

**ORAL ARGUMENT NOT YET SCHEDULED**

**No. 23-5285**

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**UNITED STATES COURT OF APPEALS  
FOR THE DISTRICT OF COLUMBIA CIRCUIT**

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CENTER FOR BIOLOGICAL DIVERSITY

*Plaintiff-Appellant,*

v.

UNITED STATES FISH AND WILDLIFE SERVICE, *et al.*

*Defendants-Appellees.*

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**BRIEF OF AMICI CURIAE SCIENTIFIC EXPERTS IN SUPPORT OF  
PLAINTIFF-APPELLANT SEEKING REVERSAL**

(See inside cover for list of amici)

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APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE  
DISTRICT OF COLUMBIA (NO. 1:21-cv-00791-TJK)

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## **CERTIFICATE AS TO PARTIES, RULINGS, AND RELATED CASES**

Pursuant to D.C. Circuit Rule 28(a)(1)(A), the amici curiae Scientific Experts submit this certificate as to parties, rulings, and related cases.

### **A. Parties and Amici**

All parties, intervenors, and amici appearing in this Court are listed in the Opening Brief of the Plaintiff-Appellant the Center for Biological Diversity.

### **B. Rulings under Review**

References to the agency action under review appear in the Opening Brief of the Plaintiff-Appellant the Center for Biological Diversity.

### **C. Related Cases**

There are no related cases within the meaning of D.C. Circuit Rule 28(a)(1)(C) of which undersigned counsel is aware.

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## D.C. CIRCUIT RULE 29(d) STATEMENT

Counsel for amici curiae Scientific Experts certify, pursuant to Circuit Rule 29(d), that a separate brief is necessary to provide the Court with the perspective and expertise held by the scientists. These amici have particular expertise in the American Burying Beetle and/or how climate change impacts vulnerable species, such as the American Burying Beetle, which is directly relevant to the agency action under review. Thus, amici curiae, through counsel, certify that it would not be practicable to file a joint brief.

DATED: August 7, 2024

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## TABLE OF CONTENTS

TABLE OF AUTHORITIES.....	v
STATEMENT OF INTERESTS .....	1
SUMMARY OF ARGUMENT.....	4
ARGUMENT .....	5
I.    FWS’S APPROACH RUNS COUNTER TO THE PURPOSE OF THE ESA.....	5
II.   CLIMATE CHANGE CONSTITUTES A PRESENT, EXISTENTIAL THREAT FOR SPECIES LIKE THE BEETLE THAT WARRANTS LISTING SUCH SPECIES AS ENDANGERED.....	7
A.   Climate Change Encompasses Ongoing and Imminent Impacts for Species Like the Beetle. ....	8
B.   FWS’s Own Evidence Demonstrates That the Effects of Climate Change Are Rapidly Escalating. ....	12
C.   FWS’s Approach Threatens the Genetic Variation of Species, Thereby Limiting Species’ Ability to Survive Climate Change. .....	15
III.  FWS FAILED TO ADEQUATELY CONSIDER THE FULL RANGE OF THREATS CLIMATE CHANGE POSES TO THE BEETLE .....	17
A.   FWS Failed to Recognize the Full Threat of Precipitation Changes in the Final Rule.....	18
B.   FWS Failed to Recognize the Intricacy and Fragility of the Beetle’s Ecosystem. ....	21
IV.  FWS HAS MISCALCULATED IN THE PAST, LEADING TO THE EXTINCTION OF LISTED SPECIES. ....	25
CONCLUSION.....	27
CERTIFICATE OF COMPLIANCE .....	30
CERTIFICATE OF SERVICE .....	31

## TABLE OF AUTHORITIES

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*Tennessee Valley Auth. v. Hill*, 437 U.S. 153 (1978).....4

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<b>Rules</b>	
85 Fed. Reg. 65241 (Oct. 15, 2020).....	4, 5, 6, 7, 8, 9, 12, 15, 19



## STATEMENT OF INTERESTS<sup>1</sup>

Each of the amici have expertise with respect to the American Burying Beetle and/or climate change impacts on vulnerable species. The amici are concerned that FWS has inadequately considered the full range of threats climate change poses to the Beetle. Much of FWS's analysis focuses on temperature projections while overlooking other impacts occurring both now and in the near-term. They wish to inform the Court about whether the threats caused by climate change warrant listing the Beetle as an "endangered species" under the Endangered Species Act (ESA), 16 U.S.C. § 1531 *et seq.*

- Anthony D. Barnosky, Ph.D. — Dr. Barnosky is Professor Emeritus of Integrative Biology at the University of California, Berkeley. He works on understanding the effects of global climate change on mammalian communities and on such ecological metrics as biodiversity. He focuses on understanding past and current planetary changes, and what they mean for forecasting and adapting to changes now underway.
- John Harte, Ph.D. — Dr. Harte is a Professor of Environmental Science, Policy, & Management at the University of California, Berkeley. His research focuses on the effects of human actions on, and the linkages among, biodiversity, ecosystem structure and function, and climate. He studies patterns in species distribution and abundance and the extent to which ecosystem responses to climate change may result in feedbacks that ameliorate or exacerbate global warming.

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<sup>1</sup> All parties have consented to the filing of this brief. Amici file this brief as individuals and not on behalf of the institutions with which they are affiliated. Pursuant to Fed. R. App. P. 29 (a)(4)(E), the undersigned counsel certifies that counsel for amici authored this brief in whole; no counsel for a party authored this brief in any respect; and no person or entity – other than amici and their counsel – contributed monetarily to this brief's preparation or submission.

- William Laurance, Ph.D.— Dr. Laurance is a Distinguished Research Professor at James Cook University in Cairns, Australia, and holds an Australian Laureate Fellowship, one of Australia’s highest scientific awards. His research focuses on the impacts of intensive land-uses on tropical forests and biodiversity. He is also interested in protected areas, climatic change, the impacts of infrastructure on biodiversity, and conservation policy. He has published eight books and over 700 scientific and popular articles.
- Michael C. MacCracken, Ph.D. — Dr. MacCracken has been Chief Scientist for Climate Change Programs with the Climate Institute in Washington DC since 2002. He previously served as chief scientist at the interagency Office of the US Global Change Research Program, serving as its first Executive Director from 1993-97. His previous research included numerical modeling of various causes of climate change. Dr. MacCracken was a co-author/contributing author of various chapters in early Intergovernmental Panel on Climate Change (IPCC) assessments and coordinated the official U.S. Government reviews of its physical science and impacts components of IPCC’s second and third assessment reports.
- Stuart Pimm, Ph.D. — Dr. Pimm is the Doris Duke Professor of Conservation Ecology at Duke University. He is a world leader in the study of present-day extinctions and what can be done to prevent them. His research covers why species become extinct, how fast they do so, global patterns of habitat loss and species extinction, and corresponding management implications. Dr. Pimm has authored over 350 scientific papers and five books.
- Peter H. Raven, Ph.D. — Dr. Raven is one of the world’s leading botanists and biodiversity advocates. Described by *Time* magazine as a “Hero for the Planet,” he advocates for conservation and environmental sustainability and has received numerous prizes and awards, including the U.S. National Medal of Science, the country’s highest award for scientific accomplishment. He was a member of President Clinton’s Committee of Advisors on Science and Technology.
- Terry L. Root, Ph.D. — Dr. Root is Emeritus Faculty at the Stanford Woods Institute for the Environment. She works on how wild animals and plants are changing with climate change, focusing on the possible mass extinction of

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- Amy Smith, Ph.D. — Dr. Smith is a Certified Senior Ecologist through the Ecological Society of America with a Ph.D. in biology from the University of Arkansas. She authored the first management plan for the Beetle, was a peer reviewer for the 2019 Species Status Assessment for the Beetle, provided research expertise for the Beetle’s Conservation Bank, co-developed models to identify its favorable habitats, and has led extensive Beetle population survey teams. She designed survey plans for projects within the Beetle’s range and evaluated documents relating to the Beetle on behalf of the Nebraska Department of Environmental Quality during the Keystone XL project.
- Rosemary Smith, Ph.D. — Dr. Smith is Emerita Professor of Ecology & Science Education at Idaho State University. Her research focuses on the behavior, ecology, and evolution of *Nicrophorus* (Burying Beetles). She has published a dozen peer-reviewed articles on the Beetle and its behavior, which have collectively been cited hundreds of times.
- Robin Verble, Ph.D. — Dr. Verble is Associate Professor of Biological Sciences at Missouri University of Science and Technology and Founding Director of the Ozark Research Field Station. She is a former member of the Texas Prescribed Burn and current member of the Missouri Prescribed Fire Council. She earned her PhD in Applied Biology from the University of Arkansas at Little Rock and was a peer reviewer for the 2019 Species Status Assessment for the Beetle.
- John A. Vucetich, Ph.D. — Dr. Vucetich is Distinguished Professor at Michigan Tech’s College of Forest Resources and Environmental Science. He is an expert in the demographic and genetic elements of population biology. He has authored more than 75 scholarly publications on a range of topics, including extinction risk and population genetics. Dr. Vucetich has been a leading voice on the definition of “endangered species”; his article on that subject was named one of the 14 most important papers in conservation social science by *Conservation Biology* in 2010.

## **SUMMARY OF ARGUMENT**

The ESA was passed in 1973 “to halt and reverse the trend toward species extinction—whatever the cost.” *Tennessee Valley Auth. v. Hill*, 437 U.S. 153, 154 (1978). And, yet, despite acknowledging that at least one climate change impact – the increase of the summer mean-maximum temperature to above 95°F—will result in the extirpation of the American Burying Beetle’s (Beetle) largest population as soon as 2040, the U.S. Fish and Wildlife Service (FWS) reduced ESA protections for the Beetle by downlisting it from endangered to threatened. 85 Fed. Reg. 65241, 65241 (Oct. 15, 2020).

FWS’s analysis gives short shrift to many of the effects of climate change that will negatively impact the species in the near term, including extreme weather events. Moreover, FWS’s decision to downlist the Beetle ignores the stated purpose of the ESA—to conserve and recover species—and the agency’s own urgent call to conserve species before it becomes too late. In 2023 alone, FWS delisted over twenty species because they had gone extinct, in part, due to federal protection arriving too late for successful recovery.

The dangers of delaying protection are more apparent than ever before. As climate change drives countless species closer to extinction, its harms are rapidly escalating from a future risk to a present reality. To downplay these dangers until a

species is already extirpated cements the devastating ecological consequences that passage of the ESA sought to avoid.

## ARGUMENT

### **I. FWS’S APPROACH RUNS COUNTER TO THE PURPOSE OF THE ESA.**

The ESA was passed “to provide a program for the conservation of . . . endangered species and threatened species.” 16 U.S.C. § 1531(b). In the case of the Beetle, FWS has taken the untenable position that the Southern Plains—the largest remaining range of the Beetle, representing 59 percent of its current range—will not be in danger of extinction until 2040, the same point at which FWS has determined the Beetle will be extirpated from that portion of its range. 85 Fed. Reg. at 65255–56. Such an approach runs directly counter to the ESA’s stated goals and severely lessens the likelihood that the Beetle will successfully recover.

For an imperiled species to receive protection under the ESA, it must first be designated as either endangered or threatened. *See* 16 U.S.C. § 1533(a)(1). The ESA provides that a species is endangered when it “is in danger of extinction throughout all or a significant portion of its range.” *Id.* § 1532(6). By contrast, a species qualifies as threatened when it is “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” *Id.* § 1532(20). In its Final Rule downlisting the Beetle, FWS identified the

“foreseeable future” as a mid-century period, representing the years 2040 through 2069. 85 Fed. Reg. at 65256.

The ESA defines conservation as “the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary.” 16 USC §1532(3). The Act is thus designed to foster the recovery of listed species, with the goal of eventually delisting them. FWS asserts that the Beetle is likely to become endangered within the foreseeable future, 85 Fed. Reg. at 65241, but at the same time acknowledges that the Beetle is likely to be extirpated throughout the Southern Plains portion of its range in *this very same time period*, *id.* at 65256. By equating the point at which a species will become endangered with the point at which it will become extirpated throughout nearly 60% of its range, FWS has violated the ESA and eliminated the possibility of recovering the Beetle in the largest remaining portion of its range. FWS’s approach leaves room for little more than the preservation of lone survivors, far from its stated goal to conserve and recover the species. *See* 16 U.S.C. § 1531(b) (establishing the goal of the ESA “to provide a program for the conservation of such endangered species and threatened species.”).

Such approach ignores the reality of species recovery. Recovery is typically a lengthy process. *See* U.S. GAO, *Endangered Species: Many Factors Affect the*

*Length of Time to Recover Select Species 3* (2006) (explaining that recovery time for endangered species can take more than a century). FWS’s approach means that, illogically, a species cannot benefit from the full protections of the ESA, and consequently the recovery process cannot truly begin in earnest, until the species has already been eradicated from a significant portion of its range. This is of particular concern with species, like the Beetle, for which many reintroduction efforts have previously been unsuccessful, making the conservation of existing populations all the more vital to the survival of the species. *See* U.S. GAO, *Endangered Species Act: U.S. Fish and Wildlife Service’s American Burying Beetle Conservation Efforts 36* (2016) (explaining that FWS has unsuccessfully attempted to reintroduce the Beetle to Ohio since 1998).

**II. CLIMATE CHANGE CONSTITUTES A PRESENT, EXISTENTIAL THREAT FOR SPECIES LIKE THE BEETLE THAT WARRANTS LISTING SUCH SPECIES AS ENDANGERED.**

In downlisting the Beetle, FWS acknowledged that the species is “currently experiencing the effects of climate change.” 85 Fed. Reg. at 65256. Nevertheless, FWS concluded that the Beetle was not endangered because “the bulk of the impact from climate change to these analysis areas occur[s] in the future[.]” *Id.* Contrary to the government’s position, the effects of climate change will not suddenly endanger species like the Beetle once an average temperature threshold is surpassed. Rather, the best available science shows that a variety of climate change

impacts, including extreme weather events and consequent habitat loss, are ongoing and intensifying so quickly that the Beetle will face extinction in all or a significant portion of its range within mere years. FWS must accurately account for the *current and ongoing* threat that climate change poses when determining whether such species are presently “in danger of extinction” and warrant listing as an endangered species.

**B. Climate Change Encompasses Ongoing and Imminent Impacts for Species Like the Beetle.**

As the 2023 U.S. National Climate Assessment emphasizes, “climate change is not just a problem for future generations, it’s a problem today.” Kate Marvel et al., *Ch. 2. Climate Trends, in Fifth National Climate Assessment* 2-16 (A.R. Crimmins et al. eds., 2023) (capitalization altered). Despite this urgency, FWS’s decision effectively skips the “today” timeframe: FWS accounts for past negative impacts to the instant of downlisting in 2020 and future ones from 2040 onwards, but largely ignores the twenty years of increasingly severe climate impacts in between. *See* 85 Fed. Reg. at 65256. Doing so downplays the dangers that species like the Beetle are currently facing.

Record-shattering climatic events indicate that the planet is already amid a rapidly intensifying crisis. These climatic events “will continue to intensify over the next decade.” Alexa K. Jay et al., *Ch. 1. Overview: Understanding Risks, Impacts, and Responses, in Fifth National Climate Assessment* 1-20 (A.R.



Crimmins et al. eds., 2023). Indeed, while FWS attempts to relegate climate change to a “foreseeable future” danger, the U.N.’s World Meteorological Organization recently declared it was “sounding the Red Alert” due to present-day climate change impacts. *Climate Change Indicators Reached Record Levels in 2023: WMO*, World Meteorological Organization (Mar. 19, 2024), <https://wmo.int/news/media-centre/climate-change-indicators-reached-record-levels-2023-wmo>. The 2023 global average near-surface temperature already reached just .05°C below the global warming threshold established by the 2015 Paris Agreement, *id.*, heralding the potential for massive detrimental impacts on vulnerable species and their habitats.

The effects of the increase in global average temperature are already apparent in species’ habitats. For instance, in the Southern Great Plains, the region where the Beetle faces the greatest climate-related risks, “[d]rier conditions [that] threaten...ecosystems” and “[e]xtreme heat and high humidity” rank among the “critical impacts expected...between now and 2030.” Jay et al., *supra*, at 1-20–21. Nonetheless, FWS treats the impacts of climate change like an on/off switch, failing to account for adverse effects until the moment they preclude a species’ survival. 85 Fed. Reg. at 65256. Such characterization ignores the reality of the current, and swiftly escalating, impacts of climate change.

The world is already experiencing rising risks from catastrophic weather events: compared to an average of “one (inflation-adjusted) billion-dollar weather disaster every four months” during the 1980s, the U.S. now experiences one “every three weeks.” Marvel et al., *supra*, at 2-4. Among recent catastrophes, a 2023 marine heatwave caused unprecedented bleaching of Florida coral reefs, with “cumulative heat stress...nearly triple the previous record.” Haley Thiem, *NOAA Employs Climate Adaptation and Resilience Techniques to Save Florida Corals From This Summer’s Record-Long Marine Heat Wave*, NOAA Climate.gov (Sept. 26, 2023), <https://www.climate.gov/news-features/event-tracker/noaa-employs-climate-adaptation-and-resilience-techniques-save-florida>. Other climate-related disasters include Hurricane Harvey, during which rainfall was “about 15%-20% heavier” due to human-caused warming, and “the record-breaking [2021] Pacific Northwest heatwave”, made 2 to 4 degrees hotter by climate change, which “led to widespread die-offs of...marine organisms.” Marvel et al., *supra*, at 2-4. Whereas FWS’s approach ignores such catastrophic dangers, the government’s own National Climate Assessment underscores their significance: “[r]ising temperatures and intensifying extreme events are reducing biodiversity” and “harming the health and resilience of ecosystems.” Jay et al., *supra*, at 1-30–31. In fact, an increase in days of dangerous extreme heat, referred to as the health heat index, can be even more dangerous to species than an increase in average temperature. *See* Sonia I.

Seneviratne et al., *Weather and Climate Extreme Events in a Changing Climate*, in *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* 1513, 1535 (V. Masson-Delmotte et al. eds., 2021); Cristian Román-Palacios & John J. Wiens, *Recent Responses to Climate Change Reveal the Drivers of Species Extinction and Survival*, 117 PNAS 4211, 4211 (2020). A recent study of 538 plant and animal species found that “extinctions occurred at sites with smaller changes in mean annual temperatures but larger increases in hottest yearly temperatures.” Román-Palacios & Wiens, *supra* at 4211.

Further climatic change portends severe consequences for vulnerable species: “[d]egradation and extinction of local flora and fauna in vulnerable ecosystems like coral reefs and montane rainforests are expected in the near term.” Jay et al., *supra* at 1-31. Absent dramatic changes in carbon consumption, climate change “will very likely initiate extinction of many terrestrial and marine species, beginning by mid-century.” Anthony D. Barnosky, *Transforming the Global Energy System is Required to Avoid the Sixth Mass Extinction*, 2 MRS Energy & Sustainability 1, 1 (2015) (hereinafter “Barnosky 2015”). FWS’s depiction of climate change impacts as largely occurring in the “foreseeable future” ignores the significant dangers currently faced by the many species at risk of near-term extinction.

Even if “the bulk of the impact from climate change,” occurs in the future, 85 Fed. Reg. at 65256, that future is not restricted to the point at which a significant portion of a species’ range becomes uninhabitable; it also encompasses the record-shattering temperatures, unprecedented heatwaves, and precipitation extremes preceding that point. By considering climate change only when models project that a species’ average conditions will be unlivable, FWS ignores the reality that the species must survive all the weather extremes bound to occur before then. Disregarding such imminent dangers runs the risk that species like the Beetle will be decimated by climate change long before FWS ever accounts for its impacts.

**C. FWS’s Own Evidence Demonstrates That the Effects of Climate Change Are Rapidly Escalating.**

Collectively, the ongoing and intensifying impacts of climate change on the Beetle cannot be understood as an on-off switch. Based on FWS’s own findings, Beetle populations will not remain in their current state then vanish once a designated temperature threshold is surpassed. Rather, *during* the early century timeframe, i.e., the timeframe the Beetle is currently in, the Southern Plains population faces a series of persistent dangers that will erode its resilience and fuel major population declines. FWS’s failure to meaningfully account for the threats the Beetle faces between the instant of downlisting and that of its projected extirpation belies the reality of how a climate change-induced extirpation is likely to unfold.

FWS’s own analysis shows that rising temperatures *already* imperil the Beetle. *See* Species Status Assessment for the American Burying Beetle (2019) (“Status Assessment”). U.S. Fish and Wildlife Service Administrative Record at 1484 (hereafter FWS\_\_\_). According to FWS, the Beetle likely cannot survive where the summer mean-maximum temperature — i.e. the average of all daily highs from June, July, and August — regularly exceeds 95°F. *See* FWS1479. Yet, nearly all of the Southern Plains areas are projected to experience temperatures above or alarmingly close to this threshold *during* the early century timeframe (2010–2039). *See* FWS1484, 1488 (projecting summer mean-maximums of 95.8–96.1°F for the Red River Analysis Area, and 94.67–95.08°F for the Arkansas River Analysis Area, averaged over 2010 through 2039); FWS1489 (projecting that 77–96% of the Flint Hills Analysis Area will reach summer mean-maximums of 94°F by 2039). Moreover, since models capture only averages, some years will be hotter, pushing temperatures past the 95°F threshold. *See* Stuart L. Pimm, *Climate Disruption and Biodiversity*, 19 *Current Biology* R595, R596 (2009) (“Averages hide extremes, and extreme, local events can be what drive the important ecological...changes.”). Finally, the Beetle likely struggles to survive even below 95°F: Beetles have failed to reproduce or died amid sustained temperatures of 85–90°F. *See* FWS1415; *see also id.* at FWS1376 (“even small increases in temperature can affect reproduction”). Because summer temperatures will be near

or above 95°F in much of the Beetle’s range *within* the next fifteen years and the Beetle risks death and impaired reproduction even below that threshold, FWS’s own evidence shows that climate threats to the Beetle are a serious present danger.

A nocturnal species, the Beetle also likely experiences limited to no reproduction on “stressful nights”, defined as having temperatures above 75°F. *Id.* at 86. “Nighttime temperatures are rising faster than daytime temperatures,” Marvel, *supra*, at 2-18, adding further urgency for the Beetle. All Southern Plains locations already witnessed “significantly more stressful nights” from 1999 to 2015. FWS1417-18. On average during the next two decades, they are projected to experience stressful nights at rates at least six times higher than during 1981–1997. FWS1418-19, 1495. These harms demonstrate the imminent danger climate change poses.

Corresponding to these impacts, populations are swiftly declining. The Beetle has not been found in the Red River Analysis Area’s Texas or Arkansas portions in over a decade, suggesting its climate-induced extirpation has already begun. *See* FWS1404, 1484. Furthermore, FWS’s Status Assessment recognizes the Beetle’s status in all three Southern Plains analysis areas as either low or zero “resilience” — FWS’s primary measure of population health, based on the ability to survive despite environmental change — *during* the early century timeframe. *See* FWS1488. This projection underscores the paradoxical nature of FWS’s

decision: the agency invoked the Beetle's moderate to high resiliency as of 2019 to disavow present danger to the Beetle, *see* 85 Fed. Reg. at 65254, but its own findings predict that resiliency in the Southern Plains analysis areas will decline at any moment now.

Thus, FWS's own science shows why climate change cannot be relegated to the "foreseeable future": the Beetle has already begun to face the climatic changes that will cause its extirpation in the Southern Plains as soon as fifteen years from now, and these dangers will grow throughout that timeframe. *See* FWS1488. Because climate change, combined with the other threats to the species, is already threatening the Beetle's near-term survival, the Beetle is presently "in danger of extinction." 16 U.S.C. § 1532(6).

**D. FWS's Approach Threatens the Genetic Variation of Species, Thereby Limiting Species' Ability to Survive Climate Change.**

FWS's approach also threatens species' long-term survival by ignoring the need to preserve genetic variation within populations, which is vital to species' ability to adapt, especially in the face of climate change. As Dr. Pimm explains: "Small populations become inbred, inbreeding tends to reduce growth rate, and a reduced growth rate in turn may be expected to increase extinction. Moreover, species that have lost genetic variability may be less able to exploit new ecological opportunities." Stuart L. Pimm, *The Balance of Nature? Ecological Issues in the Conservation of Species and Communities* 165 (1991). In other words, as climate

change leads to ecological changes, a lack of genetic variability will impede species' ability to adapt, and thus survive. If FWS refuses to consider a species as endangered until the moment of extirpation, it acquiesces to the loss of individuals and populations that could have supplied important genetic variability to the species. “[I]t is not the disappearance of the last individual of a species that guarantees a species is extinct; rather, it is falling below some critical number of individuals. In this sense, extinction is cryptic; long before the last individual disappears, the species can become a ‘dead species walking.’” Barnosky 2015, *supra* at 4.

Meanwhile, the speed of climate change is actively outpacing that at which many species can naturally adapt. *See, e.g.,* Camille Parmesan, *Ecological and Evolutionary Responses to Recent Climate Change*, 37 *Ann. Rev. Ecology, Evolution, & Systematics* 637, 656–57 (2006) (finding “no evidence for change in the absolute climate tolerances” of species and explaining that “there is little evidence that observed genetic shifts are of the type or magnitude to prevent predicted species extinctions.”); Douglas Lipton et al., *Ecosystems, Ecosystem Services, and Biodiversity, in Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* 274 (2018) (because “rapid environmental changes can exceed the ability of species to track them,” “evidence to date suggests that evolution will not fully counteract negative effects of climate



change for most species.”). Many species try to “shift their geographical distributions as though tracking the changing climate, rather than remaining stationary and evolving new forms.” Parmesan, *supra* at 655. However, human barriers to dispersal and lack of available suitable habitat hinder such species’ ability to shift their ranges. Thus, FWS’s approach is highly problematic as it removes the window of opportunity for active management and recovery efforts at the very moment in which climate change is presenting novel and serious risks to the survival of imperiled species.

### **III. FWS FAILED TO ADEQUATELY CONSIDER THE FULL RANGE OF THREATS CLIMATE CHANGE POSES TO THE BEETLE.**

FWS has also failed to adequately consider the full range of threats climate change poses to the Beetle, despite infrequent allusions to climate change impacts beyond rising temperatures in the Final Rule. The bulk of FWS’s analysis focuses on temperature projections while understating—if not ignoring—the full spectrum of impacts that are occurring now and in the near-term. Evaluating climate change as anything less than its full constellation of risks masks the magnitude of danger facing species like the Beetle. Therefore, FWS’s relative inattention to this range of impacts in the Final Rule paints an unduly optimistic picture of the present and near-future threats the Beetle faces.

**A. FWS Failed to Recognize the Full Threat of Precipitation Changes in the Final Rule.**

FWS primarily analyzed climate-related risks to the Beetle in terms of summer mean-maximum temperatures. Accordingly, its reasoning was disproportionately contingent upon projections of temperature averages. However, while the increase in average temperature is indeed cause for alarm, FWS failed to give comparable attention to the increased likelihood of extreme weather events. Such events will inevitably include record levels of precipitation, with one projection suggesting that “1-in-20 year” maximum daily precipitation records could become as frequent as “1-in-5 year” events by the end of the 21<sup>st</sup> century. Anthony D. Barnosky et al., *Scientific Consensus on Maintaining Humanity’s Life Support Systems in the 21<sup>st</sup> Century: Information for Policy Makers* 5 (2013) (hereinafter “Barnosky 2013”). We have already observed such changes. Data for the last seventy-five years indicates that “[t]here are likely more land regions where the number of heavy precipitation events has increased than where it has decreased” and “[t]he frequency or intensity of heavy precipitation events has likely increased in North America.” IPCC, *Summary for Policymakers, in Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (IPCC 2013 Summary for Policymakers), 5 (T.F. Stocker et al. eds., 2013) (emphasis removed).

As FWS accepts, “changes in precipitation, increased evaporative losses, and prolonged droughts may stress or kill individual [Beetles] and reduce reproductive success or reduce the time periods with suitable conditions for reproduction.” 85 Fed. Reg. at 65249. FWS likewise concluded that, in the Southern Plains region, climate change is projected to yield larger precipitation events with longer dry periods in between. FWS1488-89. Such events place a species like the Beetle at risk due to fluctuations in soil moisture: flooding during breeding risks drowning beetle larvae, while extended droughts elevate the chances that the Beetle, which prefers moist soils, will dry out altogether. *See* W. Wyatt Hoback, *Effects of Compaction and Soil Moisture on American Burying Beetles* 3 (2016).

Furthermore, extreme precipitation is a current and historical threat to both Southern and Northern Plains Beetle populations. Indeed, FWS trivialized the observation that Northern Plains populations declined by 90% in 2019 by noting that this was simply the result of “the record level of flooding that occurred in that area.” 85 Fed. Reg. at 65254. Correspondingly, FWS “believe[s] that the Northern Plains populations will rebound from these flooding events, because this is a temporary or short-term effect[.]” *Id.* Yet, FWS entirely failed to acknowledge that such flooding is precisely the kind of extreme weather event that will happen more frequently due to climate change, and offered no meaningful consideration of how

such dangers affect the Beetle's status. In addition, any expectation that the population will recover through a climate-change induced "range-shift" to a more Northern latitude (here, from the Southern to the Northern Plains) is clearly misguided.

Because these so-called "temporary or short-term effect[s]" are a result of already-occurring climate change in North America, any speculation on a population "rebound" should be tempered by a sober assessment of the available data. *Id.* As such, FWS acted imprudently in presumptively characterizing the 2019 Northern Plains floods as statistically outlying. At present—amid "one of the most disastrous declines of an insect's range ever to be recorded," Susan M. Wells et al., *The IUCN Invertebrate Red Data Book*, 380 (1983)—we have *already* observed significant increases in precipitation in North America. In deferring to the scientific consensus on present-day climate impacts selectively, FWS made the unsound assumption that concurring events must bear no causal correspondence.

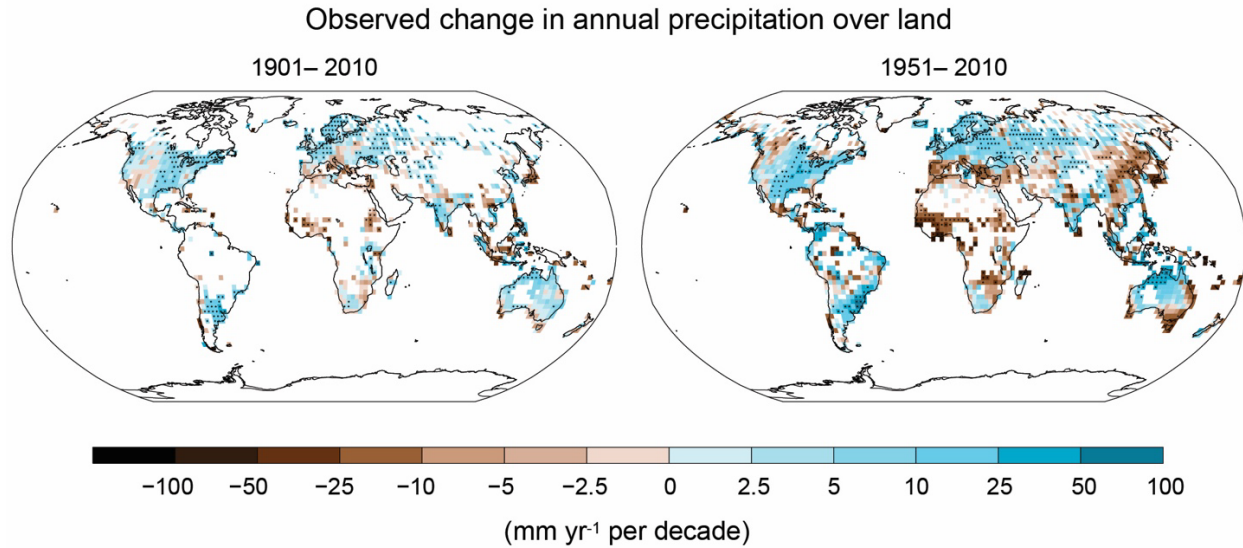


Illustration of observed change in annual precipitation over land, 1901–2010 and 1951–2010. IPCC, *supra* at 8.

**E. FWS Failed to Recognize the Intricacy and Fragility of the Beetle’s Ecosystem.**

Climate change disrupts longstanding species codependence, so-called “biotic interactions.” Barnosky 2015, *supra* at 4. With respect to the Beetle, FWS’s temperature analysis incorporates increased competition with other insects, but not impacts to the Beetle’s food source—that is, the availability of appropriately sized mammals and birds which become carrion. Resource availability is known to influence population dynamics in burying beetles. *See generally* Rosemary J. Smith & Melissa J. Merrick, *Resource Availability and Population Dynamics of Nicrophorus Investigator, an Obligate Carrion Breeder*, 26 *Ecological Entomology* 173 (2001).

Indeed, despite repeatedly recognizing carrion availability as a key determinant of the Beetle's status, FWS offers no discussion of climate change impacts to carrion sources in the Final Rule and only a cursory review in the Status Assessment. This review is so cursory that it lacks discussion of carrion sources in the Southern Plains region entirely, FWS1502, despite this area being identified by FWS as most vulnerable to climate change impacts and subsequent population loss. This is a notable absence given that FWS itself had previously concluded that "the best explanation for the decline of [the Beetle] involved habitat fragmentation, which reduced the carrion prey base and increased the vertebrate scavenger competition for it." Derek S. Sikes & Christopher J. Raithel, *A Review of Hypotheses of Decline of the Endangered American Burying Beetle (Silphidae: Nicrophorus americanus Olivier)*, 6 J. Insect Conservation 103, 107 (2002) (citing Christopher Raithel, US Fish and Wildlife Service, *American Burying Beetle (Nicrophorus americanus) Recovery Plan* (1991)). Indeed, the Status Assessment makes repeated reference to a study which found that, following reintroduction efforts on Nantucket Island, the artificial "provisioning" of carrion led to species success, but the discontinuance of active provisioning coincided with a precipitous decline of the Beetle population. Andrew McKenna-Foster et al., *Measuring Success of a Reintroduced Population of the American Burying Beetle (Nicrophorus americanus Olivier) to Nantucket Island, MA*, 20 J. Insect

Conservation 895, 895 (2016). Accordingly, the authors “suggest that a lack of natural carrion is the main reason for this decline.” *Id.*; *see also* FWS1411 (quoting McKenna-Foster); Douglas R. Leasure & W. Wyatt Hoback, *Distribution and Habitat of Endangered American Burying Beetle in Northern and Southern Regions*, 21 *J. Insect Conservation* 75, 84 (2017) (reiterating “the importance of local-scale habitat characteristics like carrion availability” to the viability of beetle populations.).

Furthermore, the Beetle only buries a subset of all carrion. *See* Sikes & Raithel, *supra* at 107. If a carcass is too large, the Beetle may feed on it but will not bury it for use in reproduction. Horst H. Schwarz & Stella Koulianos, *When to Leave the Brood Chamber? Routes Of Dispersal In Mites Associated With Burying Beetles*, 22 *Experimental & Applied Acarology* 621, 623 (1998). If a carcass is too small, however, it will provide inadequate energy for the mating Beetles and their larvae. *See* Rosemary J. Smith & Bryce Heese, *Carcass Selection in a High Altitude Population of the Burying Beetle, Nicrophorus Investigator (Silphidae)* 40 *Sw. Naturalist* 50, 53 (1995). *See also* Andrea J. Kozol et al., *The American Burying Beetle, Nicrophorus Americanus: Studies on the Natural History of a Declining Species*, 95 *Psyche* 167, 171 (1988) (finding that the Beetle preferred carrion in the 80–100 grams range over smaller or larger carrion). Similarly, the carrion must not be too long dead, otherwise they will have partially decomposed

or become laden with maggots, Smith & Heese, *supra* at 54; they must also be within range of the Beetle's habitat to be discovered, Chloe F. Garfinkel & Christy M. McCain, *Substantial Niche Overlap in Carrion Beetle Habitat and Vegetation Use*, 48 *Ecological Entomology* 433, 441 (2023) (noting that the Beetle "can move more than 1 km per night but typically moves closer to 1/3 kilomet[er] per night.") In other words, the suitability of a food source for the beetle depends on the confluence of various factors—the viability of the species is therefore contingent upon these factors being sustained.

With that in view, it is optimistic to the point of incredulity to assume that climate change will have little effect on the narrow range of carrion upon which the Beetle can reliably depend. As one summary contends, "[e]ven the most conservative analyses indicate that human-caused extinction of other species is now proceeding at rates that are 3-80 times faster than the extinction rate that prevailed before people were abundant on Earth, and other estimates are much higher." Barnosky 2013, *supra*, at 7. Atmospheric and ecological changes, such as temperature rises and shifts in precipitation, will impact the viability of the Beetle's food sources, even if these species avoid extinction.

By largely reducing the consideration of climate change to a single temperature threshold, FWS has failed to acknowledge the extent of the danger many species now face. Climate change imposes consequences beyond rising



temperatures that will impact species in myriad ways, and these dangers must be appropriately accounted for in listing decisions. While precise risks will vary by species and habitat, the scientific consensus remains that climate change currently consists of—and will continue to consist of—more than mere “global warming.” Each dimension of climate change can compound the danger that species such as the Beetle face. Thus, to best fulfill the bold and essential ambitions embodied in the ESA, the agency must consider climate change in a manner that accounts for its full spectrum of effects.

#### **IV. FWS HAS MISCALCULATED IN THE PAST, LEADING TO THE EXTINCTION OF LISTED SPECIES.**

In October 2023, FWS delisted 21 species from the ESA, not because the species had recovered, but rather because the species had gone extinct. *Fish and Wildlife Service Delists 21 Species from the Endangered Species Act due to Extinction*, U.S. Fish and Wildlife Service (Oct. 16, 2023)

<https://www.fws.gov/press-release/2023-10/21-species-delisted-endangered-species-act-due-extinction>. The 21 species included one bat, ten birds, two fish, and eight mussels. FWS Director Martha Williams commented on the delisting, explaining, “[f]ederal protection came too late to reverse these species’ decline, and it’s a *wake-up call on the importance of conserving imperiled species before it’s too late.*” *Id.* (emphasis added). However, this is precisely the policy the agency now adopts with its approach to the downlisting of the Beetle – downlisting an

imperiled species and thus failing to act to protect the species *until it is too late*. As Director Williams herself stated, “we are reminded of *the Act’s purpose to be a safety net that stops the journey toward extinction*. The ultimate goal is to recover these species, so they no longer need the Act’s protection.” *Id.* (emphasis added).

The Beetle is unfortunately among the first in what science predicts will be a long list of species facing extinction due to climate change. *See generally* Parmesan, *supra*. *See also* Wendy B. Foden et al., *Identifying the World’s Most Climate Change Vulnerable Species: A Systematic Trait-Based Assessment of all Birds, Amphibians and Corals*, 8 PLOS One 1, 1, 3 (2013); Barnosky 2015, *supra* at 6 (“under the RCP 8.5 emissions outlook, the percentage of species for which climate change alone would plausibly trigger extinction by the end of this century ranges from ~ 10–15% of birds, reptiles, and mammals, up to ~ 20% of amphibians.”). Indeed, “interactions of climate change with other well-known extinction threats promise to trigger a loss of life that has not been seen since an asteroid-strike eliminated most dinosaurs 66 million years ago.” Barnosky 2015, *supra* at 1.

The Beetle is evidently “in danger of extinction throughout all or a significant portion of its range.” 16 U.S.C. § 1532(6). FWS has failed to grapple with what standard should be applied when determining whether a species is “in danger of extinction.” However, regardless of which standard is applied, it cannot

be that “in danger of extinction” is triggered at the point of extirpation. The ESA demands that FWS employ “*all methods and procedures which are necessary*” to conserve imperiled species. 16 USC §1532(3) (emphasis added). Allowing FWS to subvert this statutory command by effectively acquiescing to the extirpation or extinction of species sets a dangerous precedent for the many cases that are sure to come. The agency must heed its own stated wake-up call and act to protect species from climate change *before* it is too late.

### **CONCLUSION**

For the foregoing reasons, the Court should reverse the district court’s grant of summary judgment for Appellees.

Respectfully submitted,

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## **CERTIFICATE OF COMPLIANCE**

This brief complies with the word limitation of Federal Rules of Appellate Procedure 29(a)(5) and 32(a)(7)(B). The brief contains 6,245 words, excluding the portions exempted by Federal Rule of Appellate Procedure 32(f) and D.C. Circuit Rule 32(e)(1). The brief also complies with the typeface requirements of Federal Rule of Appellate Procedure 32(a)(5) and the typestyle requirements of Federal Rule of Appellate Procedure 32(a)(6). The brief has been prepared in proportionally spaced typeface using Microsoft Word and 14-point Times New Roman font.

DATED: August 7, 2024

/s/ Nirva Patel  
NIRVA PATEL

**CERTIFICATE OF SERVICE**

I hereby certify that on August 7, 2024, I served the foregoing brief on all registered parties through the D.C. Circuit's Case Management/Electronic Case Files (CM/ECF) system.

DATED: August 7, 2024

*/s/ Nirva Patel*  
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