JENNIFER R. SCHWARTZ (*Pro Hac Vice*)
Email: jschwartz@wildearthguardians.org
LINDSAY K. LARRIS (CA Bar No. 254270)
Email: llarris@wildearthguardians.org
WildEarth Guardians
P.O. Box 13086
Portland, OR 97213
Telephone: (503) 780-8281

Counsel for Plaintiff

VANESSA SHAKIB (CA Bar No. 287339)
Vanessa@vanessashakib.com
Shakib Law, PC
500 N. Brande Blvd. Ste. 2000
Glendale, CA 91203
Telephone: (818) 516-9532

Local Counsel for Plaintiff

IN THE UNITED STATES DISTRICT COURT
FOR THE CENTRAL DISTRICT OF CALIFORNIA

WILDEARTH GUARDIANS, Plaintiff, vs. DAVID BERNHARDT, in his official capacity as U.S. Secretary of the Interior, and UNITED STATES FISH AND WILDLIFE SERVICE, Defendants.	Case No. 2:19-cv-09473-ODW-KS **PLAINTIFF'S NOTICE OF MOTION, MOTION FOR SUMMARY JUDGMENT AND SUPPORTING MEMORANDUM** Hearing Date: June 7, 2021 Hearing Time: 1:30pm Hon. Otis D. Wright II

NOTICE OF MOTION AND MOTION FOR SUMMARY JUDGMENT

TO ALL PARTIES AND THEIR COUNSEL OF RECORD:

Please take notice that on June 7, 2021, or as soon thereafter as it may be heard, Plaintiff Wildearth Guardians ("Guardians"), will bring for hearing its Motion for Summary Judgment pursuant to Rule 56 of the Federal Rules of Civil Procedure and this Court's Amended Scheduling Order (Dkt. No. 41). The hearing will take place before the Hon. Otis D. Wright II.

Guardians moves for summary judgment on the ground that there is no genuine dispute as to any material fact and its entitled to judgment as a matter of law. For the reasons set forth below, Defendants the Secretary of the Interior and the U.S. Fish and Wildlife Service ("FWS") violated the Endangered Species Act ("ESA"), 16 U.S.C. §§ 1531, *et seq*., in issuing a decision (the "12-Month Finding") that listing the Joshua tree (*Yucca brevifolia* and/or *Yucca jaegeriana*) as a threatened species under the Act was "not warranted."

Guardians respectfully requests this Court to find and declare that the FWS acted arbitrarily and capriciously and violated the ESA in issuing the "not warranted" 12-Month Finding. Guardians also asks this Court to set aside that unlawful decision and remand the 12-Month Finding for further analysis and agency action consistent with this Court's opinion and order.

Guardians' Motion is based on the points and authorities set forth below and the administrative record lodged with the Court by Defendants on January 15, 2021 (Dkt. No. 39). Guardians' standing to pursue this action is set forth in Plaintiff's Compl. ¶¶ 13-15 (Dkt. No. 1), as well as in the attached declarations of Erik Molvar, Taylor Jones, and Jerod Partin. A Proposed Order accompanies this Motion.

Dated this 12th day of February, 2021. Respectfully submitted,

/s/ *Jennifer Schwartz*
JENNIFER R. SCHWARTZ

WildEarth Guardians
P.O. Box 13086
Portland, OR 97213
Telephone: (503) 780-8281
Email: jschwartz@wildearthguardians.org

Of Counsel for Plaintiff

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LIST OF ACRONYMS

BLM	Bureau of Land Management
ESA	Endangered Species Act
FWS	U.S. Fish and Wildlife Service
NPS	National Park Service
JTNP	Joshua Tree National Park
SDM	Species Distribution Model (also known as an "ecological niche model")
SPR	Significant Portion of its Range
SSA	Species Status Assessment
YUBR	*Yucca brevifolia*
YUJA	*Yucca jaegeriana*

INTRODUCTION

This case concerns the plight of the Joshua tree, a desert icon, in an increasingly hotter, drier, more fire-prone world pressured by an ever-burgeoning human population. A wealth of science confirms that record high temperatures, prolonged droughts, ferocious blazes, and expanding development will push this imperiled species to the brink of extinction by century's end.

Despite being long-lived, hardy desert plants, Joshua trees only thrive within a narrow range of environmental conditions. Though they can survive high temperatures, drought decreases survivorship and recruitment. Extreme cold events limit their distribution, but they also need a period of cooler minimum winter temperature to maximize growth. Scientists postulate that these limiting factors likely explain why the species is restricted to the Mojave's slightly cooler, mid-elevation zone. But this mid-elevation zone has been compromised by invasive grasses, which carry uncharacteristically large fires across the ecosystem. Climate models predict that Joshua trees will soon be deprived of the temperature and precipitation levels they require to successfully germinate and reach adulthood.

The U.S. Fish and Wildlife Service (FWS), in electing to deny the Joshua tree federal protection as a threatened species, irrationally disregarded *every* published climate/species distribution model available, ignored other key scientific findings, and dismissed critical feedback from leading experts and sister federal agencies. In doing so, the agency ultimately reached a conclusion that runs counter to the best available science, is inconsistent with its own analyses, and is premised on unsupported assumptions, speculation, and an unreasonable insistence on more definitive information. This violates the Endangered Species Act.

FACTUAL BACKGROUND

A. The Joshua Tree

Joshua trees are long-lived, flowering evergreen trees that occur almost exclusively in the Mojave Desert. Long considered a single species with two subspecies or varieties, the Joshua tree was recently recognized by FWS as comprised of two distinct, and thus separately listable, species: *Y. brevifolia* ("YUBR") and *Y. jaegeriana* ("YUJA"). AR6928-32. The two species are geographically separated, genetically and morphologically distinguishable, and each rely on their own unique and specially evolved obligate pollinator (a "Yucca moth"). *Id.*; AR6969-91, 7032.

Though mature Joshua trees currently have a broad distribution, they do not occupy all habitat within that distribution. AR944, 952. Studies suggest large fires, rising temperatures, prolonged droughts and habitat loss from development have already rendered large portions of the Joshua tree's range unsuitable for new generations of the species. AR23-51; 943-60; 6997-7009; 8068.[1] In other words, much of the species' current distribution may only be comprised of adult trees with little to no successful recruitment of new young Joshua trees. AR7968 (Cole *et al*. 2011: "survey results show minimal to no recent Joshua tree recruitment within the southern Mojave Desert in recent years.") Within currently occupied habitat, the species distribution is also quite patchy, with density levels of individual trees varying dramatically. AR7022-23 (*e.g.* showing density levels within Joshua Tree National Park range between 10 to 277 Joshua trees per acre and an even greater range in Death Valley National Park with 10 to 870 Joshua trees per acre); AR949 (further noting species relatively low population density).

Joshua trees are characterized by infrequent germination, slow growth, and long lifespans (~200 years). AR8-13; 6933-36. They also take a long time to reach sexual maturity (up to 30 years). *Id.*; AR7032. Though each species of Joshua tree depends on a single species of yucca moth to reproduce sexually, Joshua trees sometimes reproduce asexually by rhizome growth. *Id*. Overall, successful recruitment requires a rare

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[1] Bureau of Land Management's (BLM) Ecoregional Assessment of the Mojave Basin and Range, showing a total of 2,307,068 acres (5.5% of the ecoregion) had burned at least once by a fire >1,000 acres in size between 1980 and the report's 2013 publication. AR8068. Notably, tens of thousands of more acres in this ecoregion have since burned, with 2020 proving to be especially destructive for Joshua trees. *See e.g. Decl. of Taylor Jones*, ¶8; *Decl. of Jerod Partin*, ¶¶11, 12, 14 (filed herewith).

convergence of events: fertilization by unique pollinators; seed dispersal and caching by rodents; seedling emergence triggered by isolated late-summer rainfall; nurse plants (*i.e.* vegetation like shrubs that provide favorable microclimates for successful germination and protection from herbivory); and appropriate seasonal temperature ranges. Studies suggest successful establishment of new Joshua tree seedlings happens only *a few times in a century*. AR8989 (Esque *et al*. 2015)

B. Primary Threats to the Joshua Tree's Continued Persistence

The primary stressors affecting the Joshua tree's ability to survive and reproduce are climate change, prolonged drought, more frequent and severe wildfires largely fueled by invasive grasses, habitat loss and degradation, and herbivory. These factors are often related and synergistic, and – in combination with the species' naturally low germination rates, slow growth and extremely limited dispersal capability – collectively threaten the Joshua tree's future persistence. AR23-51 (petition); 942-61 (Rapid Assessment); 14836-42 (draft threats analysis); 6997-7019 (final Species Status Assessment (SSA)).

1. Climate Change

Every peer-reviewed Species Distribution Model (SDM)[2] for Joshua tree published in the last two decades predicts "substantial climate-related decline in suitable area for the species across the Mojave Desert[.]" AR16634 (Sweet *et al*., 2019); AR35-40; 5183. For instance, the modeling effort of Shafer *et al*. (2001) shows an almost complete extirpation of *Y. brevifolia* from its current range by 2090-2099 under several future scenarios. AR35-36; 5183-84; 7971 (Cole *et al.* 2011 comparing results to Shafer *et al*. 2001). Dole *et al*. (2003) also modeled the future range for Joshua trees under doubled

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[2] According to leading experts in the field, "[w]hen making predictions about the potential distribution of a species (especially predictions about potential future or past distributions), the accepted standard is to develop a Species Distribution Model (SDM)." AR5183; *see e.g. Alaska Oil & Gas Ass'n v. Pritzker*, 840 F.3d 671, 679-83 (9th Cir. 2016) (upholding listing of the bearded seal based on agency's predictive modeling of future Arctic sea ice lost to climate change).

carbon dioxide conditions, similarly finding that a considerable portion of the species current range will become climatically unfavorable by century's end. *Id.*; AR8201-10.

Cole *et al*. (2011) built a sophisticated SDM with climate and habitat variables derived from a comprehensive dataset of presence/absence data throughout the Joshua tree's current range. AR7965-77; 37; 5183-84. Late Pleistocene and Holocene (22,000 years ago to present) records were also compiled to generate a map of past Joshua tree distribution. The study differed from previous models in its use of specific data points for presence and habitat variables for the species and the testing of models to simulate the current range of the species. *Id*. All of the individual climate models, as well as an ensemble of 22 global circulation models that the authors utilized, project a severe (~90%) decline in climatically suitable habitat for Joshua trees by 2070 to 2099, with most contraction in the southern parts of its range. AR7971.

Barrows *et al*. (2012) constructed a finer-scale model of *Y. brevifolia's* current distribution within and surrounding Joshua Tree National Park (JTNP), and then assessed the sensitivity of the species to a gradient of climate change scenarios. AR7509-16; 37-39; 5183-84. Under the most severe climate scenario modeled (3°C increase in mean July maximum temperature), there was a 90% reduction in the current distribution of *Y. brevifolia* in the Park by century's end. AR7509-16 (projecting only between 2 and 10% of existing habitat in the Park will remain climatically suitable).

Similar to Barrows *et al*. (2012), Sweet *et al*. (2019) sought to identify the existence and extent of potential climate refugia for *Y. brevifolia* within JTNP via SDMs validated with field data. Sweet *et al*. (2019) used Joshua tree presence points, a database of nine environmental variables, and end-of-century (2070–2099) greenhouse gas emissions under highly mitigated, moderately mitigated, and unmitigated scenarios. AR16632-48. Under highly mitigated and moderately mitigated greenhouse gas emissions scenarios, only 18.6% and 13.9%, respectively, of current occupied *Y. brevifolia* habitat remained as refugia. AR16638. However, under the unmitigated, "business-as-usual" emissions scenario, suitable habitat for *Y. brevolia* was almost completely eliminated from its namesake Park, with only 0.02% of *Y. brevifolia* habitat (a mere 37 acres) remaining as refugia. AR16632, 16639. Sweet *et al*. (2019) ascribed the difference in results from Barrows *et al*. (2012), to finer scale habitat data, difference in climate scenarios used, and better and more dense information on Joshua tree presence. AR16641. In other words, the more detail we learn about the current status of Joshua trees, the bleaker their future appears.

A comprehensive ecological assessment of the Mojave Basin and Range (2013) by the Bureau of Land Management (BLM)[3] also predicted "truly profound" transformations across the ecoregion by 2060 based on similar modeling efforts. *See* AR8037, 8123-29, 8133-34, 8144-45 (recognizing a whole suite of climate-related impacts and noting, based on these forecasts, one might anticipate, *e.g.*, "the expansion of sparse to completely unvegetated plains"). As the report further states, "undoubtedly considerable change in climate regime is indicated from these forecasts. In some cases, substantially more than 50% of the area of the current climate distribution is lost over the next 50 years." AR8134. Like the SDMs from independent experts, BLM's models also forecast "[s]evere contraction in characteristic bioclimates for Mojave Mid-Elevation Mixed (Joshua tree-Blackbrush) Desert Scrub" as well as the "loss of Joshua Tree woodlands from their namesake Park." AR8134, 8136 (modeling image), 8145 (summary).

In addition to these species/habitat distribution modeling efforts, numerous other studies also show the myriad ways climate change threatens the ability of Joshua trees to successfully reproduce and survive to adulthood. For instance, prolonged droughts (*i.e.* multiyear, with some persisting for a decade or more) are projected to occur with greater frequency and intensity over the coming decades. *See e.g.* AR31-34; 12036-40 (Saeger *et al.* 2007); 11603 (Notaro *et al*. 2012: "According to the [climate] models, by 2070–2099 one in every five years will be characterized by 25 cm of annual precipitation or less, making such extreme drought a regular occurrence."); AR949-61; 6989-94, 7004. Such

[3] BLM manages most Joshua tree habitat on federal lands, which includes over 1.95 million acres of YUBR habitat and over 4 million acres of YUJA habitat. AR6977-78.

drought not only precludes successful Joshua tree germination, but will also likely lead to increased adult mortality, either directly due to temperature and moisture stress or indirectly due to increased herbivory from hungry rodents lacking alternative forage. *Id*. Cornett (2014) provides evidence that decreased precipitation and increased drought is already occurring: "From 1988 through 2012 desert regions of southeastern California experienced a 16% decrease in precipitation compared with the previous 25 year period (1963 through 1987) …The severity of drought was exacerbated by a rise in annual temperature of approximately 2°C [3.6°F] beginning in the late 1970s." AR33; 951-52.

Whether or not the species' pollinating moths will be able to keep pace with a changing climate is also a concern. AR40-43; 6987, 7034-35, 7040, 7047; 14859.

Although some models predict the creation of climate refugia in higher elevations as temperatures rise, the best available science indicates that the Joshua tree's ability to colonize such habitat is "extremely limited." AR7973. In fact, Cole *et al*. (2011) reveals minimal actual northward range shift over the Holocene, corresponding to a migration rate of 2m (~6.5 feet**)** a year over the last 11,700 years. *Id*. ("[t]here are no historical records of Joshua tree invasions into new habitat and even few documented instances of recent seedling establishment.") Worst case, another expert warned, "*Y. brevifolia* will migrate too slowly to fill potential new habitat, while much of its current range will become climatically unfavorable." AR8208 (Dole *et al*., 2003).

Further, not only does the best available science indicate Joshua tree's limited dispersal capacity will likely preclude it from colonizing potential climate refugia, but the higher elevation areas in which the species are projected to best be able to survive hotter, drier conditions are at great risk of fire due to the prevalence of highly flammable invasive grasses. AR16643-44; 7510, 7514-15; 5126 (National Park Service (NPS) agreeing that areas of "climate refugia" are those with most intensive fire regimes). Indeed, over a third of the areas Barrows *et al*. (2012) identified as refugia for *Y. brevifolia* had already burned by 2012 and approximately half of the refugia within JTNP that Sweet *et al*. (2019) mapped have also already burned in recent decades. AR16638.

Like BLM's assessment, NPS officials also concur with these dire predictions: "Given that a further 50% of this suitable habitat has already been impacted by wildfire, we anticipate that suitable *Yucca brevifolia* habitat in the park will be minimal if any" by the end of the century. AR5127 (formal comments from JTNP Superintendent).

2. Wildfire

More frequent and severe fire is another major threat to the Joshua tree. AR24-28; 956-59; 6997-7001; 14839-42. Mojave ecosystems are not fire adapted. *Id*. Historically, wildfires in the region were small and exceptionally rare, with fire return intervals greater than 300 and 500 years. *Id*. But several recent studies confirm that fire has significantly increased in both frequency and severity over the past few decades, in large part due to the proliferation of invasive grasses. *Id*. Current conditions form a feedback loop, wherein increased fire frequency and extent further promotes the invasion of annual grasses into previously uninvaded areas, with increased annual grass cover and abundance in turn leading to more extensive and severe wildfires. *See* AR7110-18 (Abatzoglou *et al*. 2011 describing proliferation of this cycle and how climate change worsens it); AR9166 (Holmgren *et al.* 2009 positing "the increase in fire size and frequency could transform JTNP vegetation in a matter of decades."); AR7032-33 (SSA). As BLM's ecoregional assessment provides, even "trace" amounts of grass cover can carry fire across open spaces between shrubs, affecting vast amounts of the Mojave's mid-elevation shrublands where Joshua tree predominantly occur. AR8102. Tagestad *et al*. (2016) observed that between 1976 and 2010 there were 227 fires in the Mojave Desert that collectively burned over 1.8 million acres. The vast majority were within the Mojave's mid-elevation zone (Joshua tree habitat). AR12899-08. Researchers have also found that this mid-elevation zone is highly susceptible to increased fire size following years of high cool season rainfall that allows for especially high production of invasive grasses. *Id*.; AR7520-21 (BLM report describing Southern Nevada Complex Fires).

Recent studies further confirm that these higher intensity fires have resulted in significant, widespread mortality of Joshua trees. DeFalco *et al*. (2010) found that five years after a fire in JTNP, 80% of burned Joshua trees in the study area had died, with smaller trees (<1m tall) dying more rapidly. AR8193-200. Furthermore, DeFalco *et al.* (2010) found that 26% of *unburned* trees in the study area died during the same period (1999-2004), with drought and increased herbivory likely contributing factors. *Id*. The high mortality recorded in this study is consistent with high mortality documented in other studies. AR6999-7000 (SSA). Fires also tend to track the same heavy precipitation winters that are most suitable for Joshua tree seedling emergence, further exacerbating threats to young Joshua trees and their ability to reach adulthood. AR8994 (Esque *et al.* 2015). As FWS acknowledges, other indirect effects to Joshua trees from fire might include a degraded seed bank, loss of aboveground vegetation that could serve as nurse plants to seedlings, and alteration in seed-caching rodent dynamics within Joshua tree stands. AR6997-7001; 12905 (study further describing how blackbrush, a critical nurse plant for Joshua tree seedlings, experienced exceptional rates of burning).

3. Habitat Loss and Degradation

Joshua tree are also threatened by habitat loss and degradation from other human activities. While much Joshua tree habitat is within federally managed lands, many of those areas where management is most protective (*e.g.* National Parks) are where the impacts of climate change and wildfire may be most severe. *See supra*. Other areas of federal land that are home to the species are subject to poorly-regulated activities including off-road vehicle use, cattle grazing, power and pipeline rights-of-way and large-scale energy projects that consume or degrade habitat. AR3245 (maps showing all development and land use threats); 14836; 7017-19. Further, over half of *Y. brevifolia's* southern population is within private land, with little protection from development. FWS's analysis predicts up to nearly 42% of YUBR South will be lost or fragmented to the point where it reduces future genetic exchange and connectivity by 2095. AR7047.

STATUTORY BACKGROUND

Congress enacted the Endangered Species Act in 1973 to safeguard our nation's natural heritage by responding to threats of species extinction in order to conserve imperiled species and their habitat. *See* 16 U.S.C. § 1531(b). The Supreme Court has stated that "[t]he plain intent of Congress in enacting this statute was to halt and reverse the trend toward species extinction—whatever the cost[.]" *Tennessee Valley Auth. v. Hill*, 437 U.S. 153, 184 (1978); 16 U.S.C. § 1531(a)(1).

To benefit from the ESA's provisions, however, a species must first be "listed" as "threatened" or "endangered." A species is considered "endangered" if it "is in danger of extinction throughout all or a significant portion of its range" and "threatened" if it "is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." *Id.* § 1532(6), (20).

Importantly, the ESA requires FWS to make its listing determinations "solely on the basis of the best scientific and commercial data available" because of any one or combination of the following five factors: "(a) the present or threatened destruction, modification, or curtailment of its habitat or range; (b) overutilization for commercial, recreational, scientific, or educational purposes; (c) disease or predation; (d) the inadequacy of existing regulatory mechanisms; or (e) other natural or manmade factors affecting its continued existence." *Id.* § 1533(a)(1), (b)(1)(A); 50 C.F.R. § 424.11(c).

To comply with the ESA's "best available science" standard, the Service "cannot ignore available biological information [or] studies, even if it disagrees or discredits them." *Ctr. for Biological Diversity ("CBD") v. Zinke,* 900 F.3d 1053, 1060 (9th Cir. 2018 (internal citations omitted). As the D.C. district court also explained:

> The statutory standard, requiring that agency decisions be made on the "best scientific and commercial data available", rather than absolute scientific certainty, is in keeping with congressional intent in crafting the ESA. Congress repeatedly explained that it intended to require [FWS] to take preventive measures before a species is "conclusively" headed for extinction.

Defenders of Wildlife v. Babbitt, 958 F. Supp. 670, 679-80 (D.D.C. 1997).

STANDARD OF REVIEW

ESA claims are reviewed under the APA, 5 U.S.C. § 706 *et seq. Native Ecosystems Council v. Dombeck*, 304 F.3d 886, 891 (9th Cir. 2002). Under the APA, courts shall hold unlawful and set aside agency action found to be "arbitrary and capricious, an abuse of discretion, or otherwise not in accordance with law." 5 U.S.C. § 706(2)(A). While the APA standard is deferential, courts must nonetheless engage in a "thorough, probing, in depth review." *Citizens of Overton Park v. Volpe*, 401 U.S. 402, 415 (1971). Courts must disapprove an agency's action where its "reasoning is irrational, unclear, or not supported by the data it purports to interpret." *Nw. Coal. for Alternatives to Pesticides v. EPA*, 544 F.3d 1043, 1052 n.7 (9th Cir. 2008). A decision is arbitrary and capricious if the agency:

> [H]as relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that is could not be ascribed to a difference in view or the product of agency expertise.

Motor Vehicle Mfrs. v. State Farm Mut. Auto. Ins. Co., 463 U.S. 29, 43 (1983). Further, an agency must provide a "reasoned explanation" for relying on factual findings that contradict its earlier findings. *F.C.C. v. Fox Television, Inc.*, 556 U.S. 502, 515 (2009).

ARGUMENT

In this case, FWS's decision not to list the Joshua tree violates the ESA because: (1) the best available science reveals Joshua tree are threatened by climate change, and the cumulative and synergistic impacts of climate change stressors, more frequent and severe wildfire, habitat loss and degradation, naturally low germination rates, slow growth and an extremely limited capacity to migrate; (2) FWS failed to adequately consider whether the concentration of threats facing *Y. brevifolia's* southern population demonstrates the species is threatened throughout a "significant portion of its range"; and (3) FWS failed to evaluate whether Joshua tree are threatened by the inadequacy of existing regulatory mechanisms with respect to climate change.

I. FWS's Finding that Joshua Tree are Not Threatened by Climate Change Is Inconsistent with the Best Available Science and Thus Contrary to Law.

The ESA's "best available science" requirement prohibits FWS from ignoring available scientific evidence "pointing in the opposite direction" from its conclusions.

Greater Yellowstone Coal., Inc. v. Servheen, 665 F.3d 1015, 1030 (9th Cir. 2011); *see also Zinke*, 900 F.3d at 1060, 1068. The requirement also prohibits FWS from making listing decisions on the basis of unsupported assertions, *Tucson Herpetological Soc'y v. Salazar*, 566 F.3d 870, 878 (9th Cir. 2009), or speculation and surmise, *Building Indus. Ass'n of Superior Cal. v. Norton*, 247 F.3d 1241, 1247 (D.C. Cir. 2001). Moreover, Congress directed FWS to consider the best scientific information "'*available,*' not the best scientific data *possible*.'" *Id.* at 1246; *Defenders of Wildlife v. Jewell*, 176 F.Supp.3d 975, 1002 (D. Mont. 2016) ("Quite simply, the Service cannot demand a greater level of scientific certainty than has been achieved in the field to date.")

In this case, FWS's determination that climate change does not pose a serious threat to Joshua tree runs counter to *every* peer-reviewed analysis of this leading threat; is undermined by expert opinions from independent peer-reviews and sister federal agencies; and is rife with unsupported, contradictory assertions.

A. *Every* published, peer-reviewed analysis of climate change impacts on Joshua tree supports listing the species as threatened.

FWS violated the ESA's best available science requirement by making a listing decision that conflicts with *every* available peer-reviewed analysis on climate-related impacts to Joshua tree. As discussed *supra*, five available species distribution models (SDMs), Shafer *et al*. (2001), Dole *et al*. (2003), Cole *et al*. (2011), Barrows *et al*. (2012), and Sweet *et al*. (2019), all showed a widespread loss of suitable Joshua tree habitat due to climate change under realistic emissions scenarios, including the extirpation of Joshua tree from their namesake Park by century's end. *Supra Sec*. *B.1*. The comprehensive assessment from BLM (2013), similarly projected severe loss of suitable habitat across the Mojave and the potential extirpation of *Y. brevifolia* from its southernmost range. *Id*. (citing AR7988); AR5183 (peer-review expert noting all available SDMs "concluded that by 2100 the suitable habitat for Joshua tree will be reduced by 71-100%").

FWS itself initially recognized the dire predictions of "multiple models" showing climate change threatens the Joshua tree's ability to persist beyond the 21st century.

AR953-61; 14837-38. FWS even acknowledged studies that posit climate change has already taken a negative toll on *Y. brevifolia* recruitment. AR951-57 (*e.g.* describing overall results of population monitoring studies in JTNP by Cornett (2014) indicating: "[f]rom 1990-2013 the number of YUBR trees had declined by 33%; out of the remaining alive trees, most were mature trees (93%) and only 7% were immature trees. No new trees appeared during the study period, indicating no successful recruitment."); 14857 (acknowledging Barrows *et al*. (2012) "provide evidence that climate change has already been impacting YUBR recruitment in [JTNP]."); 14858 (reduced summer precipitation may already be "reducing germination rates and recruitment within population units.")

Rather than present any newer or more sophisticated modeling and analyses that contradicts the forecasts of these published, peer-reviewed SDMs, FWS simply discounts this entire body of available science in its final SSA, including removing references to previously recognized studies like Cornett (2014). AR7036. First, FWS admits that it "did not model future distribution based on predicted climate change scenarios." *Id*. But FWS did not *itself* need to model future distribution of Joshua trees, as this was already done by multiple researchers, with Cole *et al*. (2011), Barrows *et al*. (2012) and Sweet *et al*. (2019) employing the most sophisticated of such efforts. AR7965-977, 7509-16, 16632-648. Rather than grapple with the substantial habitat loss forecasted by these models, FWS concedes it had no interest in evaluating "quantitative assessments of climate change on future Joshua tree distribution." AR7036. Nor was FWS interested in "focusing only on the most likely predictions" *Id*. Instead, FWS offered a nebulous "qualitative evaluation" to "retain flexibility" and disregard available scientific evidence pointing in the opposite direction from its conclusions. This is contrary to the ESA. *Greater Yellowstone*, 665 F.3d at 1030 (9th Cir. 2011); *Zinke*, 900 F.3d at 1060, 1068-71.

While FWS may rely on the opinions of its own experts, it "cannot ignore available biological information [and] studies, even if it disagrees with or discredits them." *Zinke*, 900 F.3d at 1060, 1068-71 (FWS was arbitrary and capricious in disregarding study showing grayling population declining and best available science on climate change stressors); *Jewell*, 176 F.Supp.3d at 984-85, 1001-03 (FWS arbitrarily and capriciously attempted to discredit best available climate science predicting substantial loss of wolverine denning habitat). Here, FWS wholly ignored not one, but *several* scientific analyses projecting the widespread loss of climatically suitable habitat for Joshua tree by the end-of-century. In fact, the draft SSA that FWS submitted to independent peer- and agency partner-review experts, confirms FWS's attempt to sweep these modeling forecasts under the rug; the draft makes no mention of using SDMs to predict future suitable habitat in general and only breezes over the habitat loss forecasted by Barrows *et al*. (2012). *Cf.* AR3235-41 (peer-review draft) with AR7035-37.

Because of this glaring omission, peer-review experts criticized the draft SSA, some heavily, for failing to incorporate any SDM and for FWS's overall failure to make any "quantitative assessment of how suitable habitat will change under future climate scenarios." AR5187-95[4]; 5383 (FWS peer-review summary). Dr. Smith further explained how FWS's ultimate conclusions, based on a purely qualitative and vague assessment, were directly at odds with the quantitative predictions of the SDMs of Shafer *et al*. (2001), Dole *et al*. (2003), Cole *et al*. (2011), and Barrows *et al*. (2012).[5] AR5188-90. Given the significance of these problems, Dr. Smith concluded: "I consider the current assessment to not be based on the best available science, and its conclusion have no valid scientific basis." *Id*. Partner-review feedback from JTNP Superintendent echoed this sentiment, explaining: the widespread habitat loss predicted by recent SDMs, Cole *et al.*

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[4] *See* AR5430 (another expert similarly suggesting "pairing the species distribution under current summer max temp distribution with a projected climate scenario to determine how much of the current range may change to unsuitable temperatures for the species in the future."); 5221 (another expert pointing to his own model as published in Dole *et al*. (2003)); 5444 (another expert noting difficulty in reaching valid conclusions about effects of temperature change based on draft SSA, suggesting "analyses of the summer/winter temperatures occupied by Joshua tree would make a valuable supplement.")

[5] Sweet *et al*. (2019) had not been published at the time FWS prepared its SSA but was released prior to the actual listing decision being published and thus should have factored into the final decision.

(2011) and Barrows *et al*. (2012), and the Park's own estimates based on habitat already lost to fire, are "in broad contradiction" to FWS's unsupported conclusion that "a large expanse of habitat supporting a high number of individuals should remain." AR5127.

Only after receiving this critical feedback did FWS insert a last-minute paragraph into the final SSA to attempt discrediting habitat distribution modeling in general, but without addressing any particular modeling effort. *See* AR7036 (FWS's cursory assertion that "ecological niche models are often criticized for inaccurate projections of future occurrence").[6] In sum, FWS's failure to adequately explain its ultimate dismissal of multiple SDMs, each building on prior modeling efforts with finer-scale data and each reaching similar results, without providing meaningful countervailing evidence, renders the agency's conclusion on the threat of climate change to Joshua tree arbitrary and capricious. *Zinke*, 900 F.3d at 1060, 1068-71; *Jewell*, 176 F.Supp.3d at 1001-03.

B. FWS's own records show climate stressors threaten Joshua tree, undermining the agency's final decision.

Further, as was the case in *Zinke*, and notwithstanding the agency's arbitrary dismissal of the modeling forecasts, FWS's own record here also clearly recognizes that multiple climate change stressors threaten the Joshua tree's ability to persist in the foreseeable future. *See e.g. Zinke*, 900 F.3d at 1073 (noting agency's record clearly indicated that "[i]ncreases in temperature and changes in precipitation are likely to affect the availability of water in the West"); *id*. at 1059 (observing that "[d]espite [the fish's] adaptation [to warmer temperatures], climate change threatens the arctic grayling.") Consequently, the Ninth Circuit held FWS acted arbitrarily and capriciously "[b]y failing to explain why the uncertainty of climate change favors not listing the arctic grayling

[6] Notably, FWS cites Pearson and Dawson (2003) and Fitzpatrick and Hargrove (2009) for its critique of ecological niche models in the final SSA, AR7036, but neither study was referenced in earlier drafts, *see e.g.* AR3162-3276, nor are they listed in the final SSA's list of references, AR7069-78, further implicating a last-minute attempt to justify an unsupported conclusion. Moreover, these purported critiques pre-date the most sophisticated SDMs by Cole *et al*. (2011), Barrows *et al*. (2012), and Sweet *et al*. (2019).

when [the agency's own finding] acknowledges the warming of water temperatures and decreasing water flow because of global warming[.]" *Id*. at 1073. The same is true here.

For instance, FWS cited evidence in its 2017 Rapid Assessment showing more frequent severe droughts have likely already impaired the recruitment of new Joshua trees. AR952, 958. Also, that "[i]ncreased temperatures may limit seedling growth and survival. Warmer climates increase cover of non-native weeds [that] increase wildfire frequency/intensity. Lack of summer rain may limit flowering." *Id*. Following the 2017 Rapid Assessment, FWS's biologists moved on to drafting the SSA, which initially incorporated these scientific findings. *See e.g.* AR16927 (citing Cornett 2014, which was omitted from the final SSA). In fact, FWS's biologists initially concluded: "Less summer precipitation under current climate conditions could be reducing germination rates and recruitment of [Joshua tree] on a *range-wide scale*, possibly explaining the range contraction recorded in some studies." AR14837 (emphasis added). FWS also initially acknowledged that rising winter temperatures and fewer frost days may already be limiting reproduction and growth for certain Joshua tree populations, which "in tandem with other factors [could] further reduce *population level* recruitment.") (emphasis added). AR14838. But these findings were omitted from the final SSA.

Despite omitting many of its own initial findings as well as key scientific references that provide evidence contrary to its ultimate conclusions, FWS's final SSA nevertheless still readily acknowledges that the "southwest U.S. is projected to be affected particularly severely by prolonged drought, fewer frost days, warmer temperatures, greater water demand by plants, and an increase in extreme weather events…" AR7001. And that "[m]any of these phenomena may be influencing the current condition of *Yucca brevifolia*." AR7004 (further describing negative impacts of drought on species); AR7035 (stating "climate-related stressors could be currently affecting *Yucca brevifolia* populations and the species distribution across the range may be generally constrained by temperature (summer maximum and winter minimum) and precipitation (both summer and cool season)"; AR7040 (acknowledging available evidence suggests exposure to winter temperatures below 4°C is necessary for optimal Joshua tree growth); *Id*. ("Under climate Scenario II, average winter temperature increases ≥ 5°C are projected for some regions where *Y. brevifolia* populations occur, which could potentially negatively influence populations…") *Id*. ("Larger germination events and greater seedling emergence have been correlated with higher summer precipitation [] indicating that seedling establishment and recruitment could primarily be altered by reduced summer precipitation."); AR949; 16927 (also noting drought increases herbivory because of reduced forage availability); *Id*. (further explaining how drought stress strongly influences early life stage/seedling survival and thus future recruitment); AR6934, 6940 (Status Review Form summarizing final findings). In sum, FWS acted arbitrarily and capriciously by failing to explain why the uncertainty of climate change favors not listing the Joshua tree when its own findings acknowledge widespread climate change impacts. *See Zinke*, 900 F.3d at 1073.

C. FWS relied on unsupported assumptions to irrationally dismiss its own findings and the best available science on climate impacts.

FWS also improperly relied on unsupported assumptions to ultimately conclude "that any potential future increase in the maximum summer temperature would most likely not influence the future condition of *Y. brevifolia* or *Y. jaegeriana* at a population- or species-level scale." AR6939. For instance, to downplay the threats of predicted temperature increases and overstate the likely resilience of the species, FWS points to laboratory studies by Smith *et al*. (1983), in which detached Joshua tree leaves were placed in hot water for an hour and then examined for heat damage to suggest Joshua trees can survive and successfully reproduce in the wild at temperatures up to 138 degrees. *See* AR12833 (1983 lab study); AR6992-93 (SSA pointing to 138ºF as the upper "appropriate temperature range" necessary for survival at all life stages). But FWS offers no explanation for why the temperature at which a severed leaf demonstrates cell damage in a lab is an appropriate metric for the ambient temperature in which a Joshua tree can survive and successfully reproduce in the wild—a far different situation.[7] *See e.g.* AR5443 (peer-review expert expressing concern over FWS's reliance on these lab studies for determining species temperature thresholds instead of using SDMs). Notably, the highest lab air temperature that Smith *et al*. (1983) actually successfully reared Joshua trees was 45ºC (113ºF). AR12837.

In fact, *after* FWS finalized its SSA, its own experts admitted that publicly stating the species can tolerate temperatures up to 138° is not at all "realistic" or "appropriate." AR6406-08. And FWS acknowledges the species already does not generally occur in the hotter and drier portions of the Mojave, that 80-105 degrees is the current mean summer temperature, and that seedlings are far more vulnerable to "climatic events." *Id*.; AR955 (study showed small, young plants have lower survivability); AR6088, 6093; 5185 (peer-review expert urging FWS to address differences in habitat requirements for seedlings).

Second, while FWS completely disregards the predictions of SDMs with respect to future range contractions, ironically it relies on some of those same models to suggest areas of potential climate refugia will allow the species to persist. AR6093; *see also* AR7002, 7014, 7051, 7054, 7061, 7064-68 (SSA). This assumption is flawed for two key reasons. For one, as noted *supra*, it fails to account for the Joshua tree's "extremely limited" capacity to migrate and colonize new refugia in cooler, higher elevation areas. *Supra Sec. B.1* (*e.g.* citing Cole *et al*. 2011 at AR7973); *see also, e.g. Zinke*, 900 F.3d at 1070 ("FWS's reliance on the ability of the artic grayling to migrate to cold water refugia was arbitrary and capricious" given lack of evidence "that this would likely occur.") Further, as Barrows *et al.* (2012) explains, though their model identified potential climate refugium, most of these areas are also at high risk of invasive grass-spread wildfires, AR7515, much of which have already burned. *See supra Sec*. *B.2*; AR5127 (JTNP noting 50% of climate refugia in the Park has already burned).

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[7] For comparison, according to industrial safety standards, a human can safely touch items as hot a 140°F without burning their hand, but prolonged exposure to air temperature of 140°F would lead to heat stress and ultimately be fatal.

Last, the fact that the available data may not be wholly conclusive does not justify its dismissal by FWS, "especially given the ESA's 'policy of institutionalized caution,'" and it certainly does not support the agency's conclusion that Joshua tree are not threatened by climate change. *Greater Yellowstone*, 665 F.3d at 1030 (invalidating FWS's delisting of the Yellowstone grizzly bear as a threatened species, partly because FWS failed to justify why declines in whitebark pine – a primary food source for grizzlies – due to climate change were not likely to threaten the Yellowstone grizzly bear population) (citation omitted); *Defenders of Wildlife,* 958 F.Supp. at 679 (ESA "contains no requirement that the evidence be conclusive in order for a species to be listed."); *Jewell*, 176 F.Supp.3d at 1002-07 (rejecting FWS's claim that it needed greater certainty and refinement in the climate change data before listing the wolverine). Accordingly, FWS's climate impact determinations violate the agency's obligations to rely on the best available science, 16 U.S.C. § 1533(b)(1)(A), and to articulate a rational connection between the facts found and the choices made. *Greater Yellowstone*, 665 F.3d at 1023; *Zinke*, 900 F.3d at 1060, 1068-71.

II. FWS Arbitrarily Dismissed and Downplayed Threats from More Frequent and Severe Fire Fueled by Invasive Grasses.

As described *supra*, wildfire is one of the greatest threats to the persistence of Joshua tree, particularly as the species' range contracts in the face of climate change and the frequency and severity of fire increases throughout its habitat. *Supra Sec. B.2*. The record evidence shows fire has already burned large swaths of Joshua tree habitat, is a significant source of Joshua tree mortality, creates conditions that delay or preclude recruitment of new Joshua trees, and is diminishing potential climate refugia. *Id*. This negative trend is expected to continue throughout a significant portion of the Joshua tree's range. AR8197 (Defalco *et al.* 2010 explaining predicted changes to regional climate conditions "will continue to promote desert wildfires that injure and kill all size classes of *Y. brevifolia*."); *Id*. (also noting "greater frequency of recruitment failure on postfire landscapes will be detrimental to aging *Y. brevifolia* populations in the future.");

AR7114 (study finding modeling results suggest up to an additional 3 weeks of extreme fire danger conditions throughout the Sonoran, Mojave, Colorado and Great Basin deserts); *id*. ("These differences are reflective of an increase in the occurrence of chronic fire seasons.") As Brooks & Matchett (2006) summarized:

> The native fuels in [the Mojave's mid-elevation zone] are near the tipping point between a fire regime characterized by infrequent small fires and one of frequent large fires. When non-native annual grasses are added to these fuel types, especially when they bridge the interspace fuel gaps between perennial shrubs and grasses, the transition between these alternative fire regime states is much more likely. Altered fire regimes appears to have occurred over broad expanses of middle elevation shrublands in the northeastern Mojave Desert.

AR7858-59. Barrows *et al.* (2012) similarly observed:

> The interaction between increased invasive grass-spread wildfires and a climate change-related increase in severe wildfire conditions will threaten the sustainability of Joshua trees, even within their JTNP refugia. Climate change may stress Joshua trees and inhibit their ability to survive wildfires, and it will certainly reduce the area of suitable habitat so that any fire will impact a larger proportion of the remaining Joshua tree population.

AR7114. According to FWS's own experts, these studies provide evidence that the effects of more frequent and more severe fires "are likely to compromise *long-term population viability and persistence across the range* of YUBR/YUJA." AR14840-41 (emphasis added); *see also* AR956-59 (2017 Rapid Assessment on fire risk).

But like its climate analysis, FWS once again did an about-face; the agency went from acknowledging the best available science shows more frequent, larger grass-spread fires are a threat to the Joshua tree's persistence *across its range*, to summarily concluding the opposite. *Cf.* AR14840-41, 14845-50 with AR6938-39 (FWS claiming it expects the Mojave's *historical* fire return intervals (300-500 years) to continue for most of the species' ranges and thus "there is no indication that the current or future effects of wildfire and invasive plants would significantly reduce the redundancy, representation, or resiliency of *Y. brevifolia* or *Y. jaegeriana*.")

FWS points to BLM's invasive grass model from the 2013 ecoregional assessment described *supra* as its basis for evaluating Joshua tree's future vulnerability to altered fire regimes. AR7031-35. Importantly, however, BLM's assessment determined that even "trace" amounts of invasive grass (*i.e.*, 1-5% cover) can "effectively introduce a fire regime into warm desert scrub communities that have historically never experienced significant natural wildfire." AR8070-71. Meaning nearly the entire Mojave ecoregion is at risk of altered fire regimes that result in more frequent and increasingly larger fires. *Id*. Hence, BLM didn't mince words. *See* AR8074 (plainly stating fire poses "a serious threat to *imperiled* species such as…Joshua tree.") (emphasis added).

FWS on the other hand, going against the very science it purports to rely upon, arbitrarily decided in its final SSA that only areas with >25% invasive grass cover are "vulnerable" to altered fire regimes under Scenario I and only areas with >15% cover "will experience an altered fire regime" under Scenario II. AR7034-35, 7056-57. Notably, several peer- and partner-review experts criticized FWS for appearing to underrepresent or downplay fire risk to the Joshua tree. *See* AR5430-31; 5100-01; 5128; 5884-85; 5126-27.

Also very troubling, the amount of Joshua tree habitat that FWS classified as moderate to high risk of invasive grass cover inexplicably decreased (dramatically) from its draft SSAs to the final SSA. *Cf*. AR14942-43 (draft SSA after 1st "Core Team" review showing *e.g.* **52.5%** of YUBR South population at moderate to high risk of more frequent, severe wildfire based on invasive grass cover levels between 5-45%), AR15044 (draft SSA after 2nd Core Team review showing same), with AR7034 (final SSA inexplicably showing **only 2%** of YUBR South in the 5-45% invasive grass cover range). *See also* AR2985 (email from FWS core team biologist to GIS specialist expressing confusion over change and asking for an explanation); AR17947 (2010 modeling image of invasive grass potential throughout Joshua tree's range that was omitted from SSA).

In sum, FWS's final determination that more frequent, larger fires will only affect a small fraction of YUBR/YUJA populations and therefore is not a factor weighing in favor of listing either species as threatened is unsupported and contradicted by the record evidence and thus arbitrary and capricious. AR6938-39 (summary of final findings); *see e.g. Greater Yellowstone*, 665 F.3d at 1024 (holding FWS "failed to articulate a rational connection between the science it relied upon and its conclusion.")

III. The Best Available Science Reveals the Cumulative Effects of Climate Change, Wildfires, Habitat Loss and Degradation, Naturally Low Germination Rates and a Limited Dispersal Capacity Threaten Joshua Tree.

The ESA requires FWS to list a species if "any one *or a combination*" of the five statutory listing factors causes a species to be threatened or endangered. 50 C.F.R. § 424.11(c) (emphasis added); *WildEarth Guardians v. Salazar*, 741 F.Supp.2d 89, 101-103 (D.D.C. 2010) (FWS violated ESA by failing to consider cumulative impact of listing factors). Here, the best available science reveals multiple stressors acting in combination threaten the Joshua tree, particularly *Y. brevifolia* (*see supra and infra*). FWS acknowledges that the overall cumulative impact to the Joshua tree from these combined and synergistic threats is greater than each stressor alone and describes specific synergies among some of the identified stressors. *See* AR7047-49; AR6942 (Status Review Form). Ultimately, however, FWS points to the currently broad distribution of predominantly *adult* Joshua trees to arbitrarily dismiss the combined impact of these stressors and summarily conclude: "very high numbers of individuals should continue to persist across a large land area through the 21st century." AR6947-48.

This conclusion is severely flawed, however, because as peer-review expert Dr. Smith pointed out, the way FWS used the species' current distribution to define "suitable habitat" in the SSA, "ignores important recent work on demographic trends in Joshua trees, with the result that the potential distribution of Joshua tree under current climate conditions is vastly overestimated."[8] AR5182-83. As he further elaborated:

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[8] Moreover, as noted *supra*, not all currently identified "suitable habitat" is actually occupied by Joshua trees, nor does FWS's estimation appear to account for the vast amount of Joshua tree habitat that has already burned in recent years.

> There are two significant, interrelated problems with these assumptions. First, the current distribution of Joshua tree includes individuals who are hundreds of years old, and that became established during pre-industrial climate conditions when global average temperatures were a full degree cooler than they are today, and about 0.75 degrees cooler than the 30-year average. Indeed, it is well established that long-lived trees can persist as relict stands of moribund adults that exist outsides the range of suitable habitats required for long term population persistence (citation omitted).
>
> In the case of Joshua trees in particular, we have very compelling evidence that the current distribution of mature trees does not reflect the climate requirements for successful germination and seedling establishment. For example, extensive mapping studies in [JTNP] found that seedlings occur only in a fraction of the area occupied by adults, and that this area corresponds to the predicted distribution under a 2-degree warming scenario [Barrows *et al.*, 2012]. That is, the suitable habitat for seedlings is much smaller, includes a narrower range of climates, than would be predicted based [on] adult presence data. Although the Barrows [*et al.* 2012] study considered only a small portion of the geographic range of Joshua trees, other workers have found similar patterns across the Joshua trees range.

Id. Esque *et al.* (2015), which FWS purports to rely upon, similarly suggests that "[b]ecause *Y. brevifolia* is long lived, the current distribution of reproductive adults may mask the effects of recent changes in climate on recruitment and survival of seedlings and juveniles, which are more sensitive to the vagaries of desert conditions." AR8994; *see also* AR5194 ("many studies suggest [] that suitable habitat for seedlings is smaller than [Joshua tree's] total distribution[.]"); AR16634 (Sweet *et al*. 2019 noting, "long-term persistence, especially over the time reflected in climate change estimates, depends on where and when species reproduce, recruit, and establish on a landscape.")

Indeed, FWS's own admissions further undermine its reliance on the currently broad distribution of mature trees as evidence of the species long-term viability. *See e.g.* AR6947 (admitting predicted changes in climate conditions and larger, more frequent fires "may shift the YUBR South population toward older adults with fewer opportunities for plant recruitment."); AR954-55 (recognizing Esque *et al.* 2015 showed successful reproduction had not occurred); AR957 (noting Defalco *et al*. 2010 "[p]rovides evidence that a more frequent and El Niño Southern Oscillation-driven fire cycle will shift population structure toward older, taller trees, with reduced opportunities for recruitment and long-term persistence."); AR6940 (acknowledging "[p]rolonged or intense drought could reduce survivorship of seedlings and juvenile plants leading to reduced recruitment overtime."); AR7968 (Cole *et al.* 2011 observed "minimal to no Joshua tree recruitment within the southern Mojave Desert in recent years."); AR952 (acknowledging Cornett 2014 provides evidence that *Y. brevifolia* are already declining within JTNP, and *no new trees appeared during 23-year study period*) (emphasis added). As the Ninth Circuit has admonished, the ESA is "concerned with protecting the future of the species, not merely the preservation of existing [members of that species]." *Pritzker*, 840 F.3d at 683 (quoting *Alaska Oil & Gas Ass'n v. Jewell*, 815 F.3d 544, 555 (9th Cir. 2016)).

Finally, FWS additionally failed to adequately account for the overall cumulative impact of all the identified stressors in light of the species naturally low germination rates, slow growth (*i.e.* trees take roughly 30 years to reach sexual maturity), and "extremely limited" dispersal capacity (*i.e.* ability to migrate and colonize future climate refugia). AR949 (acknowledging Joshua trees are "slow reproducers, seed production is periodic or rare, low germination rate in natural settings"). 16 U.S.C § 1533(a)(1)(E) (requiring FWS to consider "other natural or manmade factors affecting [the species] continued existence.") In short, the Joshua tree's natural recruitment challenges make the species all the more vulnerable to the combined impacts of climate change, wildfire, and habitat loss, all of which further illustrates the disconnect between the available evidence and FWS's "not warranted" listing determination. AR6924. FWS's cumulative impact analysis, like its stand-alone climate change analysis, is thus arbitrary and unlawful.

IV. FWS's Finding that *Y. brevifolia* is Not Threatened Throughout Any Significant Portion of its Range Is Also Inconsistent with the Best Available Science and Therefore Contrary to Law.

As discussed previously, the ESA defines a species as "threatened" if it is "likely to become an endangered species within the foreseeable future throughout all *or a* *significant portion of its range*." 16 U.S.C. § 1532(6), (20) (emphasis added); AR6950-51 (FWS explaining its "SPR" analysis). Though the ESA does not define "significant portion of its range" the Ninth Circuit has held that if a species is "expected to survive" in an area that is much smaller than its historic range, FWS must "develop a rational explanation for why the lost and threatened portions of a species' range are insignificant before deciding not to designate the species for protection." *Zinke*, 900 F.3d at 1064 (citing *Defenders of Wildlife v. Norton*, 258 F.3d 1136, 1145 (9th Cir. 2001); *Tucson Herpetological Soc'y*, 566 F.3d at 876-77).

Here, because FWS arbitrarily disregarded the forecasted declines of nearly all suitable *Y. brevifolia* habitat across its current range by century's end (with a predicted complete loss of YUBR South), the agency also consequently failed to rationally explain why such habitat loss from climate change is "insignificant" in its SPR analysis. *See Jewell,* 176 F.Supp.3d at 1007 (rejecting FWS's findings from its SPR analysis because agency's overall analysis of climate change impacts "proceeded from a flawed premise."); *Supra Sec. B.1 & I.A* (citing modeling results). Indeed, FWS admits it didn't consider future habitat loss from climate change, with the most extreme range contractions predicted in *Y. brevifolia's* southern range, in its SPR analysis at all. AR6952 (showing SPR analysis for YUBR South population only accounted for threats from wildfire and habitat loss from development).

In addition to blatantly ignoring future habitat loss from climate change, FWS similarly sweeps past all the available scientific evidence showing little to no recruitment of new Joshua trees has been observed in YUBR South—*for over two decades*—likely due to already occurring climate impacts and the devastating effects of wildfire in this area. *Supra Sec. B, I, & III*. Further, because FWS also arbitrarily concluded in its final SSA that only 1 to 1.4% of YUBR South is under threat from more frequent, larger wildfires, AR7050, its SPR analysis for this threat to *Y. brevifolia* similarly "proceeded from a flawed premise" and must be revisited. *Jewell,* 176 F.Supp.3d at 1007; *Supra Sec. B.2 & II* (instead showing nearly the entire Mojave ecoregion is at risk of increased fire).

Last, FWS's own analysis predicts up to nearly 42% of YUBR South (1,354,815 acres) will be lost to urban development by 2095. AR7047. This loss alone may represent a "significant portion" of *Y. brevifolia's* range. *See e.g.*, *Sw. Ctr. for Biological Diversity v. Norton*, 2002 WL 1733618, *8 (D.D.C. 2002) (Canadian island which constituted one-third of subspecies's geographic range was "significant portion" of that subspecies range). In sum, like its analysis and conclusions with respect to these cumulative threats, so too is the agency's SPR analysis for *Y. brevifolia* arbitrary and capricious.

V. FWS Failed to Evaluate Whether the Lack of Existing Regulatory Mechanisms for Addressing Climate Change Threaten the Joshua Tree.

Pursuant to the ESA, the Service must evaluate whether a species warrants listing due to the "inadequacy of existing regulatory mechanisms." 16 U.S.C. § 1533(a)(1)(D). This factor alone is sufficient to warrant listing. 50 C.F.R. § 424.11(c). In this case, the best available science reveals that existing regulatory mechanisms, including the Clean Air Act, are presently inadequate to address the threats to Joshua tree from climate change and more frequent, severe wildfires. FWS, however, never evaluated the potential threat that the lack of regulatory mechanisms for addressing climate change poses to the Joshua tree as the ESA requires. *See* AR6942-43 (FWS's analysis of this listing factor).

CONCLUSION

For the foregoing reasons, Guardians asks this Court to grant its summary judgment motion, set aside FWS's finding that Joshua tree do not warrant listing under the ESA, and order the agency to prepare a new finding that is based "solely on the best scientific and commercial data available." 16 U.S.C. § 1533(b)(1)(A).

Dated this 12th day of February, 2021. Respectfully submitted,

/s/ *Jennifer Schwartz*
JENNIFER R. SCHWARTZ
WildEarth Guardians

P.O. Box 13086
Portland, OR 97213
Telephone: (503) 780-8281
Email: jschwartz@wildearthguardians.org

Of Counsel for Plaintiff

CERTIFICATE OF SERVICE

I hereby certify that on February 12, 2021, I electronically filed the foregoing with the Clerk of the Court using the CM/ECF system, which will be served upon counsel of record through the Court's CM/ECF System.

/s/ *Jennifer Schwartz*

Jennifer R. Schwartz