorker* (May 18, 2009), <https://www.newyorker.com/magazine/2009/05/25/the-sixth-extinction> (on file with the *Columbia Law Review*). The worst of these mass extinctions, which took place 250 million years ago, caused ninety percent of marine species and seventy percent of terrestrial species

the “background” or “normal” rate, leading to the conclusion that “[f]rom the perspective of geological time, Earth’s richest biota ever is already well into a sixth mass extinction episode.”¹²⁶ The approximately two hundred species that have disappeared in the last century would normally take up to ten thousand years to go extinct.¹²⁷

As human activity now affects the environment in every part of the world, we cannot escape responsibility for the plethora of other species whose existence we may soon extinguish. As presciently stated by Edward Wilson forty years ago, “The one process ongoing . . . that will take millions of years to correct is the loss of genetic and species diversity by the destruction of natural habitats. This is the folly our descendants are least likely to forgive”¹²⁸ The tools provided by the ESA, such as critical habitat designations, can and should be utilized to fight against this loss of biodiversity. To do so, we should broaden, rather than restrict, the scope of these tools.

1. *Declining Biodiversity and Its Importance in Human Life.* — In May 2019, the UN’s Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) released a landmark global assessment addressing changes in biodiversity over the last fifty years.¹²⁹ The report found that about twenty-five percent of all plant and animal species, or approximately one million species, are threatened with extinction, many within the coming decades.¹³⁰ Even though these losses may not seem to affect most people’s everyday lives, biodiversity plays an important role in

to vanish. *Id.*; see also Brad Plumer, *There Have Been Five Mass Extinctions in Earth’s History. Now We’re Facing a Sixth.*, *Wash. Post* (Feb. 11, 2014), <https://www.washingtonpost.com/news/wonk/wp/2014/02/11/there-have-been-five-mass-extinctions-in-earths-history-now-were-facing-a-sixth> (on file with the *Columbia Law Review*) [hereinafter Plumer, *Five Mass Extinctions*].

126. See Gerardo Ceballos, Paul R. Ehrlich & Rodolfo Dirzo, *Biological Annihilation via the Ongoing Sixth Mass Extinction Signaled by Vertebrate Population Losses and Declines*, 114 *Proc. Nat’l Acad. Scis.* E6089, E6089 (2017); see also Plumer, *Five Mass Extinctions*, *supra* note 125; Tatiana Schlossberg, *Era of ‘Biological Annihilation’ Is Underway*, *Scientists Warn*, *N.Y. Times* (July 11, 2017), <https://www.nytimes.com/2017/07/11/climate/mass-extinction-animal-species.html> (on file with the *Columbia Law Review*). See generally Elizabeth Kolbert, *The Sixth Extinction: An Unnatural History* (2014) (arguing that the planet has entered a man-made, sixth mass extinction).

127. Ceballos et al., *supra* note 126, at E6089.

128. *Endangered Species Act Oversight: Hearings Before the Subcomm. on Env’t Pollution of the S. Comm. on Env’t & Pub. Works, 97th Cong.* 366 (1981) (statement of Edward O. Wilson, Baird Professor of Science, Harvard University).

129. UN Report: *Nature’s Dangerous Decline ‘Unprecedented’; Species Extinction Rates ‘Accelerating’*, UN Sustainable Dev. Goals (May 6, 2019), <https://www.un.org/sustainabledevelopment/blog/2019/05/nature-decline-unprecedented-report> [<https://perma.cc/K473-RSRG>]. The report was compiled by about 150 authors from around the world, with inputs from over 350 additional authors. IPBES Summary for Policymakers, *supra* note 120, at 2.

130. See IPBES Summary for Policymakers, *supra* note 120, at 11–12.

the lives of every species on the planet—including humans. Ecosystems provide invaluable services to people living in rich and poor countries, from mangrove forests providing protection from coastal flooding to the development of new, hardier crops from wild plant varieties.¹³¹ Approximately four billion people rely primarily on natural medicines, and close to seventy percent of drugs used to treat cancer are natural, or synthesized based on natural products.¹³² We rely on animal pollinators to pollinate more than seventy-five percent of global food crops, including fruits, vegetables, coffee, cocoa, and almonds.¹³³

Though destruction of habitat and pollution are the primary drivers of the extinction crisis, climate change exacerbates these factors.¹³⁴ Despite some progress over the last several decades, the IPBES Report notes that current international conservation and sustainability goals cannot be achieved through present trajectories, and that these targets will “only be achieved through transformative changes across economic, social, political and technological factors.”¹³⁵ To achieve this transformational change, the authors of the IPBES Report recommend five main interventions, or “levers,” to address the deterioration of the environment: “(1) incentives and capacity-building; (2) cross-sectoral cooperation; (3) pre-emptive action; (4) decision-making in the context of resilience and uncertainty; and (5) environmental law and implementation.”¹³⁶

The intervention of “strengthening environmental laws and policies and their implementation, and the rule of law more generally,”¹³⁷ is especially important in the United States, where statutes such as the ESA already exist to protect biodiversity. Because climate change directly contributes to species extinction through ecosystem shift, and additionally accelerates the other drivers of extinction, any legal regime protecting biodiversity must take climate change into account. Defining “habitat” in a way that allows the Services to consider the effects of climate change will permit the Services to designate projected habitat for endangered and threatened species and more efficiently protect biodiversity in the United States.

131. Brad Plumer, *To Tell the Story of Biodiversity Loss, Make It About Humans*, N.Y. Times (May 10, 2019), <https://www.nytimes.com/2019/05/10/reader-center/biodiversity-loss-species-extinction.html> (on file with the *Columbia Law Review*).

132. IPBES Summary for Policymakers, *supra* note 120, at 10.

133. *Id.*

134. Schlossberg, *supra* note 126.

135. IPBES Summary for Policymakers, *supra* note 120, at 14 (footnote omitted).

136. *Id.* at 17.

137. *Id.*

B. *Climate Change and the Endangered Species Act*

The ESA is the only legal tool in the United States to directly protect against the threat of species extinction, but fundamental incongruities exist between how the ESA was conceived and the issues presented by climate change.¹³⁸ The ESA was designed to protect species who were endangered by “human physical encroachment on vulnerable species’ habitat,” not the more widespread and ambiguous threats posed by global warming.¹³⁹ However, the ESA is “the nation’s principal species conservation program,” and especially without more far-reaching or comprehensive climate legislation, the Act must be used to address climate-related threats to species.¹⁴⁰ Although the ESA alone may not be able to widely address the effects of climate change, the Services can “use [their] regulatory powers to ‘whittle away’ at the problem.”¹⁴¹ Without a definition of “habitat” that encompasses both currently suitable habitat for a given species and areas projected to become suitable habitat for that species, the Services will be forced to nonsensically ignore climate change effects when designating critical habitat. Promulgating a broad definition of “habitat” would give the Services latitude to consider widely accepted scientific climate models and approach conservation in an efficient, forward-thinking manner.

Over the last ten years, federal courts have upheld the Services’ use and analysis of climate studies and modeling in making listing decisions and designating critical habitat. In the case of the polar bear, two circuit courts approved of FWS’s use of climate science and projections, in both the initial listing decision for the species and for its critical habitat designation.¹⁴² Similarly, in 2016, the Ninth Circuit upheld a NMFS rule listing

138. Barry Kellman, *Climate Change in the Endangered Species Act: A Jurisprudential Enigma*, 46 *Env’t L. Rep. News & Analysis* 10,845, 10,845 (2016).

139. *Id.*

140. See J.B. Ruhl, *Climate Change and the Endangered Species Act: Building Bridges to the No-Analog Future*, 88 *B.U. L. Rev.* 1, 13 (2008) [hereinafter Ruhl, *Climate Change and the ESA*].

141. *Id.* (citing *Massachusetts v. Env’t Prot. Agency*, 549 U.S. 497, 525 (2007)). Indeed, decisions to list species as threatened and endangered, as well as other actions under the ESA, have already begun to take climate change into account. Murray Feldman & Andrew Mergen, Paper No. 9, *The Role of Climate Change in ESA Decisions*, in *Endangered Species Act: Current & Emerging Issues Affecting Resource Development* 9-2, 9-7 to -23 (Rocky Mountain Min. L. Found. ed., 2015); Kellman, *supra* note 138, at 10,848–53.

142. *Alaska Oil & Gas Ass’n v. Jewell*, 815 F.3d 544, 558–59 (9th Cir. 2016) (citing *In re Polar Bear Endangered Species Act Listing & Section 4(d) Rule Litig.*, MDL No. 1993, 709 F.3d 1, 4–6 (D.C. Cir. 2013) (upholding FWS’s use and analysis of climate science studies and reports in designating the polar bear’s critical habitat)); *In re Polar Bear*, 709 F.3d at 15–16 (approving of FWS’s decision to use forty-five years as the term for the “foreseeable future” to determine whether the species was likely to become endangered based on available climate science). The ESA defines a threatened species as “any species which is

two distinct populations of the bearded seal, a sea-ice dependent species, as threatened.¹⁴³ Deferring to the agency’s analysis and interpretation of scientific data, the court noted that “[t]he fact that climate projections for 2050 through 2100 may be volatile does not deprive those projections of value in the rulemaking process. The ESA does not require NMFS to make listing decisions only if underlying research is ironclad and absolute.”¹⁴⁴ In another instance, FWS withdrew a proposed rule listing the wolverine as threatened after political pressure by western states, prompting environmental advocacy groups to sue the agency.¹⁴⁵ Siding with the plaintiffs, the district court invalidated FWS’s withdrawal of the proposed listing, and held that FWS’s decision to discredit previously relied-on climate science was arbitrary and capricious, and that the agency “sought certainty beyond what is required by the ESA and case law.”¹⁴⁶ The decision makes it clear that the Services cannot ignore climate science and models when making ESA listing decisions if the data constitutes the best available science.¹⁴⁷

C. *Undermining the Endangered Species Act Through Regulation*

This section discusses new regulations promulgated by the Services that markedly limit the power of critical habitat designations under the ESA in section II.C.1, and describes the response to these regulations by environmental advocacy groups, Democratic state attorneys general, and Congressional Democrats in section II.C.2. Section II.C.3 then describes how the new regulations violate the text and purpose of the ESA. Section II.C.4 briefly discusses the Services’ definition of “habitat” promulgated in December 2020. Section II.C.5 analyzes why the Trump Administration’s regulations inhibit conservation of endangered species. Although climate change was not contemplated by the authors of the ESA, the ESA’s conservation mandate is clear. The Trump Administration’s ESA regulations contradict the ESA’s “broad purpose of providing comprehensive protection for endangered and threatened species.”¹⁴⁸ By severely restricting the

likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” 16 U.S.C. § 1532(20) (2018).

143. *Alaska Oil & Gas Ass’n v. Pritzker*, 840 F.3d 671, 679–81 (9th Cir. 2016); see also David J. Klein & Jori Reilly-Diakun, Federal Casenote: *Alaska Oil & Gas Ass’n v. Pritzker*, 840 F.3d 671 (9th Cir. 2016), 48 *Tex. Env’t L.J.* 155, 161–62 (2018).

144. *Alaska Oil & Gas*, 840 F. 3d at 680.

145. *Defs. of Wildlife v. Jewell*, 176 F. Supp. 3d 975, 986–97, 1000 (D. Mont. 2016).

146. *Id.* at 1001–05; see also J. Weston Phippen, Great News for Wolverines, and a Lashing for U.S. Fish and Wildlife, *Atlantic* (Apr. 8, 2016), <https://www.theatlantic.com/national/archive/2016/04/wolverines-endangered-species/477591> (on file with the *Columbia Law Review*).

147. 16 U.S.C. § 1533(b) (2018) (“The Secretary shall make determinations [of endangered and threatened species] solely on the basis of the best scientific and commercial data available to him The Secretary shall designate critical habitat . . . on the basis of the best scientific data available . . .”).

148. *Babbitt v. Sweet Home Chapter of Cmty. for a Great Or.*, 515 U.S. 687, 687 (1995).

designation of unoccupied critical habitat and critical habitat in general, and by making it more difficult to prove adverse modification of this protected habitat, the Services have suppressed their own ability to respond to the effects of climate change on endangered and threatened species.

1. *2019 Trump Administration Regulations.* — In August 2019, the Services promulgated final regulations severely weakening protections for endangered species under the ESA, including regulations pertaining to critical habitat designations.¹⁴⁹ Though the 2019 regulations leave the term “habitat” undefined, they curtail the Services’ ability to designate unoccupied area as critical habitat for an endangered species, and make it more difficult to designate critical habitat in general.¹⁵⁰ The regulations reference *Weyerhaeuser* as support for a new requirement that designated unoccupied critical habitat contain “one or more of the physical or biological features essential to the conservation of the species.”¹⁵¹ The Services also return to the two-step approach abandoned in the 2016 critical habitat designations, only allowing for designations of unoccupied habitat where occupied critical habitat designations “would be inadequate to ensure the conservation of the species.”¹⁵² The regulations further narrow the ability to designate unoccupied critical habitat by adding a requirement that there be a “*reasonable certainty* . . . that the area will contribute to the conservation of the species.”¹⁵³

The new regulations additionally give the Services far more leeway in determining whether to designate critical habitat at all, by listing new situations that would make a designation imprudent.¹⁵⁴ Under the prior regulations, the Secretary could find that a designation was imprudent if the designation would give more information to poachers and therefore increase threats to the species, or more generally if the designation “would not be beneficial to the species.”¹⁵⁵ The 2019 regulations, by contrast, keep the first exception but add four more.¹⁵⁶

149. Fears, *supra* note 14; Lisa Friedman, U.S. Significantly Weakens Endangered Species Act, N.Y. Times (Aug. 12, 2019), <https://www.nytimes.com/2019/08/12/climate/endangered-species-act-changes.html> (on file with the *Columbia Law Review*).

150. Strong, *supra* note 15.

151. Endangered and Threatened Wildlife and Plants; Regulations for Listing Species and Designating Critical Habitat, 84 Fed. Reg. 45,020, 45,022 (Aug. 27, 2019).

152. *Id.* at 45,053 (to be codified at 50 C.F.R. pt. 424).

153. *Id.* (emphasis added).

154. *Id.*

155. 50 C.F.R. § 424.12(a)(1) (2017).

156. Endangered and Threatened Wildlife and Plants; Regulations for Listing Species and Designating Critical Habitat, 84 Fed. Reg. at 45,053 (to be codified at 50 C.F.R. pt. 424). Under the new regulations, the Services can determine that a critical habitat designation would not be prudent if:

(ii) The present or threatened destruction, modification, or curtailment of a species’ habitat or range is not a threat to the species, or threats to the species’ habitat stem solely from causes that cannot be

The regulations also weaken the power of critical habitat designations by changing the definition of “destruction or adverse modification” in the Section 7 consultation process, allowing federal actions that may degrade some critical habitat if they don’t damage the habitat “as a whole.”¹⁵⁷ This change cripples the power of the adverse modification standard and allows for “death by a thousand cuts” to species and their habitats.¹⁵⁸

2. *A Response in Congress and the Courts.* — Environmental groups and a coalition of state attorneys general challenged the new regulations in two lawsuits in federal court.¹⁵⁹ Democrats in the House also introduced legislation to overturn the regulations.¹⁶⁰

Earthjustice filed a lawsuit on August 21, 2019 on behalf of multiple environmental groups,¹⁶¹ alleging that the “revised regulations violate the plain language and overarching purpose of the ESA” and lack “any reasoned basis and are arbitrary and capricious under the Administrative

addressed through management actions resulting from consultations under section 7(a) (2) of the Act;

(iii) Areas within the jurisdiction of the United States provide no more than negligible conservation value, if any, for a species occurring primarily outside the jurisdiction of the United States;

(iv) No areas meet the definition of critical habitat; or

(v) The Secretary otherwise determines that designation of critical habitat would not be prudent based on the best scientific data available.

The second new exception is particularly troubling because it absolves the Services of any responsibility if the Section 7 consultation process cannot completely solve threats to a species’ habitat. See Friedman, *supra* note 149; Strong, *supra* note 15. This exception seems particularly targeted toward species suffering from climate change–related endangerment. The preamble to the regulations justifies this exception by arguing that critical habitat designations and the resulting Section 7 consultations cannot ensure habitat protection if a “species [is] experiencing threats stemming from melting glaciers, sea level rise, or reduced snowpack but no other habitat-related threats.” Endangered and Threatened Wildlife and Plants; Regulations for Listing Species and Designating Critical Habitat, 84 Fed. Reg. at 45,042. This exception assumes that because the Services cannot fully halt climate change using the ESA, designating critical habitat for climate-threatened species is pointless—a far cry from the prior regulations encouraging the use of climate modeling for more efficient conservation efforts.

157. Endangered and Threatened Wildlife and Plants; Regulations for Interagency Cooperation, 84 Fed. Reg. 44,976, 45,016 (Aug. 27, 2019) (to be codified at 50 C.F.R. pt. 402) (defining the term as “a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species”).

158. Strong, *supra* note 15.

159. Second Amended Complaint for Declaratory & Injunctive Relief, *supra* note 18; *Ctr. for Biological Diversity* Complaint, *supra* note 18; see also *California* Complaint, *supra* note 19.

160. H.R. 4348, 116th Cong. (2019).

161. *Ctr. for Biological Diversity* Complaint, *supra* note 18 (including plaintiffs such as the Center for Biological Diversity, Defenders of Wildlife, Sierra Club, Natural Resources Defense Council, National Parks Conservation Association, WildEarth Guardians, and Humane Society of the United States).

Procedure Act.”¹⁶² The Complaint also argues that the regulations violate the National Environmental Policy Act.¹⁶³ A coalition of states, along with New York City and the District of Columbia, filed a similar suit approximately a month later.¹⁶⁴

The legislation introduced by congressional Democrats, known as the “Protect America’s Wildlife and Fish in Need of Conservation Act of 2019,” or the “PAW and FIN Conservation Act of 2019,” would void the final rules relating to the ESA promulgated by the Services in August 2019.¹⁶⁵ However, given the election of a new President, an administrative rollback may prove the simplest way to change these regulations.

3. *Contradicting the Purposes of the Endangered Species Act.* — The Administrative Procedure Act instructs reviewing courts to “hold unlawful and set aside agency action, findings, and conclusions found to be . . . arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law” or “in excess of statutory jurisdiction, authority, or limitations, or short of statutory right.”¹⁶⁶ Although agency regulations are accorded deference when the agency exercises an implicit or explicit delegated power from the legislature, agencies cannot adopt regulations that “are arbitrary, capricious, or manifestly contrary to the statute.”¹⁶⁷

The Services’ new regulations violate the ESA’s text and purpose and should therefore be invalidated.¹⁶⁸ The “[c]ongressional findings and declaration of purposes and policy” of the ESA states that the ESA’s purpose is “to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species,” and that congressional policy ensures “that all [f]ederal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this chapter.”¹⁶⁹

162. *Id.* at 3.

163. *Id.* (“[T]he Services failed to consider and disclose the significant environmental impacts from these regulations in violation of the National Environmental Policy Act.”).

164. See *California* Complaint, *supra* note 19; see also Press Release, State Energy & Env’t Impact Ctr., N.Y. Univ. Sch. of L., Eighteen State Attorneys General File Suit Challenging Trump Administration’s Gutting of Endangered Species Act (Sept. 25, 2019), <https://www.law.nyu.edu/centers/state-impact/press-publications/press-releases/esa-law-suit> [<https://perma.cc/H77U-R7FY>]. The plaintiffs presented three causes of action. *California* Complaint, *supra* note 19, at 39, 43, 48.

165. H.R. 4348. The bill was introduced on September 17, 2019, and referred to the Subcommittee on Water, Oceans, and Wildlife of the House Committee on Natural Resources. H.R. Rep. No. 116-469, at 3 (2020).

166. 5 U.S.C. § 706(2)(A), (C) (2018).

167. *Chevron U.S.A. Inc. v. Nat’l Res. Def. Council, Inc.*, 467 U.S. 837, 844 (1984).

168. See *California* Complaint, *supra* note 19, at 39–42.

169. 16 U.S.C. § 1531(b), (c) (2018).

Additionally, Section 7 of the Act provides that all “[f]ederal agencies shall, in consultation with and with the assistance of the Secretary, utilize their authorities in furtherance of the purposes of this chapter by carrying out programs for the conservation of endangered species and threatened species listed pursuant to Section 1533 of this title.”¹⁷⁰ These sections, emphasizing the clear conservation mandate of the ESA, conflict with the 2019 ESA regulations limiting the Services’ authority to protect species.

4. *Definition of “Habitat” Promulgated in 2020.* — In December 2020, the Services augmented their 2019 regulations with a final rule defining “habitat” for the purposes of critical habitat designations.¹⁷¹ Although the timing of this midnight regulation¹⁷² precludes a detailed analysis in this Note, the definition, like the 2019 regulations, unnecessarily diminishes the Services’ power to conserve endangered and threatened species. The rule limits “habitat” to “the abiotic and biotic setting that currently or periodically contains the resources and conditions necessary to support one or more life processes of a species.”¹⁷³ The definition excludes unoccupied habitat that could likely support a species in the foreseeable future because of climate change or after reasonable restoration efforts. Thus, this rule contravenes the purposes of the ESA similarly to the 2019 regulations and inhibits the Services from fulfilling their conservation mandate.

5. *The Necessity of Unoccupied Critical Habitat.* — The definition of critical habitat in the ESA includes both occupied and *unoccupied* habitat.¹⁷⁴ Unoccupied habitat is included in this definition because “Congress recognized that threatened and endangered species may require habitat different from, or in larger area than, currently occupied areas for their populations to survive and recover.”¹⁷⁵ The 2016 rule concerning the definition of critical habitat removed the requirement for the Services to consider occupied habitat before unoccupied habitat, allowing for more efficient designation of critical habitat.¹⁷⁶

170. Id. § 1536(a)(1).

171. Endangered and Threatened Wildlife and Plants; Regulations for Listing Endangered and Threatened Species and Designating Critical Habitat, 85 Fed. Reg. 81,411, 81,421 (Dec. 16, 2020) (to be codified at 50 C.F.R. pt. 424).

172. See Midnight Watch Project, State Energy & Env’t Impact Ctr., N.Y. Univ. Sch. of L., <https://www.law.nyu.edu/centers/state-impact/midnight-watch> [<https://perma.cc/4T3E-PVW6>] (last visited Jan. 1, 2021).

173. Endangered and Threatened Wildlife and Plants; Regulations for Listing Endangered and Threatened Species and Designating Critical Habitat, 85 Fed. Reg. at 81,421.

174. 16 U.S.C. § 1532(5)(A).

175. *Weyerhaeuser* Brief of Amici Curiae Scientists, *supra* note 98, at 21.

176. Listing Endangered and Threatened Species and Designating Critical Habitat; Implementing Changes to the Regulations for Designating Critical Habitat, 81 Fed. Reg. 7414 (Feb. 11, 2016). The preamble to the 2016 rule maintains that “the [ESA] as written allows for sufficient flexibility to address the effects of climate change in a critical habitat

As noted in a recent Special Report by the Intergovernmental Panel on Climate Change (IPCC), climate change has already caused the geographic ranges of multiple species to shift, and will continue to do so over the coming decades.¹⁷⁷ For example, coastal species may be especially affected by sea-level rise, and the ESA implementing regulations should allow the Services to designate these species' habitats flexibly and efficiently. In designating critical habitat for the Florida leafwing and Bartram's scrub-hairstreak butterflies in 2014, FWS designated unoccupied critical habitat in order to implement "[r]eintroduction or assisted migration to reduce the vulnerability of the subspecies to sea level rise and storm surge."¹⁷⁸ These types of designations could be rendered more difficult or impossible if the new ESA regulations are not overturned.

III. PROPOSED REGULATIONS CONCERNING THE DEFINITION OF HABITAT

Although the ESA cannot solely address all extinction threats in our time, a piecemeal approach can still aid in protecting species and should not be abandoned outright. Critical habitat designations are an important part of the ESA toolbox, and the Services should continually adapt their approaches in order to take on contemporary climate change threats. Instead of regulations undermining the Services' capacity to designate critical habitat, a more progressive administration could issue new regulations broadly construing the Services' Section 4 powers.

In *Weyerhaeuser*, the Petitioners argued that in regard to critical habitat designations, "habitat" could not include areas where a species could not currently survive.¹⁷⁹ Respondents countered that "habitat" could include areas, like the land at issue, that "would require some degree of

designation, and, therefore, the clarifications provided in [the Services'] proposal and this final rule do not expand the Services' authority." Id. at 7426.

177. Ove Hoegh-Guldberg, Daniela Jacob, Michael Taylor, Marco Bindi, Sally Brown, Ines Camilloni, Arona Diedhiou, Riyanti Djalante, Kristie L. Ebi, Francois Engelbrecht, Joel Guiot, Yasuaki Hijika, Shagun Mehrotra, Antony Payne, Sonia I. Seneviratne, Adelle Thomas, Rachel Warren & Guangsheng Zhou, Impacts of 1.5°C Global Warming on Natural and Human Systems, in *Global Warming of 1.5°C* 175, 218 (Valerie Masson-Delmotte, Panmao Zhai, Hans-Otto Pörtner, Debra Roberts, Jim Skea, Priyadarshi R. Shukla, Anna Pirani, Willfran Moufouma-Okia, C. Péan, Roz Pidcock, Sarah Connors, J.B. Robin Matthews, Yang Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor & T. Waterfield eds., 2018), https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Chapter3_Low_Res.pdf [<https://perma.cc/9ZP8-F4H8>].

178. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Florida Leafwing and Bartram's Scrub-Hairstreak Butterflies, 79 Fed. Reg. 47,180, 47,188 (Aug. 12, 2014). "Assisted migration" refers to "passively or actively moving species to areas outside their currently occupied ranges." Jaclyn Lopez, Biodiversity on the Brink: The Role of "Assisted Migration" in Managing Endangered Species Threatened with Rising Seas, 39 *Harv. Env't L. Rev.* 157, 158 (2015).

179. *Weyerhaeuser Co. v. U.S. Fish & Wildlife Serv.*, 139 S. Ct. 361, 369 (2018).

modification to support a sustainable population of a given species.”¹⁸⁰ The Court determined that critical habitat must indeed be “habitat,” but went no further.¹⁸¹ The Fifth Circuit had reached a different conclusion, and had not interpreted the term “habitat” in Section 4(a)(3)(A)(i) of the ESA.¹⁸² Accordingly, the Court vacated the Fifth Circuit’s judgement and remanded the question to the lower court.¹⁸³

Because FWS settled with Weyerhaeuser, the lower courts had no occasion to interpret the term “habitat,” and the Services chose not to define the term in their 2019 regulations.¹⁸⁴ That changed in December 2020, when the Services promulgated a final rule defining “habitat” for critical habitat designations.¹⁸⁵ However, if a new administration rolls back this definition and the Services redefine the term “habitat” in future regulations, this definition would be entitled to deference by the courts as long as it was “based on a permissible construction of the statute.”¹⁸⁶

This Part recommends that the Services promulgate a broad definition of the term “habitat” that comports with current scientific understandings of the term. This proposed definition would give the Services more flexibility when designating unoccupied critical habitat, allowing for the designation of land critical to the conservation of species threatened by climate change. Section III.A discusses the scientific concept of habitat and presents a proposed definition of “habitat” that could be adopted by the Services. Section III.B demonstrates how the proposed definition and related implementation regulations would improve conservation efforts and fit within the text and purpose of the ESA. Section III.C concludes by presenting two case studies of species that may soon be listed as threatened or endangered, and would benefit from the proposed definition, as climate change will likely cause their habitats to shift in the coming decades.

A. *A Scientific Understanding of Habitat*

The ESA requires that the Services base their designations of critical habitat on the “best scientific data available.”¹⁸⁷ It follows that the Services’

180. *Id.*

181. *Id.*

182. *Id.* (The Fifth Circuit had held that “‘critical habitat’ designations under the statute were not limited to areas that qualified as habitat”).

183. *Id.*

184. See *Endangered and Threatened Wildlife and Plants; Regulations for Listing Species and Designating Critical Habitat*, 84 Fed. Reg. 45,020, 45,022 (Aug. 27, 2019) (“We note that we do not in the rule attempt to definitively resolve the full meaning of the term ‘habitat.’”).

185. *Endangered and Threatened Wildlife and Plants; Regulations for Listing Endangered and Threatened Species and Designating Critical Habitat*, 85 Fed. Reg. 81,411, 81,421 (Dec. 16, 2020) (to be codified at 50 C.F.R. pt. 424).

186. *Chevron U.S.A., Inc. v. Nat’l Res. Def. Council, Inc.*, 467 U.S. 837, 843 (1984).

187. 16 U.S.C. § 1533(b)(2) (2018).

definition of “habitat” should comport with current scientific understandings of the term. In an amicus brief filed with the Court in *Weyerhaeuser*, fifteen prominent scientists with expertise in biology, ecology, and environmental science made this argument, stating that “[c]ourts and federal agencies should employ a scientific understanding of habitat, not a dictionary definition, to conserve endangered species and fulfill Congress’s mandates under the Endangered Species Act.”¹⁸⁸ These amici curiae note that habitat is neither temporally static nor spatially homogeneous, and state that an organism’s habitat should have the following features: “[I]t should be viewed at a landscape scale; may vary in suitability or quality, and this variance itself may change over time; may not be currently occupied; may be restorable or restored; and may be as-yet unrecognized.”¹⁸⁹

Scientists recognize that plant and animal species exist within ecosystems, which link “organisms with their habitats and the physical conditions, resources, and other interacting organisms in those habitats.”¹⁹⁰ Within these ecosystems, different species engage in ecological processes or “streams,” such as “the dynamics of community succession, the rhythm of natural disturbance, the waxing and waning of predator and prey populations, and the cycling of soil nutrients.”¹⁹¹ The habitats necessary to support these ecological “streams” for each species vary widely over space and time, and thus habitat should be viewed at a broad, landscape scale.¹⁹² Habitats are variable and constantly in flux, and “the landscape view provides the flexibility necessary to respond to the dynamic characteristics of nature.”¹⁹³ Scientists do not typically describe habitats as precise bounded geographical areas at individual points in time, and the Services’ definition of the term within the ESA should reflect this understanding.

B. *Proposed Definition of Habitat*

The Services’ definition of the term “habitat” should match contemporary scientific understanding of the term, comport with the ESA’s plain language, structure, and purpose, and allow the Services greater flexibility in designating critical habitat for species endangered by climate change. This Note proposes the following definition for the term “habitat”: *the physical and biological setting in which organisms live and in which the other components of the environment are encountered; or areas that may reasonably serve as this physical and biological setting in the future, including with restoration or*

188. *Weyerhaeuser* Brief of Amici Curiae Scientists, supra note 98, at 8.

189. *Id.* at 16.

190. Comm. on Sci. Issues in the Endangered Species Act, Nat’l Rsch. Council, Science and the Endangered Species Act 94 (1995).

191. *Id.* at 95.

192. *Weyerhaeuser* Brief of Amici Curiae Scientists, supra note 98, at 15–20.

193. *Id.* at 17.

modification efforts. Much of the language in this definition echoes the description of habitat in *Science and the Endangered Species Act*, a landmark report published by the National Research Council in 1995 that focuses on the science of extinction in relation to the ESA, including a discussion of modern perspectives of habitat.¹⁹⁴ The definition also reflects the dynamic and temporally variable nature of species' habitats, allowing for the designation of areas that will support species' existence in the future. This broad definition of habitat also supports the stated purpose of the ESA: "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, [and] to provide a program for the conservation of such endangered species and threatened species."¹⁹⁵

Simply preserving a narrow area where a species might currently reside or be able to reside will not conserve the varied ecosystems on which species depend, and impedes the ESA's conservation mandate. As noted by the Fifth Circuit, "'Conservation' is a much broader concept than mere survival."¹⁹⁶ Conserving an endangered or threatened species does not simply mean preserving the existing members of that species, but must include a plan for species recovery. The proposed definition of "habitat" will allow the Services to protect areas necessary for the recovery of a species in the future, instead of merely preserving the status quo.

Although this dynamic and temporally variable definition of habitat conforms to current scientific understanding, it will inject uncertainty into the critical habitat designation process if adopted by the Services. The ongoing effects of climate change on a species' environment multiply this ambiguity. However, the preservationist status quo in environmental law must be replaced by a new flexible view of the natural world in order to adapt to the current ecological reality.¹⁹⁷ The ESA itself allows for this flexibility, stating that the Services may revise critical habitat designations "from time-to-time . . . as appropriate."¹⁹⁸ Therefore, in addition to promulgating a new definition for the term "habitat," the Services should modify their approach by more frequently amending habitat designations. This would allow for more accurate habitat boundaries based on evolving climate models. Although agency resources and administrative inertia could impede regular revisions of critical habitat designations, continuous adjustments would reflect a viable strategy of climate change adaptation,

194. Habitat is described in *Science and the Endangered Species Act* as "the physical and biological setting in which organisms live and in which the other components of the environment are encountered." Comm. on Sci. Issues in the Endangered Species Act, supra note 190, at 71.

195. 16 U.S.C. § 1531(b) (2018).

196. *Sierra Club v. U.S. Fish & Wildlife Serv.*, 245 F.3d 434, 441 (5th Cir. 2001).

197. Robin Kundis Craig, "Stationarity Is Dead"—Long Live Transformation: Five Principles for Climate Change Adaptation Law, 34 *Harv. Env't L. Rev.* 9, 16–17 (2010).

198. 16 U.S.C. § 1533(a)(3)(A)(ii).

rather than mitigation.¹⁹⁹ This temporal element of critical habitat designations would better reflect the conservation mandate of the ESA.

C. *A Permissibly Broad Definition?*

In *Weyerhaeuser*, the Court rejected the Fifth Circuit's conclusion that designated critical habitat did not necessarily need to be habitat, stating, "'critical habitat' is the subset of 'habitat' that is 'critical' to the conservation of an endangered species."²⁰⁰ However, the Court also chose not to endorse the Petitioner landowners' definition of habitat—areas that are occupied by a given species, or currently suitable for occupation by the species.²⁰¹ Though the *Weyerhaeuser* Court did not affirm the Petitioners' definition, it represents a narrow reading of the term "habitat" in the ESA.²⁰² This narrow interpretation contrasts with the definition of habitat proposed above, which would allow for the designation of areas encompassing future suitable habitat due to the effects of climate change or human restoration. This Note's proposed definition encompasses a wider range of possibilities and would likely be challenged as too expansive by property rights advocates.

Scholars have previously argued that critical habitat designations could be used to "reserve" areas where endangered and threatened species would likely migrate (naturally, or through "assisted migration"²⁰³) due to the effects of climate change.²⁰⁴ In fact, FWS had adopted a similar approach in previous critical habitat designations.²⁰⁵ However, these

199. See generally Kundis Craig, *supra* note 197 (arguing that mitigation efforts alone are no longer sufficient to address the problems caused by climate change and that an adaptative approach is needed).

200. *Weyerhaeuser Co. v. U.S. Fish & Wildlife Serv.*, 139 S. Ct. 361, 368 (2018).

201. *Id.* at 369.

202. See J. B. Ruhl, *What Is Habitat?*, 34 *Nat. Res. & Env't* 52, 53 (2019) [hereinafter Ruhl, *What Is Habitat*] (describing four scenarios involving potential unoccupied critical habitat designations).

203. See generally Lopez, *supra* note 178, at 157 (arguing that "assisted migration, coupled with preserve and corridor protection and dramatic reductions in greenhouse gas emissions, are necessary for the conservation of imperiled species threatened with sea-level rise").

204. Ruhl, *Climate Change and the ESA*, *supra* note 140, at 36; see also Moritz et al., *supra* note 22, at 231–33.

205. See, e.g., *Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Florida Leafwing and Bartram's Scrub-Hairstreak Butterflies*, 79 Fed. Reg. 47,180, 47,192 (Aug. 12, 2014) ("Reintroduction or assisted migration to reduce the vulnerability of the subspecies to sea-level rise and storm surge requires higher elevation sites that currently are unoccupied by the Bartram's scrub-hairstreak."); *Endangered and Threatened Wildlife and Plants; Revised Critical Habitat for the Preble's Meadow Jumping Mouse in Colorado*, 75 Fed. Reg. 78,430, 78,432 (Dec. 15, 2010) ("[W]e are designating critical habitat units in excess of those recovery populations called for in the Draft Plan to provide resilience, should climate change reduce the value of lower elevation habitats currently occupied by the PMJM.").

arguments and regulations preceded the *Weyerhaeuser* decision. While it was clear at the time that unoccupied critical habitat had to be *essential for the conservation of a species*, the Court had not yet established its “critical habitat must be habitat” limitation.²⁰⁶ It could now be argued that the aforementioned unoccupied critical habitat designations, along with this Note’s proposed definition of habitat, construe “habitat” too broadly given the Court’s somewhat restrictive view in *Weyerhaeuser*.²⁰⁷ But the proposed definition, while broader than the *Weyerhaeuser* Petitioners’ notion of habitat, matches scientific understandings of the term, and gives the Services the flexibility necessary to effectively and efficiently designate critical habitat that will actually contribute to species’ recovery. By doing so, the definition conforms with the purposes and text of the ESA.

1. *A Return to Efficient Critical Habitat Designations.* — This Note’s proposed definition of habitat would allow for a return to implementing regulations for critical habitat designations that conform to the ESA’s conservation mandate. As section I.A.5 discusses, the regulations promulgated by the Services in 2016 adjusted the process for critical habitat designations so that occupied and unoccupied habitat could be designated concurrently.²⁰⁸ Prior to these regulations, the Services followed “a rigid step-wise approach,” only allowing for the designation of unoccupied critical habitat after first designating all occupied critical habitat areas.²⁰⁹ The regulations promulgated by the Trump Administration in 2019 returned to the pre-2016 approach,²¹⁰ and additionally imposed several further restrictions on the designation of critical habitat.²¹¹ While the Services based their 2016 regulations on the most effective practices for species conservation,²¹² the 2019 regulations frustrate the critical habitat designation process and encumber the Services’ attempt to protect and conserve species under the ESA. State attorneys general and environmental groups also reached this conclusion when filing lawsuits challenging the 2019 regulations.²¹³ By promulgating this Note’s proposed definition of “habitat,” the Services would pave the way for a rollback of the 2019

206. See Ruhl, *What Is Habitat*, *supra* note 202, at 53 (“Previously, I argued that such areas could be designated as critical habitat . . . But this argument did not start with the premise that critical habitat is a subset of ‘habitat.’”).

207. See *id.*

208. See Listing Endangered and Threatened Species and Designating Critical Habitat; Implementing Changes to the Regulations for Designating Critical Habitat, 81 Fed. Reg. 7414, 7415 (Feb. 11, 2016).

209. *Id.*

210. See Endangered and Threatened Wildlife and Plants; Regulations for Listing Species and Designating Critical Habitat, 84 Fed. Reg. 45,020, 45,053 (Aug. 27, 2019).

211. See *supra* section II.C.1.

212. See Listing Endangered and Threatened Species and Designating Critical Habitat; Implementing Changes to the Regulations for Designating Critical Habitat, 81 Fed. Reg. at 7415–16.

213. See *supra* section II.C.2.

regulations and a return to the flexible approach to critical habitat designations illustrated by the 2016 regulations. Because this flexible approach takes into account the current and *projected* needs of endangered and threatened species, it conforms to the ESA's mandate to conserve endangered and threatened species, along with the ecosystems upon which they depend.²¹⁴

2. *Limitations Established by the Best Available Scientific Data.* — Although this Note's proposed definition of "habitat" is expansive, critical habitat designations would still be limited by the text of the ESA, which requires the Services to designate critical habitat "on the basis of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impact, of specifying any particular area as critical habitat."²¹⁵ Although the proposed definition would permit the Services to designate critical habitat based on predictions about the future of ecosystems, these predictions would have to be based on the best available scientific data.

Scientific models predict the effects of climate change on the natural environment with varying degrees of accuracy, but courts have upheld the Services' use of widely accepted scientific models in past ESA listing decisions, including models from reports published by the IPCC.²¹⁶ The IPCC regularly prepares Assessment Reports "about the state of scientific, technical and socio-economic knowledge on climate change, its impacts and future risks, and options for reducing the rate at which climate change is taking place."²¹⁷ The IPCC also produces Special Reports when member governments agree on specific topics, including its recent Special Report on Global Warming of 1.5°C, published in 2018.²¹⁸ Federal courts have upheld the Services' use of IPCC climate models, identifying the IPCC Reports as the "best available scientific data."²¹⁹ Courts have ably distinguished between acceptable predictions based on the best available science and predictions deemed to be too remote or speculative.²²⁰ This inherent limitation in the ESA should assure skeptics that this Note's proposed definition of habitat will not allow the Services to designate impermissibly broad swathes of land as critical habitat.

214. 16 U.S.C. § 1531(b) (2018).

215. *Id.* § 1533(b)(2).

216. See *supra* notes 142–147 and accompanying text. The United Nations created the Intergovernmental Panel on Climate Change (IPCC) as a "body for assessing the science related to climate change." The Intergovernmental Panel on Climate Change, <https://www.ipcc.ch> [<https://perma.cc/SP7E-E9QV>] (last visited Oct. 2, 2020).

217. The Intergovernmental Panel on Climate Change, *supra* note 216. The most recent Assessment Report was published in 2013 to 2014, and the next Assessment Report (the sixth such Report) is scheduled to be published in 2021 to 2022. *Id.*

218. *Id.*

219. See *supra* notes 142–147 and accompanying text.

220. See *supra* section II.B.

D. *Habitat Case Studies*

This Note's proposed definition of habitat will allow the Services to consider climate change's effects when designating critical habitat. To demonstrate the importance of these considerations in the designation of unoccupied critical habitat, a discussion of two species' current and projected habitats is presented below. Although these case studies are necessarily limited in scope and analysis, they illustrate the great disparity between a species' currently occupied habitat and projected future habitat. The data presented is taken from a 2019 report produced by the Audubon Society, which determined present-day ranges for 604 species of birds by relating more than 140 million bird records to current environmental conditions.²²¹ Audubon scientists then used climate models for 1.5°C, 2°C, and 3°C of climate change above pre-industrial levels from the IPCC's Fifth Assessment Report to project future ranges for each species.²²² These thresholds were chosen to represent potential future climate trajectories—although the IPCC recommends limiting climate change to 1.5°C, there is high confidence that regardless of mitigation attempts, we will reach this degree of global warming by 2030 to 2052.²²³ The 2°C and 3°C figures represent the likely increases in global mean temperature with varying levels of mitigation action by international governments.²²⁴ The habitats of the two species presented below vary dramatically based on these models of future global warming, so it is imperative that the Services take this information into account for efficient and effective conservation.

1. *Saltmarsh Sparrow*. — A small brown bird with spiky tips on its tail feathers, the saltmarsh sparrow resides in coastal marshes along the Eastern Seaboard.²²⁵ The birds build their nests in grasses near the high

221. Nat'l Audubon Soc'y, *Survival by Degrees: 389 Bird Species on the Brink* 6 (2019), <https://www.audubon.org/sites/default/files/climatereport-2019-english-lowres.pdf> [<https://perma.cc/MV79-QB2D>] [hereinafter Audubon Report].

222. New Audubon Science: Two-Thirds of North American Birds at Risk of Extinction Due to Climate Change, Nat'l Audubon Soc'y (Oct. 9, 2019), <https://ca.audubon.org/press-release/new-audubon-science-two-thirds-north-american-birds-risk-extinction-due-climate-change> [<https://perma.cc/U38C-CU7X>].

223. Audubon Report, *supra* note 221, at 6–7.

224. *Id.* at 7. Based on the policies and international commitments currently in place, the global mean temperature will likely rise 2.9–3.4°C above preindustrial levels by 2100. Zeke Hausfather & Justin Ritchie, *A 3C World Is Now "Business as Usual"*, Breakthrough Inst. (Dec. 18, 2019), <https://thebreakthrough.org/issues/energy/3c-world> [<https://perma.cc/C83X-MTW6>].

225. Guide to North American Birds: Saltmarsh Sparrow, Nat'l Audubon Soc'y, <https://www.audubon.org/field-guide/bird/saltmarsh-sparrow> [<https://perma.cc/SLE7-VX2D>] (last visited Sept. 30, 2020).

point of estuaries along the coast between Maine and Virginia.²²⁶ As sea levels rise due to climate change, the species' saltmarsh habitat is vanishing, and increased tidal flooding threatens the sparrows' nests.²²⁷ Coastal marshes may shift inland into adjacent uplands as sea levels rise, but increased coastal development may prevent this transition from occurring in many locations.²²⁸ FWS undertook a discretionary status review to determine if the saltmarsh sparrow should be listed as threatened or endangered under the ESA, and agreed to make a listing determination by 2019.²²⁹ However, in April 2019, the agency reversed course and announced that it would not review the sparrow for ESA listing until 2023.²³⁰ If the species is listed as endangered or threatened under the ESA, designating critical habitat areas that account for climate change will give the sparrow a greater chance for recovery.

The saltmarsh sparrow depends on specific saltmarsh coastal habitat, and climate change-induced sea level rise permanently consumes this type of habitat.²³¹ Through the end of the century, the sparrow's habitat will likely move inland and northward.²³² The sparrow's range is predicted to transition northward along the coast of Maine to Canada in all three climate models (1.5°C, 2°C, and 3°C). Additionally, coastal areas slightly inland from current habitat in New York, New Jersey, Connecticut, Rhode Island, New Hampshire, and Massachusetts may evolve into suitable habitat, especially at the 1.5°C and 2°C thresholds.²³³ Coastal areas in southern North Carolina where the sparrow does not currently reside may also become acceptable habitat for the species.²³⁴ However, the species is projected to lose large portions of current saltmarsh habitat, especially among the Delaware, Maryland, and Virginia coastline.²³⁵ If FWS only protects current habitat, which may be vulnerable to sea level rise, without

226. Hannah Furfaro, *The Saltmarsh Sparrow Is Creeping Dangerously Close to Extinction*, Nat'l Audubon Soc'y (Aug. 23, 2016), <https://www.audubon.org/news/the-salt-marsh-sparrow-creeping-dangerously-close-extinction> [<https://perma.cc/D2EG-XMPK>].

227. *Conserving South Carolina's At-Risk Species: Species Facing Threats to Their Survival*, U.S. Fish & Wildlife Serv. (Apr. 2019), <https://www.fws.gov/southeast/pdf/fact-sheet/saltmarsh-sparrow.pdf> [<https://perma.cc/8V4J-T62G>].

228. *Id.*

229. *Sharp Tailed Saltmarsh Sparrow Peer Review Plan*, U.S. Fish & Wildlife Serv., https://www.fws.gov/northeast/science/pdf/peerreview/Peer_Review_Plan_sharp_tailed_saltmarsh_sparrow_Final.pdf [<https://perma.cc/TQ2Z-SJLL>] (last visited Sept. 30, 2020).

230. Purbita Saha, *Rapidly Declining Songbird Won't See Federal Protections Anytime Soon*, Nat'l Audubon Soc'y (May 24, 2019), <https://www.audubon.org/news/rapidly-declining-songbird-wont-see-federal-protections-anytime-soon> [<https://perma.cc/8JGQ-JENE>].

231. *Guide to North American Birds: Saltmarsh Sparrow*, *supra* note 225.

232. *See id.* (illustrating the expected effects of climate change on the sparrow's range with a dynamic map).

233. *See id.*

234. *See id.*

235. *See id.*

considering how saltmarsh habitat will evolve, this will do little to help the plight of the saltmarsh sparrow. Instead, FWS should account for the projected effects of climate change, especially sea level rise, to optimize its conservation efforts. FWS could also institute regular revisions of critical habitat designations for this species, taking into account the continually changing geography of saltmarsh coastal habitat.

2. *Lesser Prairie Chicken*. — The lesser prairie chicken is a crow-sized grouse with brown-and-white barred plumage that lives in the southern Great Plains area.²³⁶ Once numbering in the millions, the species has declined to approximately 38,000 birds across less than twenty percent of its original range.²³⁷ In addition to habitat loss from oil and gas development along with farming and ranching, the lesser prairie chicken is also threatened by climate change.²³⁸ Climate forecasts predict that the southern Great Plains will likely “become drier with more frequent extreme heat events and decreased precipitation events.”²³⁹ FWS repeatedly failed to make a listing decision for the lesser prairie chicken after conservation groups petitioned for its protection under the ESA, and in September 2019, the parties entered into a settlement agreement stipulating that FWS must make a listing decision by 2021.²⁴⁰ If the lesser prairie chicken is listed as threatened or endangered, FWS should consider future projections of the bird’s range when designating critical habitat.

Ground temperatures of 130°F mark a critical point past which lesser prairie chicken eggs cannot survive, and climate change is projected to quadruple the number of 100-plus degrees days in the southern Great Plains.²⁴¹ Because of these high temperatures, southern areas of the prairie chicken’s current habitat, especially in northern Texas, eastern New Mexico, and the panhandle of Oklahoma, may become uninhabitable due to hotter and drier conditions.²⁴² The lesser prairie chicken’s habitat will

236. Lesser Prairie-Chicken Identification, Cornell Lab of Ornithology, https://www.allaboutbirds.org/guide/Lesser_Prairie-Chicken/id [<https://perma.cc/5PVA-MA4X>] (last visited Oct. 2, 2020).

237. Lesser Prairie Chickens One Step Closer to Endangered Species Protection, Defs. of Wildlife (Sept. 12, 2019), <https://defenders.org/newsroom/lesser-prairie-chickens-one-step-closer-endangered-species-protection> [<https://perma.cc/9HAZ-QZNF>].

238. *Id.*

239. Blake A. Grisham, Clint W. Boal, David A. Haukos, Dawn M. Davis, Kathy K. Boydston, Charles Dixon & Willard R. Heck, The Predicted Influence of Climate Change on Lesser Prairie-Chicken Reproductive Parameters, *PLOS ONE*, July 2013, at e68225–1, e68225–2.

240. Lesser Prairie Chickens One Step Closer to Endangered Species Protection, *supra* note 237.

241. *Id.*

242. See Guide to North American Birds: Lesser Prairie-Chicken, Nat’l Audubon Soc’y, <https://www.audubon.org/field-guide/bird/lesser-prairie-chicken> [<https://perma.cc/5RS-C-2PUK>] (last visited Sept. 30, 2020) (illustrating the expected effects of climate change on the prairie chicken’s range with a dynamic map).

likely move northward, expanding in eastern Colorado and western Kansas, and even shifting into southern Nebraska. This alteration in suitable habitat will likely occur even with a 1.5°C change, with the species potentially losing thirty-one percent of its current range, but possibly gaining sixty-one percent of its range farther north.²⁴³ If FWS evaluates and designates unoccupied projected future habitat for the lesser prairie chicken, the species will have a greater shot at recovery.

CONCLUSION

The ESA is a controversial statute, pitting the preservation of biodiversity against private property interests. However, as a nation, we must accept responsibility for climate change and our rampant destruction of other species. A scientifically supported definition of habitat and progressive regulations concerning critical habitat designations would serve as important tools to protect biodiversity in the United States. This definition would make it more difficult for the Services to determine the boundaries of critical habitats and necessitate more continuous revisions of designations. However, this approach would better protect species and accord with the climate adaptation strategy that has become a necessary element of environmental protection. Human activity affects every part of the world. Designating only currently habitable areas as critical habitat for endangered species will not only hasten species' demise, but also signal an abdication of responsibility for life on our planet.

243. See *id.* (mapping the prairie chicken's expected habitat gains and losses resulting from a global temperature increase of 1.5°C).

