

A PROPOSED POLICY FOR INTERPRETING ‘SIGNIFICANT PORTION OF ITS RANGE’ FOR THE U.S. ENDANGERED SPECIES ACT, 1973

JOHN A. VUCETICH*¹, JEREMY T. BRUSKOTTER²,
NICHOLAS ARRIVO³, and MICHAEL PHILLIPS⁴

1 July 2022

¹College of Forest Resources and Environmental Science, Michigan Technological University, Houghton, MI, USA

²Terrestrial Wildlife Ecology Lab, School Environment and Natural Resources, The Ohio State University, Columbus, Ohio, USA

³Managing Attorney at The Humane Society of the United States Washington, D.C., District of Columbia

⁴Turner Endangered Species Fund, Bozeman, MT 59718, USA

*Contact info for correspondence:
e-mail: javuceti@mtu.edu

John A. Vucetich is a Distinguished Professor at Michigan Technological University. His native discipline is ecological science and he has contributed substantive understanding to various topics in the human dimensions of biodiversity conservation, including the U. S. Endangered Species Act, 1973.

ABSTRACT

The Endangered Species Act (ESA) defines an endangered species as being “in danger of extinction throughout all or a significant portion of its range...” (16 U.S.C. § 1532). The phrase “significant portion of its range” (SPR) has received considerable attention by academics, policy makers, and the courts. The Fish and Wildlife Service (FWS) has developed five interpretations of SPR over the past two decades. Each interpretation has been rejected by one or more court opinions. We show how the minimum requirements for an acceptable interpretation of SPR emerge from a synthesis of law and science.

An element of this synthesis is science pertaining to the biodiversity crisis, which unambiguously indicates that the biodiversity crisis is fundamentally about the extirpation of most species from alarming portions of their historic range. As a result, a disturbingly large portion of Earth’s land has lost startlingly large portions of native fauna. These losses are a biodiversity crisis because ecosystem health depends on species manifesting their ecological value (sensu, 16 U.S.C. § 1531) but they cannot do so on unoccupied portions of their range.

Another element of this synthesis is the ESA’s purpose (16 U.S.C. § 1532), which is clearly aligned with the aforementioned science and incontrovertibly extends beyond avoiding global extinction to also include preventing unacceptable harm to species’ ecological value which cannot be manifest on the portion of a species’ range from which it has been extirpated.

The Service may have intended to fulfill this purpose (or some version of these purposes) through § 4(a)(1) of the ESA (16 U.S.C. § 1533), which pertains to the analysis of threats, or through application of the 3Rs (resiliency, redundancy, representation). We explain how those approaches fall short. Court opinions have also indicated that the FWS has failed in its obligation to develop an adequate standard for determining endangerment. This standard would be objectively measurable, supported by relevant science, flexible enough to accommodate the great variety of endangered species, and comport with existing policy.

The courts also indicate the need to more plainly align the interpretation of “significant” with its dictionary definition. Furthermore, a large class of laws and policies use the idea (if not the word) “significant” to indicate levels of harm, loss, or danger that are unacceptable and beyond which corrective action is required. For example, harm to public health is significant when concentrations of lead in drinking water exceed X ppm; therefore, concentrations of lead should be less than X ppm. This comparison is important because the ESA is clearly among the kind of law and policy aiming to limit unacceptable harm and loss.

These considerations require that SPR be interpreted in terms that include the percentage of a species’ range no longer securely occupied. SPR may refer to more than that numeric percentage, but it must at least account for that percentage, per se.

Determining what counts as unacceptable loss is an inherently normative judgment. When an agency is obligated to make a normative judgment – as they often are – scholarship in the area of policy development indicates that scientifically-derived understanding of experts’ and the public’s views are of great importance in assisting the agency’s judgment. In this document, we review recent science that elicited the views of hundreds of conservation experts and American residents with respect to the question, how much of a species’ range can be lost beyond which special conservation protections are warranted? This research provides what had been the last missing piece of key insight for developing a robust SPR policy.

We use this synthesis to propose a policy interpretation of SPR that meets all the requirements of court opinions.

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INTRODUCTION

An essential element of the U.S. Endangered Species Act of 1973, 16 U.S.C. § 1531 *et seq.* (ESA), is its defining an endangered species as being one “in danger of extinction throughout all or a significant portion of its range...”¹ By the turn of the century, it became clear that understanding what an endangered species is requires interpreting the phrase “significant portion of its range” (hereafter, SPR). During the first decade of the 21st century, a series of scholarly papers proposed and defended a set of related interpretations for SPR.²

Between 2001 and 2020, the U.S. Fish and Wildlife Service (FWS) advanced five interpretations of SPR. Those interpretations have been at odds with principles provided by the aforementioned scholarly papers. Each of the five interpretations has also been either abandoned by the FWS or rejected by the courts, with one court writing in 2017 that the FWS’s interpretation of SPR “impermissibly clashes with the rule against surplusage and frustrates the purposes of the ESA.”³

These circumstances indicate the need for a robust SPR policy. The analysis presented here informs and guides the development of such policy.

I. UNDERLYING PREMISE

A minimally-reasonable interpretation of SPR must be true to the plain-language meaning of the phrase, cannot frustrate the purpose of the ESA, including Congress’s intent when they added that phrase to the statute, and must harmonize with the language of other operative provisions in the ESA. As such, essential content is provided by the ESA’s findings:

The Congress finds and declares that (1) various species of fish, wildlife, and plants in the United States have been rendered extinct as a consequence of economic growth and development untempered by adequate concern and conservation; (2) other species of fish, wildlife, and plants have been so depleted in numbers that they are in danger of

¹16 U.S.C. § 1532(6).

² John A. Vucetich et al., *The Normative Dimension and Legal Meaning of Endangered and Recovery in the U. S. Endangered Species Act*, 20 CONSERV. BIOL. 5 (2006); Nicole M. Tadano, *Piecemeal Delisting: Designating Distinct Population Segments for the Purpose of Delisting Gray Wolf Populations is Arbitrary and Capricious*, 82 WASH L. REV. 795 (2007); Sherry A. Enzler, and Jeremy T. Bruskotter, *Contested Definitions of Endangered Species: The Controversy Regarding How to Interpret the Phrase "A Significant Portion of a Species' Range"*, 27 VA. ENVTL. L. J. 1-65 (2009); Noah D. Greenwald, *Effects on Species' Conservation of Reinterpreting the Phrase "Significant Portion of its Range" in the U. S. Endangered Species Act*, 23 CONSERV. BIOL. 1374-1376 (2009); Alexandra Kamel, *Size, Biology, and Culture: Persistence as an Indicator of Significant Portions of Range Under the Endangered Species Act*, 37 ECOLOGY L. Q. 525 (2010); Carlos Carroll et al., *Geography and Recovery Under the U. S. Endangered Species Act*, 24 CONSERV. BIOL. 24, no. 2 (2010): 395-403.

³ *Ctr. for Biological Diversity v. Jewell*, 248 F. Supp. 3d 946, 958 (D. Ariz. 2017), *amended in part*, No. CV-14-02506-TUC-RM, 2017 WL 8788052 (D. Ariz. Oct. 25, 2017); *see also* *Desert Survivors v. US Dep't of the Interior*, 336 F. Supp. 3d 1131 (N.D. Cal. 2018).

30 or threatened with extinction; (3) these species of fish, wildlife, and plants are of
aesthetic, ecological, educational, historical, recreational, and scientific value to the
Nation and its people... ⁴

Based on those findings, Congress expressed the ESA's purpose:

35 The purposes of this Act are to provide a means whereby the ecosystems upon which
endangered species and threatened species depend may be conserved, to provide a
program for the conservation of such endangered species and threatened species, and
to take such steps as may be appropriate to achieve the purposes of the treaties and
conventions set forth in subsection (a) of this section. ⁵

40 To summarize: While the Director of the FWS has discretion in interpreting SPR, that discretion
is constrained by the ESA's statutory purpose.

II. THE BIODIVERSITY CRISIS

45 The findings and purposes of the ESA describe what scientists now refer to as the biodiversity
crisis. Understanding the purpose of the ESA requires understanding the best-available science
as it pertains to the biodiversity crisis.

50 Humans have increased the rate of species extinction by three orders of magnitude or
more.⁶ Consequently, of ~40,000 known species of vertebrates, 20% are believed to be at
elevated risk of extinction.⁷ Those statistics are important and grim. But they also represent a
deeply inadequate understanding of the biodiversity crisis.

According to best-available science, an adequate description of the biodiversity crisis
requires taking account of the widespread loss of species' geographic range for at least three
reasons:

- 55
- Extinction risk is directly related to the extent of a species' geographic range.⁸
 - The essence of being an endangered species is rarity, which is a formal concept in ecology.
According to this concept, a species becomes increasingly rare as a result of threats that

⁴ 16 U.S.C. § 1531(a).

⁵ 16 U.S.C. § 1531(b).

⁶ Stuart L. Pimm et al., *The Biodiversity of Species and their Rates of Extinction, Distribution, and Protection*, 344 SCIENCE 6187:1246752 (2014).

⁷ Michael Hoffmann et al., *The Impact of Conservation on the Status of the World's Vertebrates*, 330 SCIENCE 6010, 1503-1509 (2010).

⁸ E.g., Kevin J. Gaston and Tim M. Blackburn, *Conservation Implications of Geographic Range Size-Body Size Relationships*, 10 CONSERV. BIOL. 2, 638-646 (1996); Andy Purvis et al., *Predicting Extinction Risk in Declining Species*, 267 PROC. R. SOC. LOND. 1456, 1947-1952 (2000); José Alexandre Felizola Diniz-Filho and Natália Mundim Tôrres, *Phylogenetic Comparative Methods and the Geographic Range Size-Body Size Relationship in New World Terrestrial Carnivora*, 16 EVOL. ECOL. 4, 351-367 (2002); Kate E. Jones et al., *Biological Correlates of Extinction Risk in Bats*, 161 AM. NAT. 4, 601-614 (2003).

lead to some combination of just two processes, diminished population density and lost geographic range.^{9,10,11} The central importance of range is also represented by ecologists' taxonomy of rarity (Figure 1).^{12,13}

- A very common mechanism by which humans have elevated the extinction risk for many species is by having reduced the extent of their geographic range, especially due to habitat loss and overexploitation.¹⁴ In particular, a majority of studied terrestrial vertebrates have been extirpated from two-thirds or more of their geographic ranges.¹⁵ Those losses in geographic range translate to large portions of the Earth's terrestrial surface (including the United States) having lost a significant portion of native species whose presence is required to confer the ecological value. That lost value is of critical importance because protecting the "ecological value" of species is explicitly highlighted by the findings and purpose of the ESA (Fig. 2).

The scientists who discovered that the average vertebrate species had lost two-thirds their historic range wrote this, pertaining to the significance of the finding:

The strong focus on species extinctions, a critical aspect of the contemporary pulse of biological extinction, leads to a common misimpression that Earth's biota is not immediately threatened, just slowly entering an episode of major biodiversity loss. This view overlooks the current trends of population declines and extinctions... we show the

⁹ Total abundance is also a key determinant of rarity and extinction risk. In this formal conceptualization of rarity, total abundance is an emergent property, rising from the product of local density and size of geographic range.

¹⁰ Kevin J. Gaston, *What is Rarity?*, in RARITY 1-21 (Kevin J. Gaston ed., 1994).

¹¹ The connection between rarity and range further justifies Congress's decision to define endangered in terms of range. The fundamental importance of range to extinction risk is also indicated by range contraction being one of the basic criteria by which the IUCN assesses extinction risk.

¹² Deborah Rabinowitz, *Seven Forms of Rarity*, in THE BIOLOGICAL ASPECTS OF PLANT CONSERVATION 205-207 (H. Synge ed., 1981).

¹³ The importance of this taxonomy to conservation biologists is indicated, in part, by its having been cited more than 1500 times. Key examples include Jinping Yu and F. Stephen Dobson, *Seven Forms of Rarity in Mammals*, 27 J. BIOGEOGR. 1, 131-139 (2000); Paul G. Harnik et al., *Long-Term Differences in Extinction Risk Among the Seven Forms of Rarity*, 279 PROC. R. SOC. LOND. 1749, 4969-4976 (2012); J. Michael Reed et al., *Linking the Seven Forms of Rarity to Extinction Threats and Risk Factors: An Assessment of North American Fireflies*, 29 BIODIVERS. CONSERV. 1, 57-75 (2020).

¹⁴ Gerardo Ceballos and Paul R. Ehrlich, *Mammal Population Losses and the Extinction Crisis*, 296 Science 5569, 904-907 (2002); Andrea S. Laliberte and William J. Ripple, *Range Contractions of North American Carnivores and Ungulates*, 54 BIOSCIENCE 2, 123-138 (2004); Gerardo Ceballos et al., *Biological Annihilation Via the Ongoing Sixth Mass Extinction Signaled by Vertebrate Population Losses and Declines*, 114 PROC. NATL. ACAD. SCI. U.S.A. 30, E6089-E6096 (2017); Christopher Wolf and William J. Ripple, *Range Contractions of the World's Large Carnivores*, 4 R. SOC. OPEN SCI. 7, 170052 (2017).

¹⁵ Ceballos et al., *supra* note 14.

extremely high degree of population decay in vertebrates, even in common “species of low concern.” Dwindling population sizes and range shrinkages amount to a massive anthropogenic erosion of biodiversity and of the ecosystem services essential to civilization. This “biological annihilation” underlines the seriousness for humanity of Earth’s ongoing sixth mass extinction event.¹⁶

		SMALL RANGE		LARGE RANGE	
		low local density	high local density	low local density	high local density
habitat generalist		<i>Black robins</i>	<i>Various island endemics</i>	<i>Gray wolves</i>	NOT RARE
habitat specialist		<i>Ghost orchids</i>	<i>Various island endemics</i>	<i>Red-cockaded woodpecker</i>	<i>Trillium flowers</i>

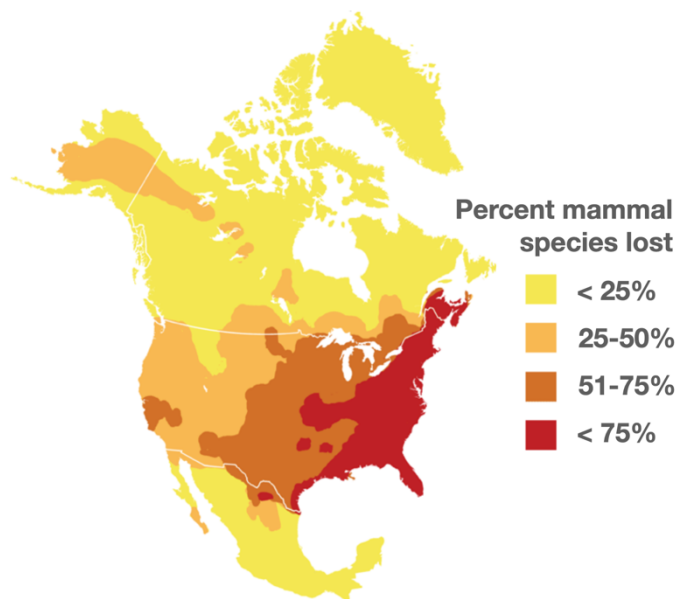
Fig 1. Taxonomy of rarity.¹⁷ One way to understand the taxonomy of rarity is to consider an example, say gray wolves. Wolves have three characteristics pertaining to this taxonomy. Wolves are (i) habitat generalists (indicated by the label on left side of this taxonomy), (ii) have a large geographic range (indicated by the bold-faced labels on the top of taxonomy), and (iii) exhibit low population density. Each box in this taxonomy represents one of only seven different ways by which a species can be rare. The boxes are also illustrated with heuristic examples.

This taxonomy represents two essential results. First, losses in geographic range are one of two basic mechanisms by which threats can cause a species to become rare (the other mechanism being reduced density). Second, there are only seven basic kinds of rarity. The relevance of that second result is presented later in this document (Section (V)(F)).

¹⁶ *Id.* at E6089.

¹⁷ Rabinowitz, *supra* note 12.

Fig. 2. Most mammal species for which sufficient data is available have been driven to extinction from more than two-thirds or more of their geographic range. The cumulative effect of those losses is that large portions of the United States have lost large portions of their native species, as illustrated here. Redrawn from Ceballos & Ehrlich (2002), *supra* note 14.



105 The loss of biodiversity is a crisis because species are ecologically valuable to their native
ecosystems.¹⁸ But a species cannot manifest its ecological value on portions of range no longer
inhabited due to anthropogenic threats. In other words, ecosystem health depends on species
occupying their native range at densities that are largely unimpaired by human activities. This
best-available science is consistent with the purpose of the ESA where it highlights the
110 *ecological value* of a species.¹⁹

In sum, interpreting SPR without explicitly accounting for the percentage of historic
range that is unoccupied is contrary to both the best-available science and the purpose of the
ESA, which is – in scientific parlance – to mitigate the biodiversity crisis.

115 III. CORRECTING A LEGAL MISUNDERSTANDING ABOUT ECOLOGICAL SCIENCE

The scientific review of the biodiversity crisis (presented in the previous section) corrects an
objectively inaccurate impression of scientific knowledge that had been expressed in a prior
120 court opinion which stated, essentially as a musing: “A more thorough analysis, however,

¹⁸ Michael E. Soulé et al., *Ecological Effectiveness: Conservation Goals for Interactive Species*, 17 CONSERV. BIOL. 5, 1238-1250 (2003). John A. Vucetich et al., *A Minimally Nonanthropocentric Economics: What Is It, Is It Necessary, and Can It Avert the Biodiversity Crisis?*, 71 BIOSCIENCE 8, 861-873 (2021).

¹⁹ 16 U.S.C. § 1531(a). In other words, what the ESA refers to as species’ ecological value corresponds to what ecologists refer to as species’ ecological function. A species’ ecological function cannot be manifest in places where it is not present at densities unimpaired by anthropogenic threats.

suggests that a flat percentage of geographic area is not the *sole* [emphasis added] determinant of significance..."²⁰ The more complete context of that quotation is:

A more thorough analysis, however, suggests that a flat percentage of geographic area is not the sole determinant of significance. As a general rule, species are not evenly distributed across their ranges, but rather tend to concentrate in certain areas where habitat is particularly suitable. Thus, the percentage of geographic area would not linearly correlate to the percentage of a species' population. One-third of a species' geographic range may be found to contain a disproportionately greater or lesser percentage of the total number of individuals. It does not seem fair or sensible, then, to point to some arbitrary geographic percentage as constituting a "significant" portion of a species' range.²¹

The science agrees that "a flat percentage of geographic area is not the *sole* [emphasis added] determinant of significance." And, any minimally-reasonable interpretation of SPR must take account of determinants of significance aside from a flat percentage. But the need to account for such forms of significance does not preclude the importance of a flat percentage – as evidenced by Section II.

The court's view misunderstands other important scientific principles as well. Specifically, portions of a species range with low density are not, in general or as a matter of principle, less valuable to the species or with respect to the ecological value provided by a species. Gray wolves provide an important example. The density of wolves on the Brooks Range of northern Alaska is five times greater than in Wisconsin. But the Wisconsin portion of wolf range is no more or less important than the Brooks Range portion of wolf range. Furthermore, important differences in density typically arise for ecological reasons such as the differences in prey density or prey type or differences in the ecosystem's abiota (e.g., Normalized Difference Vegetation Index, NDVI). If two portions of a range differ in such a manner that would be important evidence for concluding that the two portions of range represent distinct population segments.²²

Additionally, portions of range where density is lower and less stable are portions of range that are likely important for contributing to the long-term health of the species due to their role in maintaining genetic diversity.²³

The court is also correct in stating that it would not be fair or sensible "to point to some arbitrary geographic percentage as constituting a "significant" portion of a species' range." We explain how to make such a decision in a non-arbitrary manner in Sections (V)(A) through (V)(D) of this document.

²⁰ Sw. Ctr. For Biological Diversity v. Norton, Civ. No. 98-934, 2002 WL 1733618, at *16 (D.D.C. July 29, 2002).

²¹ *Id.*

²² Section (VI)(A) for details.

²³ John A. Vucetich and Thomas A. Waite, *Spatial Patterns of Demography and Genetic Processes Across the Species' Range: Null Hypotheses for Landscape Conservation Genetics*, 4 CONSERV. GENET. 5, 639-645 (2003).

IV. PREVIOUS INTERPRETATIONS

The history of FWS interpretations of SPR is effectively conveyed in episodes, pertaining especially to (i) a brief filed in a 2001 court case about the flat-tailed horned lizard, (ii) a Solicitor's opinion issued in 2007, and (iii) a final SPR policy issued in 2014.

A. Flat-Tailed Horned Lizard

In 1993, the FWS proposed listing the flat-tailed horned lizard due, in part, to widespread habitat loss.²⁴ In 1997, the FWS withdrew that proposed listing.²⁵ In 2001, Defenders of Wildlife challenged the Service's decision to withdraw the proposed listing in court.²⁶

In briefs submitted by the Secretary of the Department of Interior (and subsequently quoted in the court's decision), the Secretary proffered an interpretation of an endangered species that takes account of the SPR phrase. Specifically, the Secretary interpreted an endangered species as one that "faces threats in enough key portions of its range that the *entire species* is in danger of extinction."²⁷ This SPR-related interpretation has been referred to as the "clarification interpretation."²⁸

The court rejected the clarification interpretation because it resulted in the SPR phrase being reduced to surplusage and was contrary to the ESA's legislative history.²⁹ That legislative history includes, but is not limited to, the House Report accompanying the bill which highlighted how the ESA would replace a predecessor law and in doing so be a "significant shift in the definition [of an endangered species] in existing law which considers a species to be endangered only when it is threatened with worldwide extinction" because the ESA would include as endangered species any species that is in danger of extinction "in *any* portion of its range."³⁰ Furthermore, the court indicated that while the Secretary has broad interpretive discretion in interpreting SPR, it must explain how its interpretation is consistent with statutory text and purpose of the ESA.

The clarification interpretation was rejected for similar reasoning in a second case, involving Canada lynx.³¹

²⁴ Proposed Rule to List the Flat-tailed Horned Lizard as Threatened, 58 Fed. Reg. 62,624 (Nov. 29, 1993).

²⁵ Withdrawal of the Proposed Rule to List the Flat-Tailed Horned Lizard as Threatened, 62 Fed. Reg. 37,852 (July 15, 1997).

²⁶ Defenders of Wildlife v. Norton (*Flat-tailed Horned Lizard*), 258 F.3d 1136 (9th Cir. 2001).

²⁷ *Flat-tailed Horned Lizard*, 258 F.3d at 1141.

²⁸ Kristyn Judkins, *Deciphering the ESA's Enigmatic SPR Phrase*, Environmental, Natural Resources, & Energy Law Blog, Lewis and Clark Law School. (Aug. 19, 2020). <https://www.lclark.edu/live/blogs/121-deciphering-the-esas-enigmatic-spr-phrase->.

²⁹ *Flat-tailed Horned Lizard*, 258 F.3d at 1142.

³⁰ ENDANGERED AND THREATENED SPECIES CONSERVATION ACT OF 1973, H.R. Rep. No. 93-412 (1973)

³¹ Defenders of Wildlife v. Norton, 239 F.Supp.2d 9 (D.D.C. 2002).

Shortly after those rejections, the FWS held a meeting at Marymount University, where it developed a more elaborate – but effectively identical – interpretation of SPR (Fig. 3). The so-called Marymount interpretation of SPR was rejected in two court opinions in 2005.³²

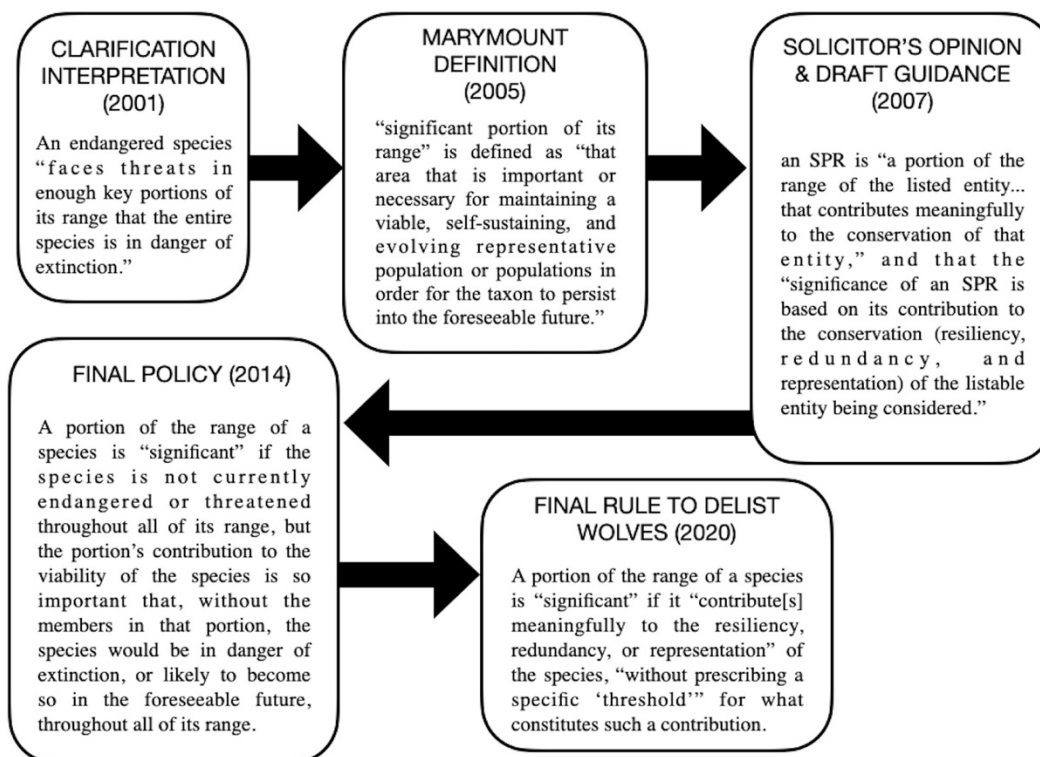


Fig. 3. Evolution of the Service’s interpretation of “significant portion of its range.”

The courts have consistently indicated that while Service is entitled to deference with its interpretation, because the phrase is ambiguous, the Service must explain itself and the interpretation must be reasonable. The diagram suggests that the Service has increasingly explained what is essentially the same interpretation. This pattern (and other evidence provided in the main text) suggests that the Service’s underlying interpretation (explanations notwithstanding) has been unreasonable. A robust and minimally-reasonable SPR policy will almost certainly be a substantial departure from the Service’s previous interpretations. Each interpretation is cited in the main text, except for the Marymount definition, which is found in *National Wildlife Federation v. Norton* (2005) (note 30 at 565) and the Final Rule (2020), which is from 85 Fed. Reg. 69,778 (Nov. 3, 2020).

³² Nat’l Wildlife Fed’n v. Norton, 386 F. Supp. 2d 553 (D. Vt. 2005); Defenders of Wildlife v. U.S. Dep’t of the Interior, 354 F. Supp. 2d 1156 (D. Or. 2005).

B. Solicitor's Opinion (2007)

The failure of those SPR interpretations led the FWS to issue a Solicitor's opinion in 2007 on the interpretation of SPR, which explicitly rejected the clarification interpretation and stated:

The SPR phrase is a substantive standard for determining whether a species is an endangered species... and the protections of the ESA [are to be] applied to [a] species in that portion of its range where it is specified as an "endangered species"³³

The Solicitor's opinion also indicates that the Secretary has the discretion to interpret SPR in terms other than size, including for example, in terms that further the ESA's purpose of protecting the values of a species (*i.e.*, aesthetic, ecological, educational, historical, recreational, and scientific) that would be lost if the species were to become extinct in either that portion or the whole range.³⁴

In 2008, the FWS issued draft guidance that elaborated on the Solicitor's opinion. It states that an SPR is "a portion of the range of the listed entity... that contributes meaningfully to the conservation of that entity," and that the "significance of an SPR is based on its contribution to the conservation (resiliency, redundancy, and representation) of the listable entity being considered."³⁵ The FWS indicated that the concepts of resiliency, redundancy, and representation were to be the "indicators of the conservation value of portions of the range."³⁶

The FWS withdrew the Solicitor's opinion after strong public opposition³⁷ and after its fundamental premise – that the ESA permits SPRs to be listed or delisted as discrete entities, separate from the species or subspecies within which they exist – was rejected by two courts.³⁸

³³ Memorandum from Dep't of Interior, Office of the Solicitor to Dir. of U. S. Fish and Wildlife Serv., *The Meaning of "In Danger of Extinction Throughout All or Portion of its Range"*, M-37013 (March 16, 2007). https://www.doi.gov/sites/doi.opengov.ibmcloud.com/files/uploads/M-37013_0.pdf [hereinafter USDOJ (2007).]

³⁴ See USDOJ (2007), *supra* note 33 at 11 ("According to the Act's findings... fish, wildlife, and plants are worthy of conservation because they are of "esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people." ESA § 2(a)(3). Thus, in defining what portion of a range will be considered "significant," it is appropriate for the Secretary to consider factors other than just the size of the portion in relation to the current range as a whole. He may define "significant" in such a way as to insure [sic] conservation of the species protected by the Act. For example, the Secretary could consider, among other things, the portion of the range in terms of the biological importance of that portion of the range to the species and in terms of the various values listed in the Act that would be impaired or lost if the species were to become extinct in either that portion of the current range or in the current range as a whole.")

³⁵ U.S. Dep't of the Interior, Draft Guidance Regarding Identifying Significant Portions of a Species' Range Under the Endangered Species Act, Memorandum (May 2, 2008), <https://www.regulations.gov/document?D=FWS-R9-ES-2011-0031-0008> [hereinafter USDOJ (2008).]

³⁶ *Id.* at 8.

³⁷ See Noelle Struab, *Scientists Call for Ending Bush-Era Endangered Species Listing Policy*, N.Y. TIMES, Dec. 10, 2009.

³⁸ *Defenders of Wildlife v. Salazar*, 729 F. Supp. 2d 1207 (D. Mont. 2010); *WildEarth Guardians v. Salazar*, No. CV-09-00574-PHX-FJM, 2010 WL 3895682 (D. Ariz. 2010).

C. Final SPR Policy (2014)

225 The core feature of this policy is where it defines “significant” to mean:
A portion of the range of a species is “significant” if the species is not currently endangered
or threatened throughout all of its range, but the portion’s contribution to the viability of
the species is so important that, without the members in that portion, the species would be
in danger of extinction, or likely to become so in the foreseeable future, throughout all of its
230 range.³⁹
That interpretation is very similar to the clarification interpretation offered in 2001 and
subsequently rejected by the courts. In *Center for Biological Diversity v. Jewell* (2017) the
Service’s interpretation of SPR was vacated for the District of Arizona on the grounds that it
“impermissibly clashes with the rule against surplusage and frustrates the purposes of the
235 ESA.”⁴⁰ And, the interpretation of “significant” in the 2014 policy was vacated nation-wide in
Desert Survivors v. U.S. Dept. of Interior (2018) for largely the same reason that the clarification
interpretation had been rejected in 2001.⁴¹

D. Subsequent Interpretations

240 In subsequent actions, the FWS has continued to rely on an interpretation that is very similar to
that provided in the 2014 final policy. Specifically, in November 2020, the FWS published a final
rule delisting gray wolves throughout the coterminous United States.⁴² In that final rule, the Service
stated that it had “not yet determined the best way to interpret ‘significant’ in light of the decision
in *Desert Survivors*” but that it was applying “‘significant’ in a way that is consistent with [the
245 court’s opinion in *Desert Survivors*], and with other relevant case law.”⁴³ The FWS’s
interpretation of SPR in its final rule is summarized in Figure 3. The court rejected the FWS’s
decision to delist gray wolves on grounds that its interpretation of SPR was arbitrary and
capricious. The court’s rationale for rejecting the FWS’s interpretation of SPR is especially clear,
important and instructive for what is required of an adequate SPR interpretation. We review that
250 rationale in section (V)(A) of this document.

E. Range

The Service has also made important claims about the interpretation of the word “range” in the
Solicitor’s Opinion (2007) and the Final SPR Policy (2014). The specific concern is whether that
255 word refers to “current range” or “historical range.” We detail this concern later in this

³⁹ Final Policy on Interpretation of the Phrase “Significant Portion of Its Range” in the Endangered Species Act’s Definitions of ‘Endangered Species’ and ‘Threatened Species’. 79 Fed. Reg. 37,577 (July 1, 2014). Hereinafter USFWS (2014).

⁴⁰ *Ctr. for Biological Diversity v. Jewell*, 248 F. Supp. 3d 946, 958 (D. Ariz. March 28, 2017).

⁴¹ *Desert Survivors v. U.S. Dep’t of the Interior*, 336 F. Supp. 3d 1131, 1136 n.2 (N.D. Cal. 2018).

⁴² *Removing the Gray Wolf (Canis lupus) From the List of Endangered and Threatened Wildlife*. 85 Fed. Reg. 69,778 (Nov. 3, 2020).

⁴³ This circumstance was also highlighted (nearly verbatim) in *Defenders of Wildlife v. U.S. Fish and Wildlife Service*, No. 21-cv-00344-JSW, 2022 WL 499838 (N.D. Cal. 2022).

document, where it is easier to explain how that judgment may or may not affect the interpretation of SPR.

In sum, the Service advanced a series of interpretations of SPR over the past two decades (Fig. 3). The courts have repeatedly rejected these interpretations. Repetitious features of this cycle indicate the need for a substantively different and improved SPR policy.

V. DEVELOPING A NEW, ROBUST INTERPRETATION

A. *The Meaning of “Significant.”*

We begin by focusing on the word “significant,” which has been conceptualized by the Service in this way:

a portion of the range of a species is “significant” if the species is not currently endangered or threatened throughout all of its range, but the portion’s contribution to the viability of the species is so important that, without the members in that portion, the species would be in danger of extinction, or likely to become so in the foreseeable future, throughout all of its range... We evaluate biological significance based on the principles of conservation biology using the concepts of redundancy, resiliency, and representation (the three Rs).⁴⁴

Here, the meaning of “significant” depends on the 3Rs, for which the most recent interpretation appears to be:

- Redundancy: The ability of a species to withstand catastrophic events by spreading risk among multiple populations or across a large area.
- Representation: The ability of a species to adapt to changing environmental conditions over time as characterized by the breadth of genetic and environmental diversity within and among populations.
- Resiliency: The ability of a species to withstand stochastic disturbance; resiliency is positively related to population size and growth rate and may be influenced by connectivity among populations.⁴⁵

This conceptualization of “significant” – when focused on the “ability of a species” to survive – relegates SPR to surplusage, which the courts have identified as problematic with the Service’s SPR policies. This concern is illuminated with a heuristic example: Suppose that a species is lost from some portion of its range, but the species still inhabits enough range to withstand stochastic disturbance. According to the Services’ SPR policy, this species is not endangered because the species still exhibits *resiliency*. Now, suppose the species is subsequently lost from more range and can no longer withstand stochastic disturbance. According to the SPR policy, the species is

⁴⁴ USFWS (2014), *supra* note 39 at 37,581.

⁴⁵ David R. Smith et al., *Development of a species status assessment process for decisions under the US Endangered Species Act*. 9 JOURNAL OF FISH AND WILDLIFE MANAGEMENT 1, 302-320 (2018).

no longer resilient and so becomes endangered. The concern is that this resilient-based trigger is also the point at which the species becomes, very simply, “at risk of extinction.” In this way the SPR phrase is redundant and relegated to surplusage. While we used resiliency as an example, the same point stands with respect to representation and redundancy.⁴⁶

The same concern, expressed differently, is: The Service uses the 3Rs to help answer the question, what portion of species range is significant to the entire species’ viability? However, the SPR phrase requires the FWS to answer the importantly shorter and more basic question, *what portion of a species’ range is significant?* This simple and subtle misalignment of question and answer may explain why courts have consistently ruled that the Service’s interpretation of SPR is surplusage.

While it may seem excessive to give so much attention to concerns about surplusage, we do so because the FWS has had perennial difficulty accommodating the courts’ instructions pertaining to surplusage – including as recently as Smith et al. (2018) and USFWS (2020).

The concern is reinforced by *Defenders of Wildlife v. USFWS* (2022), which reversed the Service’s decision to delist wolves in January 2021 and faulted the Service’s interpretation of SPR, stating that the Service’s rule to delist wolves:

... suggests that wolves that contribute to the resiliency, redundancy, and representation of gray wolves still may not be considered meaningful and thus, do not satisfy the “significant portion” standard. But the Service has not sufficiently explained how it draws that line. Because the Service has not provided any threshold for meaningfulness, the Court cannot assess whether the Service’s interpretation gives independent meaning to the phrase or has again implemented an interpretation that renders it redundant or superfluous. Accordingly, the Court finds the Service’s interpretation is not a reasonable construction of the phrase “significant portion of its range” and GRANTS Plaintiffs’ motion on this basis.⁴⁷

When the court states the Service “has not sufficiently explained how it draws that line” the court is effectively saying: The Service has not interpreted the legal definition of an endangered species with sufficient precision to know whether – at least in the case of gray wolves – the species is endangered or not. Section II indicates that cases like gray wolves are common.

A substantial portion of the Final SPR Policy (2014) is a section entitled, “The Threshold for ‘significant.’” Regardless of what questions one might hope that section of the policy to address, the Final SPR Policy fails to answer the question, by what standard does one determine answers to the question, what is an endangered species?

⁴⁶ For emphasis, there is nothing fundamentally wrong with the 3Rs as a tool for thinking about the mechanisms of extinction. The concern is the Service has yet to employ the 3Rs in a manner that answers the unresolved policy question, i.e., What is an Endangered Species?. While the 3Rs are valuable as general principles, those concepts have not been adequately developed by the scientific community to be of particular use in answering the question, What is an Endangered Species?, with the kind of measurable specificity required by the ESA.

⁴⁷ *Defenders of Wildlife v. USFWS*, 2022 WL 499838 at *11. Also, the preceding text of section (V)(A) was written before (and therefore independently of) the court’s decision.

The Service's having relegated SPR to surplusage is also likely associated with interpreting "significant" as an idea that goes well beyond parsimonious understandings of that word as indicated by everyday language and dictionaries. More than one court has highlighted the appropriateness of minding such interpretations.⁴⁸

Common understandings of "significant" are also central to a wide swath of laws and policies pertaining to levels of acceptable risk, acceptable loss and acceptable danger. Examples of more parsimonious uses of "significant" in policy-related contexts include:

- The loss of life that occurs when highway speed limits exceed *X* is significant; therefore, speed limits should be less than *X*.
- The risk to public health is significant when concentrations of lead in drinking water exceed *Y* ppm; therefore, concentrations of lead should be less than *Y*.

In those cases, "significant" follows dictionary definitions of the word, such as where the American Heritage Dictionary defines significant as:

Having or likely to have a major effect; important: *a significant change in the tax laws...*

Fairly large in amount or quantity: *significant casualties; no significant opposition.*

In those examples (about speed and lead) and in many other examples like those, including the ESA, the word "significant" carries an important and inescapable normative judgment about what counts as a "major effect" or a "fairly large amount." Furthermore and no less important, a "significant" risk or loss is judged to be an unacceptable risk or loss that demands corrective action.⁴⁹

Consider this analysis of "significant," the fundamental role it plays in giving meaning to the ESA's definition of an endangered species, and the best-available science pertaining to the biodiversity crisis. This tripartite consideration leads to the conclusion that the Service has not interpreted the legal definition of an endangered species with enough precision to adequately answer the question, what is an endangered species? Certainly, we know that pandas and tigers are endangered and American red squirrels and American robins are not endangered. However, and at no risk of hyperbole, there is a large and growing class of cases for which the Service has not provided a robust standard for answering the question.

B. Significance Beyond Percentage of Range, Per Se

The percentage of lost geographic range, *per se*, is fundamental to the meaning of SPR. But, it is not the only meaning that can rise from SPR. The need to account for more than percentage, *per se*, is illustrated by analogy with the "pound of flesh" demanded by Shakespeare's Shylock. While a pound of flesh is only less than a percent of most humans' flesh, to lose a pound of heart muscle is fatal (i.e., significant to persistence), while losing some other pound of flesh may not be significant to persistence. However, losing say 30% of one's flesh may not threaten one's

⁴⁸ Defenders of Wildlife v. Norton, 239 F.Supp.2d 9 (D.D.C. 2002); Ctr. for Biological Diversity v. Everson, 435 F.Supp.3d 69 (D.D.C. 2020).

⁴⁹ This analysis is not claiming that the word "significant" is used universally in law or policy pertaining to unacceptable risk, harm or danger. Rather the preceding analysis refers to an underlying logic and meaning, which is broadly employed.

365 persistence, but that loss would unquestionably be “significant” – regardless of which 30% was lost.

We apologize for the gruesome analogy. But it seems important to draw ample and memorable attention to the simple, but easily overlooked point: significance must refer to a flat percentage and may also refer to other aspects of significance – such as some particular portion of range being significant in some other way.

370 We are not the first to acknowledge the importance of both aspects of significant. In particular, the courts have written, “A more thorough analysis, however, suggests that a flat percentage of geographic area is not the **sole** [emphasis added] determinant of significance.”⁵⁰ The word sole clearly indicates that other elements of significance may also be important.

375 The FWS has also acknowledged the importance of both aspects of significance, where the Solicitor’s Opinion (2007) states that “the Secretary... and may consider factors other than simply the size of the range portion in defining what is “significant.” This is a clear acknowledgment that percentage, per se, is important, in addition to other possible considerations.

380 *C. Objectively Measurable Standards and Normative Judgments*

That extinction risk and the biodiversity crisis are directly linked to the gradual loss of geographic range is a basic fact of ecological science. Furthermore, the statutory findings and purpose of the ESA highlight the ecological value of a species, which cannot be manifest on unoccupied portions of a species’ range. The loss of ecological value and growth in extinction risk that rise from range loss are gradual processes, and the ESA’s purpose is unquestionably to arrest those fundamentally inter-related processes.

385 Because those processes involving loss, risk, and danger⁵¹ are continuous (as opposed to discrete), administrators of the ESA are in the inescapable position of having to make a normative judgment about what *objectively measurable* level of loss, risk and danger is generally to be considered unacceptably high and therefore in need of corrective action (i.e., federal protection of a species).

390 Identifying and justifying this normative judgment is required to prevent courts from concluding that the judgment is arbitrary and capricious. This requirement is not a foreign idea. A wide swath of policy pertaining to public health and environmental protection require agencies to judge the point at which loss, risk or danger becomes unacceptably high and therefore deserves corrective action. Two examples are:

- The requirement for employers to “assure that no employee is exposed to lead at concentrations greater than fifty micrograms per cubic meter of air (50 ug/m³) averaged over an 8-hour period.”⁵²

⁵⁰ Sw. Ctr. For Biological Diversity v. Norton, Civ. No. 98-934, 2002 WL 1733618 (D.D.C. July 29, 2002).

⁵¹ “danger,” as in being “in danger of extinction,” which represents the first words in the ESA’s definition of endangered species (16 U.S.C. § 1632(6)).

⁵² OSHA Lead Exposure Regulation, 29 C.F.R. § 1910.1025.

- 400 • Requirement for automakers to limit CO2 emission in light-duty vehicles to 205 grams of CO2 per mile.⁵³

Those objectively measurable standards represent normative judgments about acceptable loss, risk and danger. There is no robust reason to think that policy pertaining to acceptable loss, risk, and danger in biological species differs in this regard (i.e., the need for developing such standards). Indeed, the court’s recent decision in the case of wolves explicitly indicates the lack of such a standard as the central problem (p. 13).

405 Setting such a standard (even providing guidance for such a standard) is an inescapably normative judgment that depends on understanding the best-available science, but also transcends the scope of science. Furthermore, scholarship indicates that, in the arena of public policy, there are four basic influences on judgments of unacceptable loss, risk or danger: statutory language (and supportive documentation such as the Congressional record), expert opinion, judgments of the general public, and judgments of policy makers.⁵⁴

410 The core phrase of the legal definition of an endangered species, i.e., “in danger of extinction” represents virtually no guidance at all as to what counts as unacceptable risk.⁵⁵ And, it would be remarkable to conclude that Congress offered so little guidance about what counts as unacceptable risk or loss. Rather, Congress almost certainly offered substantive guidance with the phrase “throughout all or a significant portion of its range.”⁵⁶

420 With that last sentence – and the scientific understanding that range loss is intimately and causally linked to the loss of ecological value and a key mechanism by which extinction risk grows – one should realize that the SPR phrase is not some subordinate, supporting principle by which to understand the legal definition of an endangered species. Rather, for a broad class of species, SPR is central for being able to answer the question, what is an endangered species?

D. *Judgments about Acceptable Loss and Sociological Knowledge.*

425 The judgment – that is required of the Service and featured in the previous section – is fundamentally normative and values based. Yet, the ESA requires that “the secretary shall make determinations [about listing] solely on the basis of the best scientific... data available...” That seeming contradiction is readily resolved by distinguishing (i) determinations for listing any particular species from (ii) the standard by which a determination is based. Best-available

⁵³ 86 Fed. Reg. 74,434.

⁵⁴ Paul R. Hunter and Lorna Fewtrell, *Acceptable Risk, in WATER QUALITY: GUIDELINES, STANDARDS AND HEALTH. RISK ASSESSMENT AND MANAGEMENT FOR WATER-RELATED INFECTIOUS DISEASE*, 207-228 (Lorna Fewtrell and Jamie Bartram eds., 2001); John A. Vucetich and Michael Paul Nelson, *Acceptable Risk of Extinction in the Context of Endangered Species Policy, in PHILOSOPHY AND PUBLIC POLICY*, 81–103 (Andrew I Cohen, 2018).

⁵⁵ Eric T. Freyfogle and Dale D. Goble. *WILDLIFE LAW: A PRIMER* (2009).

⁵⁶ In section (V)(A) of this document, we highlighted the court’s criticism of the FWS’s use of the 3Rs. This criticism is reinforced by the ideas here in section (V)(C). Specifically: While the 3Rs are useful for explicating the underlying mechanisms of extinction risk, the FWS’s use of the 3Rs provides no guidance as to what counts as unacceptably low levels of resiliency, redundancy or representation. In other words, the Service’s final policy almost certainly takes Congress’s guidance about unacceptable risk and replaces it with a description of the processes that underlie the extinction process.

430 science constrains *determinations* of whether a particular species fit the standard, but the
standard itself is an inescapably normative judgment.

Furthermore, this normative judgment is importantly constrained by the ESA's explicit
purpose, which is supported by documentation of Congress's intent, and further clarified by best-
available ecological science (Section II). Even with those constraints, there is still a significant
435 normative judgment to make – i.e., a value judgment that has not been determined by the ESA,
Congressional intent, or the best-available science. Making that judgment is the responsibility of
the Service.

On what grounds could it make such a value judgment? That judgment should perhaps be
substantively informed by an understanding of the values of the people for whom the law is
440 intended to serve – if such information exists. Fortunately, such information exists. We present
that information, then make the argument that such information ought to inform the Service's
judgment.

Two of the authors of this report led a team of researchers in administering a survey to a
445 representative sample of 909 American residents.⁵⁷ Survey participants were asked to provide
their judgments about what would count as an acceptable loss of geographic range for a species.
Specifically, survey participants were presented with these statements:

The geographic areas where a species lives is called their 'range.' Most mammal species
have been driven to extinction from half or more of their historic range because of
450 human activities.

And:

Extinction is a process that involves regional extinction at various places throughout a
species' historic range. The geographic areas where a species lives is called their 'range.'
Most mammal species have been driven to extinction from half or more of their historic
455 range because of human activities.

Then, participants were asked these two questions⁵⁸:

What percentage of historic habitat loss would be acceptable?

460 How much [what percentage] of a species' historic range should be lost before federal
law steps in to protect a species?

Responses to those survey items indicate that the majority of the adult Americans indicated that
acceptable losses should be less than 30% of a species historic range. (Fig. 4).

465 Participants were also asked to indicate their political orientation (7-point scale from
'very liberal' to 'very conservative'). Importantly, responses to survey items C and D were not

⁵⁷ The results of this survey are part of the peer-reviewed literature. Tom Offer-Westort et al., *What is an Endangered Species?: Judgments about Acceptable Risk*, 15 ENVIRON. RES. LETT. 1, 014010 (2020).

⁵⁸ Considering responses to two similarly worded survey items, as done here, increases the ability to meaningfully discern participants' responses to the underlying idea common to both survey items, as opposed to potentially less meaningful responses to idiosyncrasies in the wording of either survey item.

associated with political orientation. That is, there was no tendency for conservatives to be more accepting of loss than liberals.

The survey also included a set of items to assess a person's overall knowledge of the environment. Participants demonstrating less knowledge about the environment tended to be more accepting of loss than those with more knowledge. But the difference between the most and least knowledgeable in judgment about acceptable loss was about 10% (from a mean of about 25% to a mean of about 15%).

Judgments about acceptable loss are a synthesis of facts and values. Judgments from a representative sample of Americans could, in principle, be impaired by most Americans' lacking expertise pertaining to species endangerment. Being expertly informed about the biological conservation may alter one's judgment about what counts as an acceptable loss.

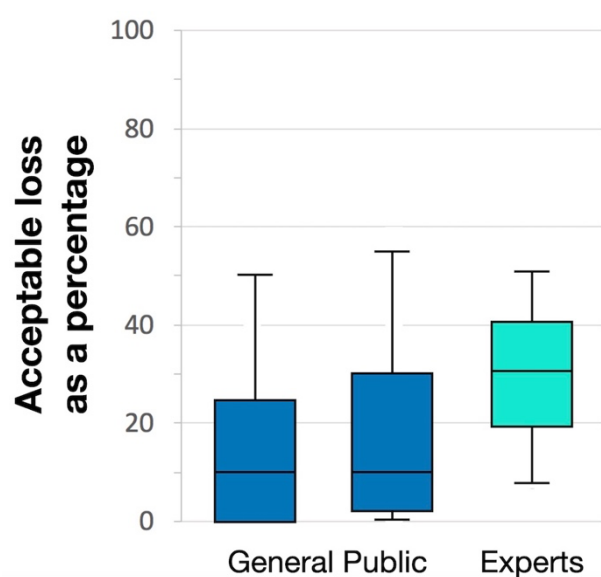


Fig. 4. Judgments by the general public and experts on what constitutes an acceptable loss of geographic range. Boxes represent the 25th and 75th percentiles, horizontal lines within each box represent the median, and the whiskers represent the 10th and 90th percentiles. The left column refers to the question, “What percentage of historic habitat loss would be acceptable?” The middle column refers to the question, “How much [what percentage] of a species' historic range should be lost before federal law steps in to protect a species?” See main text for other details.

This possibility is accounted for with another recent scientific finding. In particular, a representative sample of 438 conservation scholars were presented with this statement and question⁵⁹:

In the past two centuries, the median terrestrial vertebrate species is thought to have lost approximately 60% of its historic range. Taking account of human needs, what would be an acceptable loss of historic range for most species (0 = no range loss & complete restoration; 60 = current median loss; 100 = complete extirpation).

The distribution of expert responses to this item is given in the right-most column of the figure above. While experts' judgments tend to be accepting of larger losses, the distributions of

⁵⁹ This survey result was first reported in Vucetich, John A. Vucetich et al., *How Scholars Prioritize the Competing Values of Conservation and Sustainability*. 257 BIOL. CONSERV. 109126 (2021).

responses are importantly overlapping. Three-quarters of the experts surveyed indicated that acceptable loss is 40% or less of a species geographic range (Fig. 4).

495 With respect to the aforementioned findings, we make one narrow claim: After taking account of constraints imposed by the ESA, Congressional intent, and best-available ecological science; the Service should make a value judgment about what counts as acceptable loss for a species that is substantively informed by scientifically-derived information about the values of constituents and experts as they pertain to the judgment.

500 This claim does not preclude other legitimate considerations from informing the Service's judgment.⁶⁰ And, we are unable to envision an argument that would conclude that the knowledge of the values of constituents and experts is irrelevant. In no way does such consideration reduce the creation of policy to mere scientific polling, because the policy is already greatly constrained by other powerful influences and further mediated by however the Service decides to take
505 account of the scientific information about values.

E. The Meaning of "Range."

Understanding the phrase SPR requires understanding, not only the meaning of "significant, but also the meaning of "range." The FWS has, since publication of the Solicitor's
510 Memorandum (2007), expressed its belief that "range" (as the word appears in the ESA's definition of endangered species) is best equated with "current range." While the courts have affirmed that Service may do so, the courts do not require the Service to do so.⁶¹ That affirmation is troubling because the reasons to think that "range" means "historic range" (as detailed in Appendix A).

515 Concerns about "range" are, however, moot as they pertain to the interpretation of SPR proposed here. In particular, we show in Appendix B that the proposed policy (presented in section (V)(H)) is not affected by whether one interprets range as being current or historic. But, the proposed policy is considerably easier to comprehend if explained while equating range with historic range. Therefore, for the purpose of initially presenting the proposed policy, we equate
520 "range" in the ESA's definition of endangered species with "historic range."

F. The Seven Forms of Rarity

We now turn attention away from interpretation of statutory language to highlight an essential feature of *rarity*, which is the formal concept developed through extensive, long-standing
525 conservation scholarship and was introduced in Section II. The motivation for returning to rarity is that any robust interpretation of SPR must handle the many hundreds of varied circumstances that surround endangered species cases – from wolves to ghost orchids. The details of rarity

⁶⁰ We do not have any additional legitimate considers of a particular nature in mind. Whether such a consideration exists would require an explanation, as opposed to being adequately supported by presumption or assertion.

⁶¹ *Humane Soc'y of the U.S. v. Zinke*, 865 F.3d 585 (D.C. Cir. 2017); *Ctr. for Biological Diversity v. Zinke*, 900 F.3d 1053 (9th Cir. 2018).

provide the framework for an SPR policy that can handle that diversity of circumstance present among endangered species.

Rarity is a relative concept, in the sense that a species is rare (or not) in relation to its prior condition or in relationship to other species. For this reason, not every species that exhibits some form of rarity would necessarily qualify as threatened or endangered. However, the reverse is true: every endangered species is (or soon will be⁶²) characterized by one and only one of seven forms of rarity (Fig. 1). That is the valuable result: Of the thousands of instances of endangerment, each is well characterized by one of only seven forms of rarity. Those seven forms of rarity are presented in Figure 1.

G. Essential Properties of an SPR Policy

The preceding analyses indicate that a robust interpretation for the legal definition of an endangered species, given the meanings of “range” and “significance” must have these properties:

- SPR cannot be surplusage.
- SPR should account for the percentage of lost range, per se, in addition to other ways that some particular portion of range might be considered significant.
- Interpreting the ESA’s definition of “endangered species” must serve the ESA’s purpose. The purpose of the ESA, in the parlance of current science, is to lessen the biodiversity crisis, and restore the values of endangered species that have been lost to the extinction process – which for terrestrial vertebrate species is more often than not associated with contraction of a species range.
- Interpreting the ESA’s definition of “endangered species” must pass normative judgment about what counts as unacceptable risk and associated loss (of species’ value) – unacceptable to the point of deserving corrective action. That judgment should be informed by the best-available science.⁶³
- Interpreting the ESA’s definition of “endangered species” must be appropriately flexible to accommodate the varied circumstances that surround any species. We’ll see momentarily that this flexibility is provided, in part, through the taxonomy of rarity.
- Interpreting the ESA’s definition of “endangered species” must be appropriately specific to favor consistent and (legally) defensible application.

⁶² Ecologists’ understanding of endangerment would also include the notion that some species are at risk of extinction because their population growth rate is negative. Such species may not be rare at the moment, but soon will be.

⁶³ This includes both ecological science (Section (II) of this document) and social science (such as Figure 4; see also Sections (VII)(C) and (D)).

565 H. *The Proposed Policy*

A policy that satisfies the aforementioned properties is: A species will generally be considered endangered if its current range is reduced by X% or more of the species' historic range. These are species for which enough loss has occurred to merit the corrective actions afforded by the ESA. Except, for some species it may be necessary to adopt a threshold for acceptable loss that is less than X%. These cases include:

- species whose historic range is small enough such that small reductions in occupied range would lead being in danger of global extinction. When handling such a case, the Service should propose a lower threshold of acceptable loss for that species and defend that view with the best-available science.
- species that have lost little of their current range, but have become too rare as a result of lost habitat throughout its historic range or have become too rare because their range-wide density has been reduced to the point of being too rare.

580 In extreme cases, X would be zero. Such a case would represent a species "at risk of extinction throughout all of its range."

There is ample evidence in this document (e.g., Figure 4) to develop a robust determination for the value that should replace "X" in this preceding policy recommendation.

585 There may be cases leading the Service to additionally conclude that some particular portion of range is significant, due to, for example, its contribution to overall viability. In such cases, the Service would explain how and why that portion is significant. Conserving these significant portions of range is independent of the requirement to conserve a specific percentage of historic range.

590 While this expression of the proposed policy assumes that "range" in the ESA's definition of an endangered species equates to "historic range," the policy is functionally identical if one were to assume that "range" equates to "current range." (Appendix A for details).

I. *Threat Assessments*

595 The Service might respond to the proposed policy by indicating that they account for lost historic range (and the possible need to restore lost range) when the Service conducts its analysis of threats as required by the ESA⁶⁴, which states:

The Secretary shall... determine whether any species is an endangered species or a threatened species *because* [emphasis added] of any of the following 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

⁶⁴ The Service seems to make this argument in USFWS (2014), *supra* note 39.

605 (E) other natural or manmade factors affecting its continued
existence.⁶⁵

The consideration of historic range is clearly important in fulfilling the ESA’s requirement for determining which threats caused a species to become endangered. For emphasis, the word “because” in the above cited text indicates that this portion of §1533 in the ESA is focused on
610 assessing the causes of endangerment (i.e., why a species is endangered). Understanding why a species is endangered is important (in part, because it leads understanding how to recover species). But understanding *why* a species is endangered is different from understanding *whether* a species is endangered. Nothing in § 1533 of the ESA provides any sense or guidance as to Congress’s thinking about how one determines *whether* a species is endangered (i.e., a standard
615 for drawing the line between endangered and not endangered). That guidance is provided in § 1532 of the ESA where Congress defined an endangered species and thereby provided its guidance for developing an objectively measurable standard for judging *whether* a species is endangered. The need for the Service to develop such a standard and that guidance for such a standard rests with the SPR phrase has been indicated by the courts.⁶⁶

620 One might object to the analysis of the preceding paragraph on grounds that *whether* and *why* are so tightly linked as to be inseparable. But they are separable, as illustrated by this pair of analogous questions: Is this person dying? If the answer is yes, then why are they dying? The questions and possible answers are distinct. The answer to the first question indicates *whether* corrective action is required. The answer to the second question indicates *what* corrective action
625 to take.

One might also object to the preceding analysis on grounds that § 1533(a)(1) requires attending *whether* and *why* because that passage of the ESA includes the words “whether” and “because.” We would concede this point if the ESA did not include a legal definition for endangered species, but it does.⁶⁷ And, that definition clearly answers the question, by what
630 standard does one determine *whether* a species is endangered? While assessing threats (as required by § 1533(a)(1) of the ESA) might, in some cases, incidentally offer auxiliary insight as to whether a species is endangered, its primary purpose it to guide the Service in its assessment of *why* a species is endangered. Furthermore, attending historic range in threat assessment does not grant *carte blanche* to ignore the relevance of historic range in the legal definition of the
635 ESA, which is clearly guidance for determining the standard for whether a species is endangered.

VI. RECAPITULATIONS

640 A. Specificity

The development of any policy pertaining to acceptable risk, loss or harm requires the policy-maker to make a judgment that is both normative and specific. These judgments are constrained

⁶⁵ 16 U.S.C. § 1533

⁶⁶ *Supra* note 47.

⁶⁷ 16 U.S.C. § 1531

by statutory language and further specifications should be informed by a scientifically-derived understanding of views held by experts and the general public.⁶⁸ These normative judgments need enough specificity for consistent and objective application to individual cases. These features are common place in federal policies involving acceptable risk, loss or harm (See section (V)(C) for examples). There is no robust reason for policy pertaining to acceptable risk, loss or harm in biological species to differ in these regards.

The boxed text on the previous page provides the structure for a policy representing an appropriately specific, measurable standard for determining whether a species fits the legal definition of an endangered species. The next (and more-or-less final) step in developing this policy is for policy-makers to select a value for X, *i.e.*, the portion of lost range that is unacceptable and beyond which corrective actions of the ESA are warranted. This value should be selected in a manner that comports with the statutory meaning of “significant” (Sections (V)(A) and (V)(B)) and is appropriately informed by relevant sociological information (Section (V)(D)).

For example, if the Service wanted X to be aligned with the typical conservation expert, they would select 30%. Also, for example, if the Service wanted X to be aligned with no more loss than what most American residents would accept, then the Service would (coincidentally) select 30%. These are two examples for how Figure 4 can be used by policy-makers to select an appropriate value of X.

Any approach that does not focus on the selection of a consistently applied value for X will fail for some combination of the following reasons: being arbitrary and capricious, failing to identify a standard with sufficient measurable specificity, or being applied inconsistently and subjectively across cases.

B. Flexibility

The proposed SPR policy is not only specific, but also flexible. It is flexible enough to account for every kind of endangered species. The proposed policy’s flexibility rises from its use of an all-encompassing taxonomy of rarity that is widely used by conservation biologists (section (V)(F)). This flexibility is manifest in the proposed policy by its acknowledgment that some cases will require smaller values of X. The cases requiring smaller values of X are specified in the proposed policy. Briefly, those cases involve species at risk of extinction throughout the entirety of their range. Many of these cases will involve species with small historic ranges. In those cases, the Service would have an obligation to select a smaller value of X (perhaps zero) and explain why that smaller value of X is appropriate. The explanation requires a normative judgment about what counts as being “at risk of extinction” and a scientific explanation for how extinction risk is influenced by X and other factors, such as total abundance and the population’s per capita growth rate.

VII. ADDITIONAL CONSIDERATIONS

⁶⁸ See Section IV.C for an explanation. The most salience of these views are represented in Section (IV)(D), especially Figure 4.

A. Relationship to Distinct Population Segment Policy

The proposed SPR policy would to apply to any listable entity, including a distinct population segment (DPS). In other words, after identifying a listable entity (of any kind, species, subspecies, DPS, etc.), then one would apply the SPR policy. No less important, the ESA does not permit an SPR – *in and of itself* – to be a listable entity.

There is value in inspecting more closely how SPR and DPS policy relate to one another with for a particular kind of case, i.e., taxa that are habitat generalist with large historic ranges (such as gray wolves and grizzly bears). To understand such cases, recall that long-standing policy allows for recognizing a DPS only on the basis of its “significance” and “discreteness,” and recall that discreteness involves two criteria.⁶⁹

Consider the first criterion for discreteness, which requires a DPS to be “markedly separated from other population as a consequence of physical, physiological, ecological, or behavioral factors.”⁷⁰ A useful basis for judging this kind of separateness are Level I and Level II ecoregions – a schema widely recognized by ecologists, including those working at federal agencies, such as the EPA. Level I and Level II ecoregions are markedly separate (as indicated by the boundaries of the map in Figure 5), and that marked separation is a consequence of ecological factors. The marked, ecological separateness of ecoregions will *in some cases* result in taxa whose historic ranges spanned two or more ecoregions to be comprised of two or more DPSs, characterized by marked, ecological separateness. There is no requirement that a DPS align precisely with the boundaries of an ecoregion. Rather, we use ecoregions to illustrate a broader point: habitat generalists with large historic ranges are likely to exhibit marked, ecological separateness across their historic range due to marked differences in habitat. Such taxa are likely composed of two or more DPSs.⁷¹

To further illustrate the first criterion for discreteness (i.e., being “markedly separated”) related to the proposed SPR policy, consider the gray wolf of the coterminous United States. Across the historic range of this gray wolf, the composition of their diet varied markedly. Gray wolf diet consisted largely of white-tailed deer in some regions, a mixture of deer and moose in other regions, elk in other regions, etc. Those differences are concomitant with, for example, marked differences predation behavior and ecosystem function. Differences in ecosystem function arise from wolves’ impact on prey populations and the differing impact of those prey populations on the ecosystems the inhabit. These are only examples of regional differences in the ecology, behavior and phenotype of gray wolves – differences that serve as the basis for acknowledging that the gray wolf is comprised of several DPSs.

⁶⁹ Policy Regarding the Recognition of Distinct Vertebrate Population Segments Under the Endangered Species Act. 61 FR 4722 (Feb. 7, 1996). [Hereinafter USFWS (1996).]

⁷⁰ *Ibid.*

⁷¹ Some habitat *specialists* had large historic ranges. Some of those taxa may also have exhibited spatial variation in genetics that leads to acknowledging that such taxa are comprised of two or more DPSs. The salient point being, the proposed SPR policy does not interfere with DPS policy.

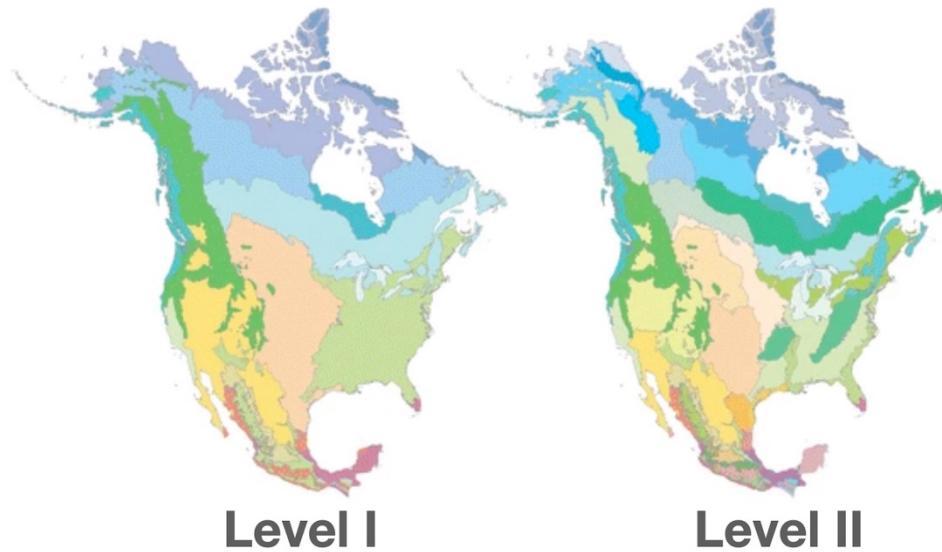


Fig. 5. Level I and II Ecoregions of North America. Source: www.epa.gov/eco-research/ecoregions-north-america

To further see how the proposed SPR policy comports with existing DPS policy, consider the DPS policy’s requirement for “significance,” which refers to the DPS’s “importance to the taxon.” The policy lists several examples of such importance, including “evidence that loss of the discrete population segment would result in a significant gap in the range of a taxon.”⁷² That involves no longer securely inhabit, for example, ecoregions 8.1 and 5.3, or ecoregions 9.2, 9.3, and 9.4, or ecoregion 10.1 certainly qualifies as a significant gap in the range of that taxon.⁷³ The DPS policy’s account of “significance” concludes:

Because precise circumstances are likely to vary considerably from case to case, it is not possible to describe prospectively all the classes of information that might bear on the biological and ecological importance of a discrete population segment.⁷⁴

The salient consequence of that stipulation is that the significance of a DPSs has to be argued. The SPR policy proposed here does not interfere with that (or any other element) of DPS policy.

Finally, consider the DPS policy’s second criterion for discreteness, which states that discreteness can be manifest as being, “delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms.”⁷⁵ Ecological science recognizes this second criterion as often being an importantly specific instance of the first criterion for discreteness. The principle that makes criterion 2 a specific instance of criterion 1 is: Humans are often an important part of a species’

⁷² USFWS (1996), *supra* note 69.

⁷³ The listed ecoregions align approximately with the great basin, the northeast, central plains, respectively. Precise locations of these regions may be found at: www.epa.gov/eco-research/ecoregions-north-america. Note, researchers sometimes aggregate ecoregions to better suit the particular application (e.g., James A. Falcone et al., GAGES: A Stream Gage Database for Evaluating Natural and Altered Flow Conditions in the Conterminous United States: Ecological archives E091-045, 91 ECOLOGY 2, 621 (2010).

⁷⁴ USFWS (1996), *supra* note 69 at 4725.

⁷⁵ *Id.*

ecology. More specifically, the second criterion refers to discreteness in terms of mortality and habitat that are a consequence of (anthropogenic) ecological factors, i.e., regulatory mechanisms (or lack thereof). To consider that a regulatory mechanism can be (or can directly lead to) an anthropogenic ecological factor is very much aligned with (i) principles of the Anthropocene and (ii) conceptual limitations of demarking “natural” and “unnatural” processes on the basis of human influence. Both ideas (i and ii) are increasingly taken into account during the administration of federal environmental policy.⁷⁶

Insomuch as the second criterion for discreteness is a special case of the first criterion – on grounds that humans are routinely part of a species’ ecology – then it is appropriate to acknowledge that other political boundaries can, in principle, give rise to the discreteness that defines a DPS. An example would be states where regulatory mechanisms allow for or encourage unduly high rates of exploitation of a particular taxon.

DPS policy emphasizes that DPSs are to be used “sparingly.” As such, DPS policy should be applied to species with large historic ranges only, when necessary, as opposed to more frequently. Nothing about the proposed SPR policy interferes with the requirement for sparing use.

The Service does express a belief in the DPS policy that almost certainly requires revision or rejection, given the scholarship presented here, where they state:⁷⁷

Despite its orientation toward conservation of ecosystems, the Services do not believe the Act provides authority to recognize a potential DPS as significant on the basis of the importance of its role in the ecosystem in which it occurs. In addition, it may be assumed that most, if not all, populations play roles of some significance in the environments to which they are native, so that this importance might not afford a meaningful way to differentiate among populations.⁷⁸

Contrary to that belief, the best-available ecological science almost certainly indicates that the role of a species in an ecosystem is an important basis for distinctness. This belief also contradicts a central feature of the DPS policy, where it explains “significance,” which includes reference to the “ecological importance” of a DPS.⁷⁹

This assessment of DPS does not imply any need for the Service to revisit their DPS policy, except to: (i) abandon the belief expressed just above and (ii) strike the word “international” from the list of criteria that can result in recognizing a DPS so that the operative phrase is “delimited by governmental boundaries.”⁸⁰

⁷⁶ e.g., David N. Cole and Laurie Yung, eds. *BEYOND NATURALNESS: RETHINKING PARK AND WILDERNESS STEWARDSHIP IN AN ERA OF RAPID CHANGE* (2012); Michael T. Rains, *A Forest Service vision during the Anthropocene*, 8 *FORESTS* 3, 94 (2017).

⁷⁷ USFWS (1996), *supra* note 69.

⁷⁸ See also Section II of this document.

⁷⁹ See quote from USFWS (1996) associated with note 63.

⁸⁰ See quote from USFWS (1996) associated with note 64.

770 Finally, a purpose of DPS policy is to afford ESA protections to DPSs that need such
protection, but not to DPSs that do not need ESA protection.⁸¹ Nothing about the proposed SPR
policy interferes with that purpose.

B. Critical Habitat

775 The SPR policy proposed in section (V)(H) also comports well with the notion of “critical
habitat” as that idea is defined in the ESA⁸² and administered by the FWS.⁸³ The essential
distinction between SPR and critical habitat is their purposes and explicit contexts. The purpose
of SPR is to convey the standard by which a species is to be judged endangered. The purpose of
critical habitat is to provide a means of conservation⁸⁴ so that a species’ condition can improve to
780 the point of no longer fitting the definition of an endangered species.

This distinction is highlighted, for example, by observing, that, “the only effect of
designating an area as critical habitat is to trigger the ESA requirement that actions authorized,
funded, or carried out by federal agencies must not destroy or adversely modify designated
critical habitat.” By contrast the effect of observing that a species is in danger of extinction
785 throughout a significant portion of its range is to afford all of the protections of the ESA until the
species no longer fits the ESA’s definition of endangered.

In other words, the purpose of SPR is to determine whether a species is endangered and
therefore in need of all the protections afforded by the ESA. By contrast the purpose of critical
habitat is to provide one of many possible means for conservation. Most succinctly, SPR speaks
790 to *whether* a species is endangered; critical habitat speaks to *how* one might go about conserving
an endangered species.

Given those distinct purposes, the ESA’s defining critical habitat as being “essential for
the conservation of the species”⁸⁵ does not represent misalignment, confusion or cross-purpose
with the notion that some portion of range might be “significant.”⁸⁶

⁸¹ In particular, a purpose of the DPS policy is (USFWS 1996, *supra* note 69): “Listing, delisting, or reclassifying distinct vertebrate population segments may allow the Services to protect and conserve species and the ecosystems upon which they depend before large-scale decline occurs that would necessitate listing a species or subspecies throughout its entire range. This may allow protection and recovery of declining organisms in a more timely and less costly manner, and on a smaller scale than the more costly and extensive efforts that might be needed to recover an entire species or subspecies. The Services’ ability to address local issues (without the need to list, recover, and consult rangewide) will result in a more effective program.”

⁸² 16 U.S.C. § 1532(5)(A)

⁸³ Testimony of Dan Ashe, Director, U.S. Fish and Wildlife Service, Department of the Interior, before the U.S. House of Representatives, Committee on Natural Resources, regarding implementation of the critical habitat requirements of the Endangered Species Act of 1973 (April 19, 2016) <https://www.fws.gov/sites/default/files/testimony/41916HNRESACHHearing.pdf>

⁸⁴ “Conservation” is defined in 16 U.S.C. § 1532(3) and we use that term in this sense throughout Appendix C.

⁸⁵ 16 U.S.C. § 1532(5)(A)

⁸⁶ For readers less familiar with ecology, “range” and “habitat” are basic terms in ecology and both words refer to where a species lives. A species’ “range” and “habitat” can typically be shown on a map. But there is a strong tendency for ecologists to use “range” to describe where species lives on small-scale maps (e.g., Grizzly bears’ range includes western Montana) and to depict “habitat” to be depicted on larger-scale maps (that could, for example, show that Grizzly bears do not live in downtown Missoula,

C. Climate Change

The purpose of the ESA is to mitigate anthropogenic threats, and climate change is an anthropogenic threat. At the same time, it may not be possible to mitigate some threats associated with climate change. Taxa that qualify as endangered species due to such threats may be “conservation-reliant” and may warrant ESA protections for the foreseeable future.⁸⁷ As such, the proposed SPR policy is not unworkable due to climate change. While concerns about the ESA and climate change are extremely important and merit more attention, they transcend concerns pertaining to SPR. Otherwise and in the meantime, experimental populations⁸⁸ may be the most useful mechanism within the ESA for mitigating cases where climate change has irreversibly rendered some portion of a species’ range unsuitable.

D. Conservation-Reliant Species and Conservation Triage

The interpretation of SPR proposed here would likely reveal that many endangered species will require indefinite protection under the ESA. One concern with such a circumstance is that Congress is unlikely to allocate sufficient funds to the FWS, precluding the FWS from fully pursuing the recovery of all species at any one point in time. Important insight about how to handle this circumstance is found in scientific findings about Americans’ attitudes about these circumstances.⁸⁹ In particular, a large majority of Americans:

- agree with the statement, “It will be impossible to fully recover some endangered species. Nevertheless, some of these species benefit importantly from federal protection. We should protect this kind of species,” (Fig. 6) and,
- disagree with the statement: “If a species cannot be fully recovered, they should not be protected even if the species would benefit from such protection.” (Fig. 7).

The interpretation of SPR proposed here would likely exacerbate the challenge of deciding how to allocate insufficient funds among endangered species. Again, important insight about how to handle this circumstance is found in scientific findings about Americans’ attitudes about these circumstances.⁹⁰ In particular, most Americans think – that when it is not possible to fully protect all species – it is best to provide minimal protection to all endangered species by making it illegal to kill or harm them, and provide additional protections when possible (Fig. 8).

even though they live in western Montana). A species’ “range” and “habitat” are both dependent on the “physical [and] biological features” of an area.⁸⁶ Ecologists have not tended to use the term “critical habitat” except when motivated by discourse related to the ESA. The ESA does not define the words “range” or “habitat” (apart from “critical habitat”). But there is no usage of “range” or “habitat” (as distinct from “critical habitat”) that is inconsistent with ecologists’ use of those terms.

⁸⁷ e.g., polar bears.

⁸⁸ 16 U.S.C. § 1539(10)(j). The USFWS recently proposed proposing revising [section 10\(j\) regulations](https://www.fws.gov/press-release/2022-06/department-interior-proposes-proposes-expanding-conservation-technique) by allowing for the introduction of listed species to suitable habitats outside of their historical ranges. <https://www.fws.gov/press-release/2022-06/department-interior-proposes-proposes-expanding-conservation-technique>

⁸⁹ Offer-Westort et al., *supra* note 57.

⁹⁰ *Id.*

825 And, most Americans think it is not right – under that circumstance – to fully protect some species and provide no protection for others.

Fig. 6. Responses from a representative sample of 909 adult U.S. residents to the statement, “It will be impossible to fully recover some endangered species. Nevertheless, some of these species benefit importantly from federal protection. We should protect this kind of species.”

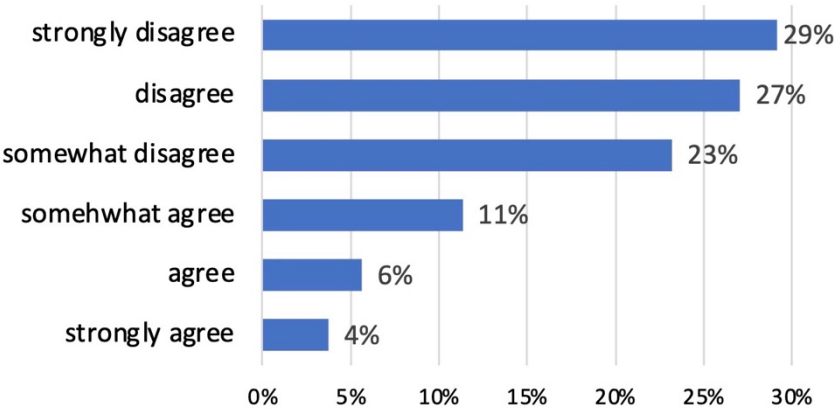
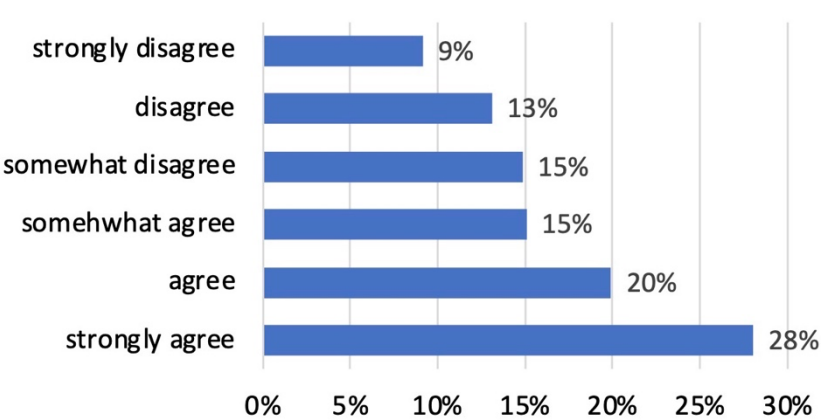
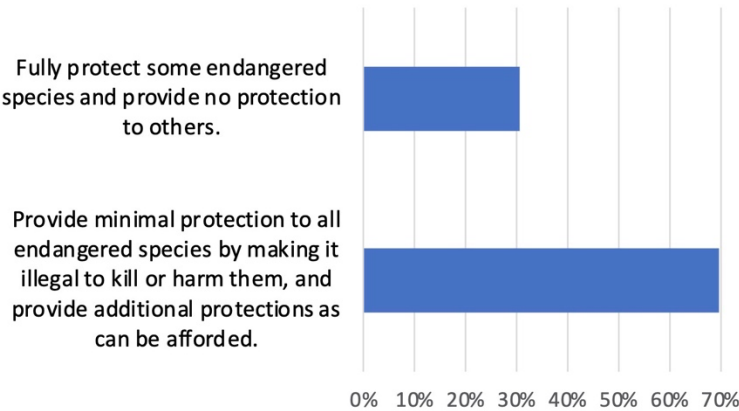


Fig. 7. Responses from a representative sample of 909 adult U.S. residents to the statement, “If a species cannot be fully recovered, they should not be protected even if the species would benefit from such protection.”

Fig. 8. Distribution of responses from a representative sample of 909 American resident to the question, “How should the effort to protect endangered species be allocated when there is not enough funding to protect all endangered species?”



E. Public Support and Fear of Backlash Against the ESA

Some may be concerned that full implementation of the ESA – by, for example, establishing and implementing an adequate SPR policy – would trigger “backlash” by the public leading to loss of support for the ESA. This concern is consistent with, for example, Service leadership referring to the ESA as a “glass hammer” and fear of “over-exercising” the ESA. Scientific knowledge indicates that backlash by any significant segment of our citizenry is unfounded. We summarize this knowledge, here.

First, support for the ESA is strong, broad, and enduring.⁹¹ In particular, the ESA is overwhelmingly supported by liberals and conservatives (Fig. 9). The ESA is also overwhelmingly supported by those who identify with a broad range of special interests (Fig. 10). The ESA is also overwhelmingly supported in regions of the U.S. where the ESA has been used to protect a controversial species, i.e., the gray wolf (Fig. 11). The ESA’s overwhelming support is enduring (Fig. 12).

Scientific knowledge also indicates that the general public calls for strengthening the ESA and increasing its funding.⁹² Specifically, survey participants from a representative sample of 909 adult U.S. residents were asked to finish this statement, “I think the ESA should be...” with one of six phrases ranging from “far more protective” to “far less protective.” The distribution of responses indicates that most Americans think the ESA should be more protective of biodiversity (Fig 13).

The result depicted in Figure 13 reinforces earlier peer-reviewed science. In particular, Czech & Krausman (1997)⁹³ report on a sample of 644 members of the general public, who were asked to finish this statement: “In the best interests of the nation, the Endangered Species Act should be...” with one of these four responses: “revoked,” “weakened to provide less protection to species,” “remain unchanged,” and “strengthened to provide more protection to species.” Forty-nine percent of the sample indicated that the ESA should be strengthened. Only 16% thought the ESA should be weakened or revoked.

Consistent with calling for a more protective ESA, most members of the general public believe that too little federal funding is allocated to the protection of endangered species (Fig. 14) and that more federal funding should be allocated to the protection of endangered species (Fig. 15). While support by all important segments of the general public indicates strong support for the ESA, we do acknowledge concern that politically powerful special interests that do not represent any

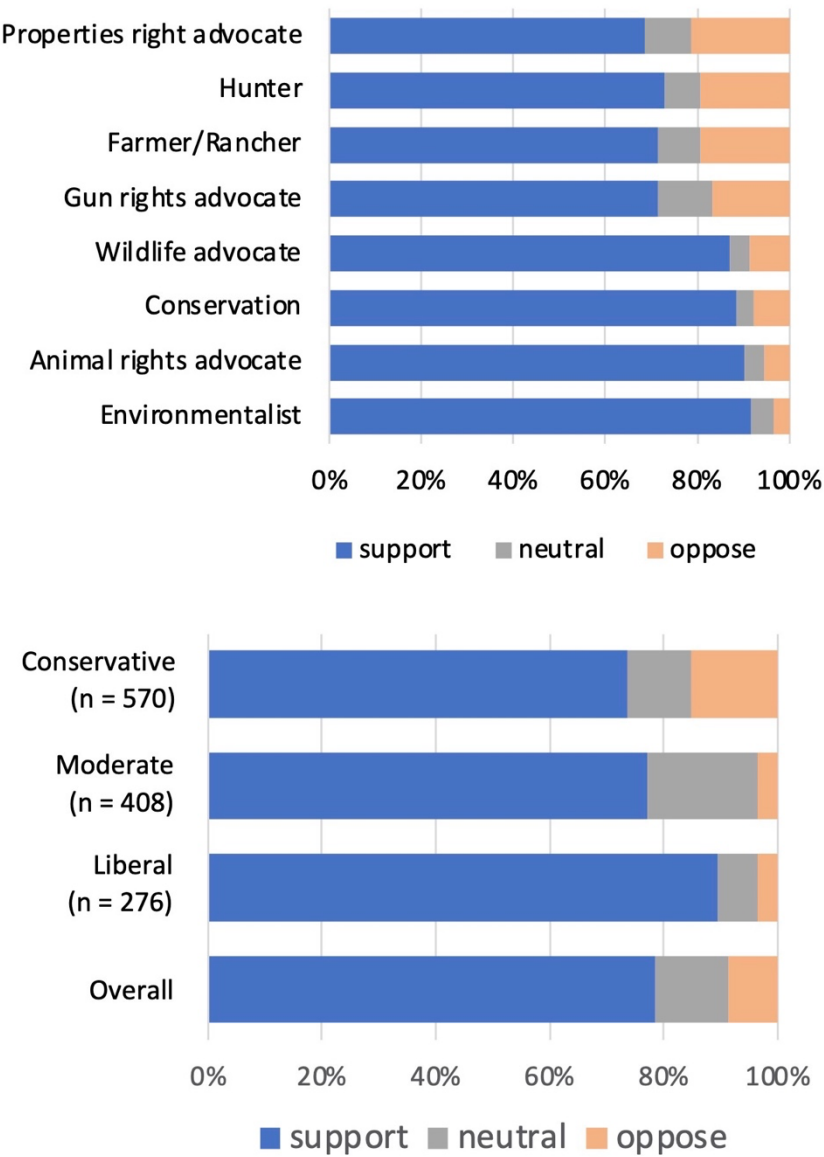
⁹¹ The results presented in this section were first reported in Jeremy T. Bruskotter et al., *Support for the U. S. Endangered Species Act Over Time and Space: Controversial Species Do Not Weaken Public Support for Protective Legislation*. 11 CONSERV. LETT. 6, e12595 (2018).

⁹² Results presented here are previously unreported portions of the survey described in Offer-Westort et al. (2020), *supra* note 57.

⁹³ Brian Czech and Paul R. Krausman, *Public opinion on species and endangered species conservation*. 5 ENDANGERED SPECIES UPDATE 6, 7-10 (1997). See also Jeremy T. Bruskotter et al., *Support for the ESA remains high as Trump Admin and Congress try to gut it*. THE CONVERSATION (2018). <https://theconversation.com/support-for-the-endangered-species-act-remains-high-as-trump-administration-and-congress-try-to-gut-it-95279>

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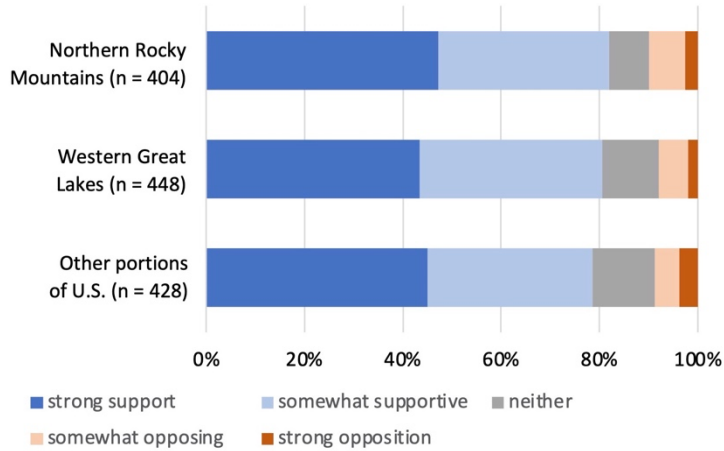
significant segment of citizens may work increasingly against the ESA if the Service were to implement the ESA as Congress intended. If that concern is genuine and a reason to oppose the proposed SPR policy, it should be called out by the Service as such so that concern can be confronted. Failure to do so contributes to the erosion of representative democracy. If this concern is not genuine, then fear of backlash should not be an obstacle for the proposed SPR policy.



Figures 9 and 10. Distribution of responses from a representative sample of adult U.S. residents to the survey item, “As you may know, the Endangered Species Act is an environmental law established to protect all wildlife, plants, and fish that are in danger of extinction. Based on what you know, would you say that you strongly support, somewhat support, somewhat oppose, or strongly oppose the Endangered Species Act?” Each horizontal bar of Figure 3 (right) represents survey participants that self-identified with each of the listed special interests.

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Fig. 11. Distribution of responses to the same survey question described in Figure 2 about support for the ESA. Each horizontal bar represents a different region of the U.S. The region labelled “other portions of the U.S. exclude (i) Alaska, (ii) Arizona, New Mexico, and (iii) North Carolina, which correspond to areas inhabited by gray wolves, Mexican wolves or red wolves, respectively.



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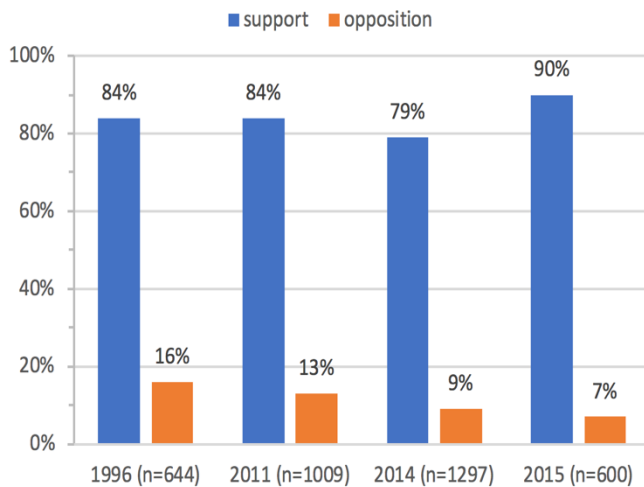
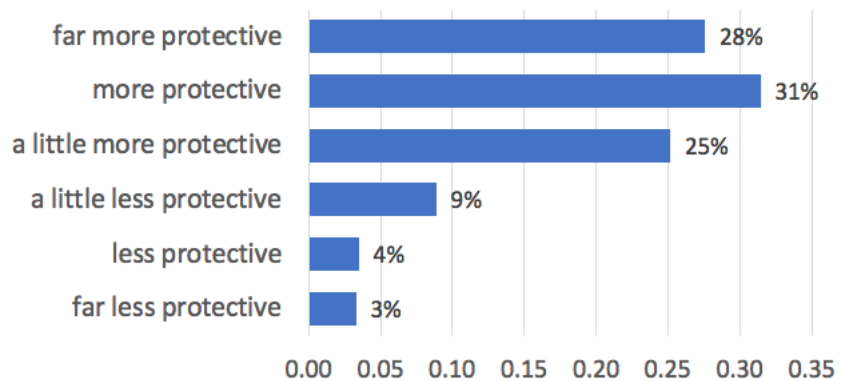


Fig. 12. Support for and opposition to the ESA as inferred from four surveys conducted over a 20-year period. See footnote 67 for details.

Fig. 13. Distribution of responses from a representative sample of 909 American resident to the statement, “I think the Endangered Species act should be...”



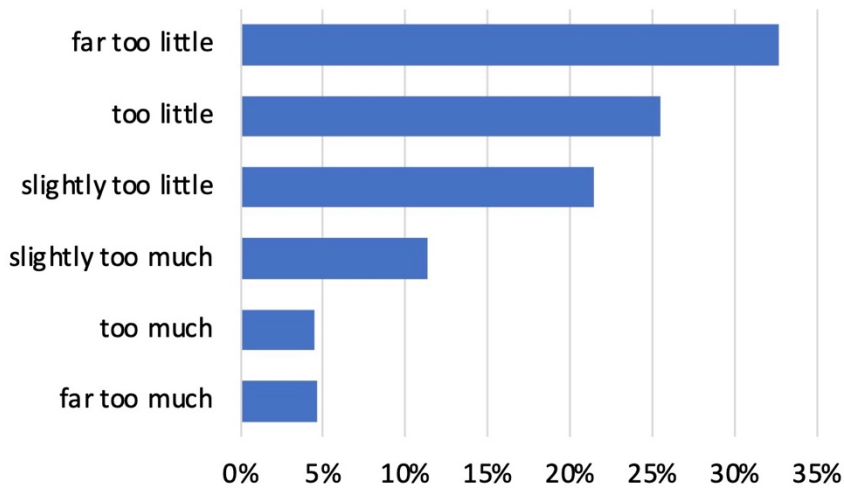


Fig. 14. Distribution of responses from a representative sample of 909 adult U.S. residents to the statement, *"Less than a one-tenth of a percentage (0.1%) of the federal budget is spent in the ESA. This amount is..."*

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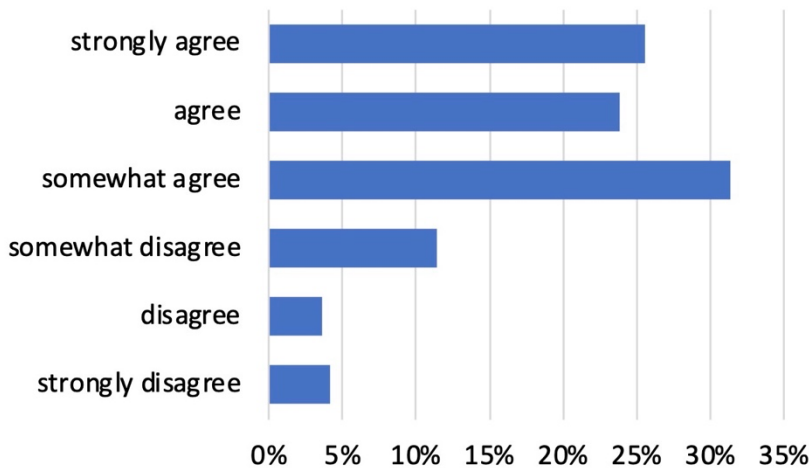


Fig. 15. Distribution of responses from a representative sample of 909 adult U.S. residents to the statement, *"The ESA is not sufficiently funded by Congress to protect all species. Without necessarily increasing taxes or the federal budget, we should allocate more funding to the ESA."*

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VIII. SUMMARY

This proposed SPR interpretation emerges from a synthesis of ecological science, the ESA's statutory purpose, court opinions, and scientifically-documented views of conservation experts and attitudes of the general public.

A. The Ecological Science

Global extinction is the final state of an unconserved species, but the primary manifestation of the biodiversity crisis is the loss of species' geographic range.⁹⁴ Extinction is the dramatic tip of an iceberg whose far more insidious and massive body is the loss of species' range.

The biodiversity crisis is not only dire, but also worsening. That statement is not rhetorical. The best-available science indicates that the world-wide conservation status of species has been worsening for several decades across major groups of taxa, including birds, mammals and amphibians.⁹⁵

More than half of this worsening is concentrated among just eight nations, including the U.S.⁹⁶ The United States' poor performance in stemming the biodiversity crisis is especially troubling for two reasons. First, the U.S. also has a large portion of its land base designated as public lands that are intended to serve the most important public interests. Second, the U.S. has very high per capita wealth as compared to the other eight nations in this group of nations contributing most to the biodiversity crisis.⁹⁷ If any country can readily afford to do better, it is the United States.

B. Statutory Purpose & Court Opinion

Congressional records are clear that the ESA is intended to do more than merely prevent global extinction. Rather, the ESA's unambiguous purposes – according to those same records and the ESA⁹⁸ – include stemming the biodiversity crisis and protecting the ecological value of species. Both purposes require limiting the loss of species' geographic range. The severity and worsening of the

⁹⁴ Loss of geographic range is also a primary mechanism by which extinction risk increases. See Section II for details.

⁹⁵ Especially concerning are trends in the Red List Index (RLI), for which 0 equates to all species having gone extinct and 1.0 equates to all species qualifying as Least Concern. ("Least Concern" refers to species that are not expected to become extinct in the near future according to criteria established by the IUCN.) A declining RDI indicates that the biodiversity crisis is worsening. Among vertebrate taxa for which the RLI can be usefully assessed (birds, mammals, amphibians), the RLI – when aggregated across species and geographic regions – has been declining for at least the past three decades (IUCN 2022. Red List Index. URL: <https://www.iucnredlist.org/assessment/red-list-index>).

Trends in the RLI are also important because realizing a positive trend has been adopted as an explicit goal for the Convention on Biological Diversity's 2010 target, Aichi Biodiversity Targets, the UN Sustainable Development Goals (Goal 15), and the Convention on Migratory Species (and several of its daughter agreements) (IUCN 2022). The United States supports each of these international agreements, and the ESA is the primary legal instrument for realizing that goal. But the ESA can serve that goal only if interpreted adequately.

⁹⁶ Ana S. L. Rodrigues et al., Spatially Explicit Trends in the Global Conservation Status of Vertebrates." 9 PLOS ONE 11, e113934 (2014).

⁹⁷ *Id.*

⁹⁸ 16 U.S.C. § 1531

biodiversity crisis indicate that the ESA has been inadequately applied to meet its purpose. An important element of this inadequacy has been an SPR policy that does not explicitly account for the importance of limiting losses to species' geographic ranges.

915 The legal definition of an endangered species clearly provides substantive guidance for what counts as levels of unacceptable loss, unacceptable risk, and unacceptable danger. The courts have clearly indicated the need for the FWS to provide a clear, objective, measurable standard by which to apply Congress's guidance.⁹⁹

920 *C. Public Attitudes*

Any policy about (un)acceptable harm, loss or danger requires making a normative judgment about what counts as (un)acceptable. This requirement undoubtedly applies to the interpretation of an endangered species, especially as it concerns SPR. The Service may be aided in making such a judgment by understanding the attitudes of the public and conservation experts as they pertain to SPR. As such, it is important to understand the best available science pertaining to understanding the values of Americans as they relate to the ESA, acceptable loss of range, and the biodiversity crisis. These values are summarized, thusly:

An overwhelming majority of Americans are supportive of the ESA, and most think it should be better funded and more protective of species. An overwhelming majority of Americans also think that federal protections are warranted for species that have lost more than 30% of their geographic range. Expert opinion is similar. Those scientifically derived views are also well-aligned with the urgent need to stem what is a grimly severe biodiversity crisis, as described in Section II.

Most people think it is appropriate to protect a species even if it cannot be fully recovered. And, most people think that all species qualifying as endangered should receive the minimal protection that is afforded by making it illegal to kill or harm the species and subsequently provide more protection and recovery effort as resources allow. Much of the information described here was first made available only within the past few years.

D. Conclusion

940 The proposed SPR interpretation *is* a significant departure from previous SPR policy. The need for which is indicated by the ESA's statutory purpose, court opinion, science, and attitudes of conservation experts and the general public.

945 The biodiversity crisis is like the climate change crisis in that preventing harm is easier than undoing harm. As such, the climate change crisis offers an important lesson for mitigating the biodiversity crisis. Specifically, climate change has been ignored for political expediency now to the point where scientific consensus is quickly gravitating toward realization that it is now impossible to avoid serious harm from climate change. For these reasons there is urgency in accepting the proposed SPR interpretation now, rather than implement an unduly weak interpretation, only later to find out that is 950 unsatisfying to the courts and future generations of Americans. Later will be too late.

We anticipate others will develop competing ideas for how to interpret SPR. We hope those policies will be subjected to the same kind of rigorous scrutiny that we have provided for this proposed

⁹⁹ See section (V)(A) of this document.

955 interpretation. We also anticipate that some will criticize this proposed interpretation. Of those critics, we ask that the criticisms be fully and transparently vetted, including an opportunity for rejoinder.

APPENDIX A. The interpretation of “range” and its impact on interpreting SPR

We explain in Appendix B why equating “range” with “current range” is inappropriate. However, that equating is allowed (though not required) by the courts.¹⁰⁰ As such, it is important to demonstrate that equating “range” with “current range” does not undermine or alter the proposed policy.

The demonstration begins by acknowledging that current range can exist in either of two states, *occupied range* or *unoccupied range*. By this account, unoccupied (current) range would be defined as *range that would become occupied after mitigating threats and taking actions that result in recolonization or reintroduction*. This definition is almost certainly a less-than-parsimonious use of the English language. However, this less-than-parsimonious language is the sole result of the FWS’s less-than-parsimonious interpretation of “range” as “current range.”

Under that poor interpretation, this notion of unoccupied (current) range is *essential* for maintaining consistency with the ESA’s essential logic and purpose, which is that anthropogenic threats have resulted in unacceptable harms to many species that require corrective action.

The notion that many species do not occupy all of their current range is also reflected in more natural-sounding language of this claim: a species does not have to be currently distributed or currently inhabit all of its current range because some of its current range may have been rendered unsuitable by threats that the ESA is expected to mitigate.

Nothing about that definition of unoccupied (current) range is misaligned, confusing, or at cross-purpose with the ESA’s definition of “critical habitat.”¹⁰¹

Reprinted, just below, is the core portion of the proposed policy presented in section (V)(H). This reprinting features colored text representing substituted phrases (“current range” for “historic range” and “occupied range” for “current range”). These substitutions demonstrate that the policy in (V)(H) is functionally identical, regardless of whether range is interpreted as “historic range” or “current range.”

THE PROPOSED POLICY, REPRISED

A policy that satisfies the aforementioned properties is: A species will generally be considered endangered if its **occupied range** is reduced by X% or more of the species’ **current range**. These are species for which enough loss has occurred to merit the corrective actions afforded by the ESA. Except, for some species it may be necessary to adopt a threshold for acceptable loss that is less than X%. These cases include:

- species whose **current range** is small enough such that small reductions in occupied range would lead to unacceptably high risk of global extinction. When handling such a case, the Service should propose a lower threshold of acceptable loss for that species and defend that view with the best-available science.
- species that have lost little of their **occupied range**, but have become too rare as a result of lost habitat throughout its **current range** or have become too rare because their range-wide density has been reduced to the point of being too rare.

¹⁰⁰ Humane Soc’y of the U.S. v. Zinke, 865 F.3d 585 (D.C. Cir. 2017).

¹⁰¹ See Section (VII)(B).

APPENDIX B. More on the interpretation of range

1000 *A constraint on the interpretation of “current range”*: While the courts allow (but do not require) the Service to interpret “range” as “current range,” not any interpretation of “current range” is allowable, because some interpretations would plainly contradict the purpose of the ESA.

1005 For example, suppose that one were to interpret “current range” simply as *places where the species currently exists*. As straightforward and appropriate as that interpretation may seem, it leads directly to undermining the purpose of the ESA. Here’s how: the extinction process for most species involves a contraction of current range.¹⁰² And, by that aforementioned definition a species always exists on 100% of its current range. So, a species could lose massive amounts of its (historic) range and securely occupy all of its current range. Such species wouldn’t qualify as
1010 endangered unless they were simply (and unqualifiedly) “at risk of extinction.” This is problematic because a basic purpose of the ESA is to limit range loss.

The case for “historic range”: Robust cases for interpreting “range” as “historic range” (that existed prior to anthropogenic threats, such as over exploitation and habitat loss) has been made
1015 elsewhere.¹⁰³ Those cases are considerably more sensible and more clearly aligned with the ESA’s purpose which is to mitigate the adverse impact of anthropogenic threats on a species’ range. Here we recap some of the key reasons.

The House Report associated with the ESA’s 1978 amendments states that “[t]he term ‘range’ is used in the general sense and refers to the historical range of the species.”¹⁰⁴ Prior
1020 delisting decision have been made in explicit relationship to historic range (e.g., pelicans and gray whales).¹⁰⁵ Furthermore, a report to Congress states:

In May, 1979, the chief of FWS’s listing branch provided... draft guidelines and criteria for determining endangered or threatened species, which... define significant portion as
1025 (1) more than half of a species’ range, which may include historical as well as recent and anticipated future losses or (2) losses of habitat totaling less than 50 percent for species of relatively small range, or in other circumstances where the loss may have an inordinately large negative impact on the species’ survival.¹⁰⁶

¹⁰² Section II of this document.

¹⁰³ e.g., Vucetich et al., *supra* note 2; Jeremy T. Bruskotter and Sherry A. Enzler. *Narrowing the Definition of Endangered Species: Implications of the U. S. Government’s Interpretation of the Phrase “A Significant Portion Of Its Range” Under the Endangered Species Act of 1973*. 14 HUM. DIMENS. WILD. 2, 73-88 (2009); D. Noah Greenwald. *Effects on species’ conservation of reinterpreting the phrase “significant portion of its range” in the US Endangered Species Act*. 23 CONSERV. BIO. 6, 1374-1377. (2009).

¹⁰⁴ House Report (1978) Rep. No. 95–1625 (p. 18).

¹⁰⁵ Removal of Brown Pelican in southeastern U.S. from list of endangered and threatened wildlife. Federal Register 50:4938–4945; Remove the eastern north Pacific population of the Gray Whale from the list of endangered wildlife—final rule. 59 FR 31094 (Jun 16, 1994).

¹⁰⁶ GAO (1979). Endangered species – a controversial issue needing solution – Report to the Congress, Wash, D.C., General Accounting Office, 1979. <https://www.gao.gov/products/ced-79-65>

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A sometimes-raised concern with interpreting “range” as “historical range,” is that it begs the (supposedly unanswered) question, *what point in historic time is being referenced?* The question is answered in a manner consistent with the ESA’s purpose by letting “range” refer to the historic range that existed prior to anthropogenic threats, such as over exploitation and habitat loss.¹⁰⁷

¹⁰⁷ The centrality of “historic range” as a *fundamental* consideration in listing a species as threatened or endangered is further indicated by the formal list of threatened and endangered species as presented in Code of Federal Regulations for Wildlife and Fisheries (Part 17, Vol 1 to 6 [Contains SS17.1 to 17.95(a)] Revised on Oct 2011] which includes a table of all listed species and that table includes a column labelled “historic range” which is described as “the known general distribution of the species or subspecies as reported in the current scientific literature. The present distribution may be greatly reduced from the historic range.”