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April 27, 2026

Secretary Doug Burgum
Secretary of the Interior
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Director Brian Nesvik
Director
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Via Email & FedEx

Re: Sixty-day Notice of Intent to Sue for Violations of the Endangered Species Act Concerning Denial of Protection for the Lake Sturgeon (*Acipenser fulvescens*)

Dear Secretary Burgum and Director Nesvik:

On behalf of the Center for Biological Diversity ("Center"), this letter notifies the U.S. Fish and Wildlife Service ("Service") of violations of the Endangered Species Act ("ESA")[1] connected to the Service's April 23, 2024 finding that the lake sturgeon (*Acipenser fulvescens*) is not warranted for listing as an endangered or threatened species.[2] As explained further below, the Service's decision violates section 4 of the ESA[3] and deprives this imperiled fish of the protection it needs to survive against numerous ongoing threats.[4]

[1] 16 U.S.C. §§ 1531–1544.
[2] *See* Endangered and Threatened Wildlife and Plants; 12-Month Finding for Lake Sturgeon, 89 Fed. Reg. 30311–14 (Apr. 23, 2024) [hereinafter 12-Month Finding].
[3] 16 U.S.C. § 1533.
[4] The Center provides this letter pursuant to the 60-day notice requirement of the citizen suit provision of the ESA. 16 U.S.C. § 1540(g)(2)(C). If the Service does not remedy the violations of law outlined in this letter within 60 days, the Center will file suit in federal court to resolve this matter. *See id*. § 1540(g)(1).

BACKGROUND

I. The Lake Sturgeon

One hundred and fifty million years ago, the lake sturgeon (*Acipenser fulvescens*) swam alongside dinosaurs.[5] The lake sturgeon is a large, armored fish, which has evolved by surviving catastrophes that annihilated its larger contemporaries, leading the lake sturgeon to become widely distributed across the eastern and central United States and Canada by the mid-nineteenth century and one of the most abundant native fish species in the Great Lakes.[6] But by the late 1900s, with a 99 percent decline from historic population levels, the lake sturgeon faced a threat which Tyrannosaurus Rex did not: humans.[7]

Starting in the late 1800s, commercial fishing reduced lake sturgeon populations to "a small fraction of their historical abundance."[8] Similar overexploitation, as well as the construction of dams blocking migration corridors in the Mississippi River basin, resulted in a 97 percent decrease in the population there.[9] Overall, the current population of lake sturgeon is about one percent of its former abundance in the mid-nineteenth century.[10]

Throughout its life stages, the lake sturgeon requires different habitats, migrating between lake systems and swift-flowing rivers to spawn.[11] Lake sturgeon have strong site fidelity, with many spawning lake sturgeon returning to the same sites year after year to reproduce.[12] These fish require moderate water temperatures and ample migration corridors between habitats that are free from barriers such as dams.[13]

The success of the lake sturgeon species is closely tied to the availability and conditions of its habitat. For one, lake sturgeon spawning is "highly dependent on water temperature," with peak spawning occurring between 50º and 61º F.[14] Although a female sturgeon can release between fifty thousand and one million eggs annually into rocky substrates on the river bottom,

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[5] U.S. Fish & Wildlife Service, *Species Status Assessment for Lake Sturgeon (*Acipenser fulvescens*)*, Version 1.1 (December 2023) 4 [hereinafter SSA].
[6] *Id*. at 8, 16.
[7] *Id*. at 16.
[8] *Id*. at 74.
[9] *Id*. at 16, 92.
[10] *Id*. at 16.
[11] *Id*. at 7.
[12] COMM. ON THE STATUS OF ENDANGERED WILDLIFE IN CAN. (COSEWIC), COSEWIC Assessment and Status Report on the Lake Sturgeon *Acipenser fulvescens*, Western Hudson Bay populations, Saskatchewan-Nelson River populations, Southern Hudson Bay-James Bay populations and Great Lakes-Upper St. Lawrence populations in Canada (2017) [hereinafter COSEWIC 2017]; JASON HERRALA, *Movement of Reintroduced Lake Sturgeon in Lake Cumberland*, FISHERIES BULL. NO. 116 (Kentucky Dep't of Fish & Wildlife Res., 2015); J. A. Rusak & T. Mosindy, *Seasonal Movements of Lake Sturgeon in Lake of the Woods and the Rainy River, Ontario*, 75 CAN. J. ZOOLOGY 383, 383–95 (1997); G.M. SWANSON ET AL., *A Report on the Fisheries Resource of the Lower Nelson River and the Impacts of Hydroelectric Development, 1989 Data*, Manuscript Report 91-03, at 248 (Man. Dep't of Nat. Res. Fisheries Branch, 1991).
[13] SSA, *supra* note 5, at 8, 10–13, 24.
[14] *Id.* at 5.

the hatching success rate is typically low[15] because it requires well-oxygenated water, adequate airflow, and moderate temperature—conditions now absent in many rivers.[16] After hatching, larval sturgeon must drift downstream to nursery habitats with off-current refuge areas to feed and develop into juveniles and adults.[17] These juvenile and adult lake sturgeon require two types of habitats to survive and grow: overwintering habitat that provides refuge from water flow and foraging habitat with moderate prey abundance.[18] Migration corridors between these habitats are crucial but are often disrupted by barriers such as hydroelectric dams.[19]

As a result of many threats, lake sturgeon populations have decreased or become extirpated from a large portion of their range. Of the 257 analysis units ("AUs") of lake sturgeon in the United States, 47 percent are functionally extirpated, meaning that there are only "sporadic observations of adults with little to no evidence of spawning activity,"[20] and 11.5 percent of AUs are extirpated, meaning that there is "no natural recruitment occurring and no lake sturgeon exist."[21] An additional 23 percent of AUs are in 'low' condition, meaning that recruitment is occurring "at levels that do not support a self-sustaining population."[22]

Dams, channelization, climate change, invasive species, commercial harvest, and other threats associated with human activities have caused and will continue to cause the further decline and extirpation of lake sturgeon.[23] These threats also interact with one another and create "feedback loops and interrelationships" between stressors that exacerbate the harms to the species.[24]

Among these threats, dams and other in-water infrastructure have had the "highest degree of adverse effects" on lake sturgeon throughout their range, primarily due to impacts on the species' spawning migration.[25] In some Lake Michigan tributaries, dams have reduced available spawning habitat by 90 to 99 percent.[26] Dams have also completely isolated some lake sturgeon populations, making them even more vulnerable to disease, catastrophic events, genetic isolation, and other harms.[27] Dams further degrade lake sturgeon habitat by altering water temperature and sedimentation patterns, decreasing dissolved oxygen levels, and increasing contaminant levels.[28]

Climate change and its effects further endanger lake sturgeon by intensifying existing stressors such as pollution, overfishing, and invasive fishes, and by increasing the frequency and

[15] *Id*. (generally less than 40 percent).
[16] *Id*. at 8.
[17] *Id*.
[18] *Id*. at 8.
[19] *Id*.
[20] *Id*. at 2, 70, 114.
[21] *Id*.
[22] *Id*. at 70, 114.
[23] *Id*. at 16–19.
[24] *Id*. at 15.
[25] *Id*. at 17.
[26] *Id.* at 17–18.
[27] Nancy A. Auer, *Importance of Habitat and Migration to Sturgeons with Emphasis on Lake Sturgeon*, 53 CAN. J. FISHERIES & AQUATIC SCI. 152 (1996).
[28] SSA*, supra* note 5, at 17–21.

severity of droughts and floods.[29] Because they spawn primarily in rivers, lake sturgeon are particularly susceptible to climate-associated changes to their habitat. Higher temperatures negatively impact reproductive success, ration levels, and growth rates.[30] Climate-related hazards are the latest addition to the already extensive list of threats from development and other human activities that have contributed to the decline and extirpation of the lake sturgeon.[31]

II. The Endangered Species Act

The ESA is "the most comprehensive legislation for the preservation of endangered species ever enacted by any nation."[32] The ESA is intended to conserve species that the Service determines to be "endangered" or "threatened."[33] "Endangered" means the species "is in danger of extinction throughout all or a significant portion of its range."[34] "Threatened" means the species is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range."[35]

When making listing determinations, the ESA requires that the Service use five enumerated factors to determine whether a species is endangered or threatened:

(A) the present or threatened destruction, modification, or curtailment of its habitat or range;
(B) overutilization for commercial, recreational, scientific, or educational purposes;
(C) disease or predation;
(D) the inadequacy of existing regulatory mechanisms; or
(E) other natural or manmade factors affecting its continued existence.[36]

The Service must list a species if it meets the definition of "endangered" or "threatened" due to any one or a combination of these five factors.[37] In evaluating these factors for a listing decision, the Service must rely "solely on . . . the best scientific and commercial data available."[38]

Further, the ESA defines "species" to include "any subspecies of fish or wildlife or plants, and any *distinct population segment* of any species of vertebrate fish or wildlife which interbreeds when mature."[39] Congress added "distinct population segment" ("DPS") to the definition of "species" in 1978 to give the Service an additional tool to protect the most

[29] *Id*. at 23, 26.
[30] *Id*. at 24–25.
[31] *Id*. at 23.
[32] *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 180 (1978).
[33] 16 U.S.C. §§ 1531(b), 1533(a).
[34] *Id.* § 1532(6).
[35] *Id.* § 1532(20).
[36] *Id.* § 1533(a)(1).
[37] 50 C.F.R. § 424.11(c); *see also Fed'n of Fly Fishers v. Daley*, 131 F.Supp.2d 1158, 1164 (N.D. Cal. 2000) ("These factors are listed in the disjunctive; any one or a combination can be sufficient for a finding that a particular species is endangered or threatened.").
[38] 16 U.S.C. § 1533(b)(1)(A).
[39] *Id.* § 1532(16) (emphasis added).

vulnerable segments of a species, allowing the listing of less than the entirety of a given species.[40]

In 1996, the Service, along with the National Marine Fisheries Service ("NMFS"), adopted an internal policy ("DPS Policy") for designating a DPS, formally interpreting this statutory language.[41] Under the DPS Policy, to be considered a DPS, the portion must be both discrete and significant.[42] A species portion is "discrete" if it is either "markedly separated from other populations" due to "physical, physiological, ecological, or behavioral factors," including "genetic or morphological discontinuity," or "delimited by international governmental boundaries."[43] The policy does not require complete reproductive isolation for a population to be considered discrete.[44] Once discreteness is established, the Service must consider "significance," which can include, but is not limited to, "persistence" in a unique ecological setting, gaps in the range, and genetic differences.[45] After a portion is found to be both discrete and significant, the Service applies the five-factor ESA framework for threatened and endangered species, described above, "as if it were" its own species.[46] In sum, the DPS Policy allows the Service to be geographically selective in applying ESA protections for species that may not warrant listing when considered only in aggregate.

III. The Center's Petition to List the Lake Sturgeon and Prior Listing Litigation

The Center petitioned the Service to list the lake sturgeon as threatened or endangered on May 14, 2018.[47] The Center's petition asked in the alternative that the Service define and list DPSs of lake sturgeon in the U.S. and proposed that, based on existing scientific literature and information, lake sturgeon could be split into nine DPSs. On August 15, 2019, the Service issued a positive 90-day finding, determining the petition presented substantial scientific information indicating that listing may be warranted.[48] As a result, the Service was under a statutory obligation to issue a 12-month finding on whether listing was warranted by May 14, 2019.[49] On February 20, 2020, the Center and co-petitioners sued to compel the required 12-month finding.[50]

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[40] Endangered Species Act Amendments of 1978, Pub. L. 95-632, § 2, 92 Stat. 3751 (1978).
[41] *See* Policy Regarding the Recognition of Distinct Vertebrate Population Segments Under the Endangered Species Act, 61 Fed. Reg. 4722–25 (1996) [hereinafter DPS Policy].
[42] *Id.* at 4725.
[43] *Id.*
[44] *Id.* at 4724.
[45] *Id.* at 4725.
[46] *Id.*
[47] *See generally* Center for Biological Diversity, *Petition to List U.S. Populations of Lake Sturgeon (*Acipenser fulvescens*) as Endangered or Threatened under the Endangered Species Act* 2 (May 14, 2018), available at https://www.biologicaldiversity.org/species/fish/pdfs/Lake-Sturgeon-petition-5-14-18.pdf [hereinafter Petition].
[48] *See* Endangered and Threatened Wildlife and Plants; 90-Day Finding for Lake Sturgeon, 84 Fed. Reg. 41691 (Aug. 15, 2019) [hereinafter 90-Day Finding].
[49] 16 U.S.C. § 1533(b)(3)(B).
[50] Complaint, *Ctr. for Biological Diversity v. Bernhardt*, 1:20cv1227 (N.D. Ill. Feb. 20, 2020), Dkt. No. 1.

In resolving cross-motions for summary judgment, the court set a deadline of June 30, 2024, for the Service's 12-month finding.[51]

IV. The Service's Species Status Assessment and Species Assessment Form

In December 2023, the Service issued a Species Status Assessment ("SSA") for the lake sturgeon.[52] As described by the Service, an SSA is "a biological risk assessment to aid decision makers" in making listing decisions about a particular species.[53] While an SSA does not result in a listing decision directly, it provides "the best available scientific information for comparison to policy standards to guide ESA decisions."[54] The SSA evaluates the species' current population status and future viability in the context of its biology and threats to its survival. Here, the Service defined "viability" as the lake sturgeon's ability "to sustain populations in the wild over time," and clarified that viability represents "a continuous measure of the likelihood that the species will sustain populations over time."[55]

The SSA evaluated "Designatable Units" of lake sturgeon in Canada and "representation units" and "analysis units" of lake sturgeon in the U.S.[56] In the SSA's discussion of taxonomy, there was no consideration of DPSs of lake sturgeon, even though the SSA acknowledged that the "data show that most lake sturgeon populations are genetically distinct from each other,"[57] and discussed genetically distinct populations in Canada and the Ohio and White Rivers.[58]

Following the issuance of the SSA, the Service's Species Assessment and Listing Priority Assignment Form ("SAF") concluded that the lake sturgeon does not warrant listing.[59] The SAF erroneously concluded that none of the nine petitioned DPSs of lake sturgeon are "discrete" and, thus, failed to consider whether they are "significant."

V. The Service's 12-Month "Not Warranted" Finding for Lake Sturgeon

On April 23, 2024, the Service published its 12-month finding on the lake sturgeon in the Federal Register.[60] In the 12-month finding, the Service decided that, based on its assessments in the SSA and SAF, listing the lake sturgeon as endangered or threatened was "not warranted."[61] The Service's 12-month finding improperly determined that none of the petitioned DPSs met the

[51] *Ctr. for Biological Diversity v. Haaland*, No. 1:20cv1227 (N.D. Ill. Sept. 14, 2021), Dkt. No. 30.
[52] *See* SSA, *supra* note 5.
[53] U.S. Fish & Wildlife Serv., *USFWS Species Status Assessment Framework: an integrated analytical framework for conservation, Version 3.4*, at 4 (Aug. 2016).
[54] *Id.*
[55] *See* SSA, *supra* note 5, at 1.
[56] *See id*. at ii.
[57] *See id.* at 6, 29.
[58] *See id*. at 66.
[59] U.S. Fish & Wildlife Serv., *Species Assessment and Listing Priority Assignment Form for Lake Sturgeon (*Ascipenser fulvescens*)* (Mar. 14, 2023) [hereinafter SAF]. Atypically, the SAF is dated nine months before the SSA, but the signature date on the SAF is April 17, 2024—the date of the Service's 12-Month Finding.
[60] *See* 12-Month Finding, *supra* note 2.
[61] *See id.*

criteria for discreteness in the DPS Policy, and therefore the Service did not evaluate their significance under the DPS Policy. The Service's finding violated the DPS Policy in its analysis of the biological discreteness of the proposed lake sturgeon DPSs, applying a limitation requiring a showing of complete geographical isolation to satisfy discreteness. The Service's finding did not address information in the petition regarding genetic distinctiveness nor other DPS Policy factors for marked separation besides physical separation, such as physiological, ecological, or behavioral factors.

VIOLATIONS OF THE ENDANGERED SPECIES ACT

I. The Service erred by failing to recognize distinct population segments within the lake sturgeon's range.

By amending the definition of "species" in 1978 to include "any subspecies of fish or wildlife or plants, *and any distinct population segment* of any species," Congress provided the Service an additional tool to protect the most vulnerable segments of a species.[62] Recognizing the phrase "distinct population segment" is "not commonly used in scientific discourse," the Service and NMFS adopted a joint policy for designating a DPS in a "clear and consistent fashion."[63] Courts have broadly upheld the policy as a reasonable interpretation of Congress's five-word addition to the ESA.[64]

The DPS Policy evaluates three elements—discreteness, significance, and conservation status—in that order and according to broader ESA listing standards.[65] To be considered discrete, the population segment must either be: (1) "markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors" (including "genetic or morphological discontinuity"); or (2) "delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms."[66] Once discreteness is established, the Service considers significance. Factors include, but are not limited to: (1) "persistence of the [DPS] in an ecological setting unusual or unique for the taxon"; (2) "evidence that loss of the [DPS] would result in a significant gap in the range of a taxon"; (3) "evidence that the [DPS] represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historic range"; and (4) "evidence that the [DPS] differs markedly from other populations of the species in its genetic characteristics."[67] If the discreteness and significance elements are met, the Service considers the DPS's status "as if it were" its own species, under the broader, five-factor ESA framework for threatened and endangered species.[68] Finally, the DPS Policy invokes Congressional guidance regarding the purpose of the amendment, which is to "encourage[e] the conservation of genetic diversity."[69]

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[62] 16 U.S.C. § 1532(16) (additions italicized).
[63] *See* DPS Policy, *supra* note 41, at 4722.
[64] *See, e.g., Maine v. Norton*, 257 F.Supp.2d 357, 387 (D. Maine 2003) ("[T]he Joint DPS Policy was a reasonable interpretation of ambiguous statutory language.").
[65] *See* DPS Policy, *supra* note 41, at 4725.
[66] *See id*.
[67] *See id*.
[68] *See id.*; *see also* 16 U.S.C. § 1522(a)(1)(A)–(E); 16 U.S.C. § 1531(6), (20).
[69] *See* DPS Policy, *supra* note 41, at 4725 (quoting S.R. 151, 96th Congress, 1st Session).

Geographically selective designation through identifying a DPS allows the Service "the flexibility to protect a portion of a species according to that portion's conservation status."[70]

Here, the Service wrongly determined that none of the petitioned populations warranted a DPS designation because it found that none of the populations passed the "discreteness" prong of the above three-part test.[71] Consequently, the Service truncated all subsequent analysis under its own DPS Policy; by denying discreteness based on incomplete analysis, the Service did not even consider the significance or conservation status prongs.[72] This determination is arbitrary and capricious for two primary reasons: first, the Service failed to follow its own DPS Policy; and second, the Service denied DPS status to lake sturgeon based on implausible interpretations of data and not on the best available science.

A. The Service failed to follow its own DPS Policy by considering only one form of "marked separation" in assessing the lake sturgeon.

The Service failed to follow its own DPS policy by failing to analyze three of four possible indicators of "marked separation," despite scientific evidence in the petition that supported a finding of marked separation. In its 12-Month Finding, the Service denied DPS designation for each petitioned population solely due to "evidence of *migration and movement* between each petitioned DPS and a population of lake sturgeon outside of the petitioned DPS."[73] This evidence applies to only the "physical" factor of marked separation, but does not address the physiological, ecological, or behavioral factors included in the marked separation analysis in the Service's DPS policy.[74] Such an unsupported deviation from the Service's established policy renders the Service's determination arbitrary and capricious and a violation of the ESA.

The Service is generally required to follow its DPS Policy. While an agency is free to adopt its own policies that go beyond what is statutorily mandated, once it has adopted those policies, the agency has a "duty to explain its departure from prior norms."[75] These principles apply to the Service and its DPS Policy, and courts have reversed determinations based on

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[70] *Southwest Ctr. for Biological Diversity v. Babbitt*, 980 F. Supp. 1080, 1085 (D. Ariz. 1997).

[71] *See* SAF, *supra* note 59, at 2.

[72] *See id*. at 7 ("We did not find any of the petitioned DPSs to be discrete; therefore, we did not consider significance."); *see also* DPS Policy, *supra* note 41, at 4725 ("If a population segment is considered discrete under one or more of the above conditions, its biological and ecological significance will then be considered[.]").

[73] *See* 12-Month Finding, *supra* note 260, at 30312 (emphasis added). The Service independently denied the northern Minnesota population based on the second criterion for discreteness for populations that cross international boundaries, but this has no bearing on the Service's failure to follow or respond to evidence under the first, the marked separation prong. *See* SAF, *supra* note 59, at 2, 5–6.

[74] DPS Policy, *supra* note 41, at 4725.

[75] *Atchison, T. & S. F. Ry. Co. v. Wichita Bd. of Trade*, 412 U.S. 800, 808 (1973); *see also Immigr. & Naturalization Serv. v. Yang*, 519 U.S. 26, 32 (1996) (finding that if an agency "announces and follows-by rule or by settled course of adjudication . . . an irrational departure from that policy (as opposed to an avowed alteration of it) could constitute action that must be overturned as arbitrary, capricious, [or] an abuse of discretion.") (internal quotations omitted).

failures to follow this policy as arbitrary and capricious.[76] For example, in *Rauch*, the court reversed NMFS's DPS determination for blueback herring because it "fail[ed] to show that it considered the issue [of ecological uniqueness], much less that it reached a reasoned conclusion," rejecting a "single, incomplete sentence in an internal memorandum" as evidence that the agency "gave any consideration whatsoever to the first significance prong of its 1996 DPS Policy."[77] *Rauch* simply reiterates that the DPS Policy, like all internal agency policies, requires procedural fidelity so the resulting determinations may be legibly reviewable by the courts; failure to adhere to these procedures, however demanding, is arbitrary and capricious.[78]

In failing to address other forms of "marked separation" beyond physical separation for the lake sturgeon, the Service glossed over the plain text and structure of its DPS Policy, deviating from the settled course. As stated in the DPS Policy, a population segment is discrete if "[i]t is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, *or* behavioral factors."[79] If the Service meant to require all factors to be present, it easily could have placed an "and" where there is an "or." Therefore, denying marked separation through review of physical factors alone is insufficient; the Service must address the other three factors, especially when the Service had access to genetic evidence that clearly demonstrates certain lake sturgeon populations' physiological, ecological, and behavioral marked separation.

Further, the phrasing of other sections of the DPS Policy as compared to the language governing marked separation suggests that the Service must analyze each of the four types of separation. The analytical procedure for the second DPS element, significance, is permissive and allows "consideration [that] *may* include, *but is not limited to*" four categories of evidence.[80] In other words, the Service gave itself a choice of which factors to consider or whether to consider them at all when assessing significance. The Service chose not to take this approach when defining marked separation, suggesting that it must consider each form of separation.

Finally, enumeration of these four independent factors of marked separation is a meaningful expansion of the DPS Policy's only precursor, the NMFS's "Ecologically Significant Unit" ("ESU Policy"), which considered only "substantially reproductively isolated" populations

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[76] *See*, *e.g.*, *Nat. Res. Def. Council, Inc. v. Rauch*, 244 F.Supp.3d 66, 97–100 (D.D.C. 2018); *see also Nat. Res. Def. Council, Inc. v. Coit*, 597 F.Supp.3d 73, 93 (D.D.C. 2022) (remanding a decision not to list a DPS for lack of an "adequate explanation"); *Ctr. for Biological Diversity v. Lohn*, 296 F.Supp.2d 1223, 1243 (W.D. Wash. 2003), *vacated on other grounds* 511 F.3d 960 (9th Cir. 2007) (remanding a decision not to list a DPS for failing to analyze genetic differences within a taxon, an enumerated factor under the DPS Policy's significance prong); *Defs. of Wildlife v. Hall*, 565 F.Supp.2d 1160, 1171–78 (D. Mont. 2008) (enjoining the Service's delisting of gray wolf populations as a distinct population segment because the Service had not sufficiently justified its deviation from its previously promulgated Environmental Impact Statement).

[77] *Rauch*, 244 F.Supp.3d at 97, 100.

[78] *Id.* at 97 (citing *Motor Vehicle Mfrs. Ass'n, Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983)).

[79] *See* DPS Policy, *supra* note 41, at 4725 (emphasis added).

[80] *See id.*

to be discrete.[81] A key difference between the ESU and DPS Policy was the addition of other factors in the "discreteness" prong, expanding the ways a species can be "markedly separate."[82] Thus, the evolution of the DPS Policy requires more of the agencies procedurally in assessing a species' "marked separation." In assessing the lake sturgeon, the Service's failure to comply with this DPS Policy and consider the full breadth of "discreteness" is arbitrary and capricious.

Here, the Service failed to acknowledge evidence of physiological, ecological, and behavioral separation, including genetic indicia. For Lake Superior populations, the Service found no "marked *physical* separation."[83] The Service failed to respond to genetic evidence of physical, physiological, ecological, and behavioral separation presented in the listing petition.[84] For Western Lake Michigan populations, the Service relied on a lack of "physical barriers" separating lake sturgeon from other parts of Lake Michigan to rebut the Petition's claim that the population is "reproductively isolated."[85] However, the Service failed to respond to evidence of genetic separation regarding these populations.[86] For Mississippi River basin populations, the Service found the populations have "historically had unimpeded access to each other" and that for Mississippi River basin populations that do currently face physical barriers, there is evidence that "lake sturgeon can and do pass both upstream and downstream of navigation dams."[87] But the Service failed to respond to genetic evidence of ecological and behavioral separation across what the petitioner characterized as five distinct DPSs within the Mississippi River basin.[88] For

[81] *See id*. (quoting Policy on Applying the Definition of Species under the Endangered Species Act to Pacific Salmon, 56 Fed. Reg. 58612, 58618 (Nov. 20, 1991)).

[82] *See Modesto Irrigation Dist. v. Gutierrez*, 619 F.3d 1024, 1030 (9th Cir. 2010) ("The primary difference in the application of the two policies is that the ESU Policy relies on 'substantial reproductive isolation' as the primary factor in delineating a group of organisms, while the DPS Policy relies on 'marked separation' to delineate the group.") (quoting 70 Fed. Reg. 67131) (Nov. 4, 2005)).

[83] *See* SAF, *supra* note 59, at 3 (emphasis added).

[84] *See id*; *see also* Petition, *supra* note 47, at 13, 107 (citing P.I DeHaan et al., *Genetic Population Structure of Remnant Lake Sturgeon Populations in the Upper Great Lakes Basin*, 135 TRANS. AM. FISHERIES SOC. 1478 (2006); COSEWIC 2017, *supra* note 12; Amy Welsh, et al., *Genetic Assessment of Lake Sturgeon Population Structure in the Laurentian Great Lakes*, 28 N. AMER. J. FISHERIES MGMT. 572 (2008)).

[85] *See* SAF, *supra* note 59, at 3.

[86] *See id*; *see also* Petition, *supra* note 47, at 14, 107–08 (citing Kim Scribner, et al., *Lake Michigan Basin Genetics Sub-project: 2004 Final Report* (2004); Amy Welsh et al., *Genetic Guidelines for the Stocking of Lake Sturgeon in the Great Lakes Basin*, Misc. Pub. 27 (2010); Jonathan Homola et al., *Genetic Assessment of Straying Rates of Wild and Hatchery Reared Laked Sturgeon in Lake Superior Tributaries*, 36 J. GREAT LAKES RSCH. 798 (2012)).

[87] *See* SAF, *supra* note 59, at 4. As discussed below, the Service's claims regarding physical separation are belied by evidence of significant physical separation. Indeed, one of the studies used to suggest movement is possible refers to a single individual moving between two areas of critical habitat. *See infra* I.B.3.

[88] *See id*; *see also* Petition, *supra* note 47, at 16–17, 109–11 (citing Amu Drauch, et al., *Genetic Evaluation of the Lake Sturgeon Reintroduction Program in the Mississippi and Missouri Rivers*, 27 N. AMER. J. FISHERIES MGMT, 434–42 (2007); Amu Drauch, et al., *Evaluation of a Remnant Lake Sturgeon Population's Utility as a Source for Reintroductions in the Ohio River System*, 9 CONSERVATION GENETICS, 1195–1209 (2007); T.M Buchanan, et al., *New Distributional Records for Arkansas Surgeons*, 47 J. ARK. ACAD. SCI. 34 (1993); Arkansas Game and Fish Commission, Endangered, Threatened, and Species of Special Concern (2013)).

the northern Minnesota populations (Red River Basin and Rainy River/Lake of the Woods Basins), the Service claimed "no major barriers prevent movement" and that there is "interchange of lake sturgeon between Minnesota and Ontario."[89] The Service again failed to respond to evidence of behavioral separation in the listing petition.[90]

By considering only physical separation, the Service failed to respond to strong evidence of marked separation presented in the petition. The Service must at least consider the other enumerated discreteness factors according to its own DPS Policy and respond to the petition's evidence or articulate a reason why it did not. Because the Service neither considered nor justified its substantial deviation from its own internal procedures, its ultimate determination is arbitrary and capricious.

B. The Service's DPS analysis was arbitrary and capricious because it relied on an implausible misinterpretation of relevant data and not the best available science.

The best available science requirement also applies to the Service's decision on whether to designate a subset of a species as a DPS.[91] The Service's interpretation of studies receives deference only to the extent that the agency "provides a reasonable explanation for adopting its approach and discloses the limitations of that approach."[92]

In its discreteness analysis regarding the lake sturgeon, the Service acted arbitrarily and capriciously by offering "implausible misinterpretation[s]" of the studies it cited.[93] Additionally, the Service's analysis repeatedly draws on studies that "contradict[] the data on which [the Service] relied," while failing to mention this contradiction.[94] The Service's failure to address these contradictions is independently arbitrary and capricious.[95] As described below, the Service committed both errors throughout its consideration of potential DPSs.

1) Lake Superior population

In its analysis of the Lake Superior population as a possible DPS, the Service acted arbitrarily and capriciously when it misrepresented the findings of two studies and concluded erroneously that the Lake Superior population is not distinct from other Great Lakes sturgeon populations.

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[89] *See* SAF, *supra* note 59, at 5.
[90] *See id*; *see also* Petition, *supra* note 47, at 16, 108 (citing L.P Aaland et al., Changes in Fish Assemblage Structure of the Red River of the North, in 45 AMER. FISHERIES SOC. SYMP 293 (2005)); COSEWIC 2017, *supra* note 12.
[91] *See W. Watersheds Project v. Hall*, 338 F. Appx. 606, 608 (9th Cir. 2009) (reviewing the Service's decision not to list populations of the interior mountain quail based on its compliance with the ESA's best available science requirement).
[92] *WildEarth Guardians v. U.S. Fish & Wildlife Serv*., 782 F. Supp. 3d 893, 908 (C.D. Cal. 2025) (quoting *Alaska Oil & Gas Ass'n v. Pritzker*, 840 F.3d 671, 679 (9th Cir. 2016)).
[93] *Defs. of Wildlife v. Jewell*, 176 F. Supp. 3d 975, 1003 (D. Mont. 2016) (finding the Service acted arbitrarily and capriciously where its use of a study "runs counter to the intent of the study.").
[94] *Ctr. for Biological Diversity v. Zinke*, 900 F.3d 1053, 1068 (9th Cir. 2018).
[95] *Id.*

First, the Service misleadingly drew on the 2008 Welsh study to suggest that sturgeon move between Lakes Huron and Superior via the St. Mary's River.[96] However, the Service misstated the study's findings in several important ways. First, the study does not discuss the St. Mary River as a pathway for the movement of lake sturgeon between the lakes. Rather, the study only mentions that the lakes are connected by the river. In fact, the study states that "[d]espite the fact that several thousand lake sturgeon have been tagged and released back into Lake Superior, *none* have been recaptured outside of the [Lake Superior] basin[.]"[97] The study goes on to explain that "[t]he locks, dams, bypass channels, and shallow rapids that currently exist at the outlet [to Lake Superior] probably continue to preclude interlake fish movement."[98] Second, the study notes that even where interlake exchange is possible, "lake sturgeon appear to exhibit fidelity to spawning and foraging grounds," indicating behavioral and physical separation at key life stages.[99] Even in the situations where lake sturgeon can move between Great Lakes ecosystems, the study demonstrates that lake sturgeon tend not to do so. In other words, the Service relied on the mere possibility of movement among populations to conclude that the populations were not physically separated. Finally, the study notes that "[t]he majority of spawning populations within the Great Lakes basin were genetically distinct from each other," including the Lake Superior population.[100] Thus, contrary to the Service's claims, the 2008 Welsh study actually concludes that there is strong evidence of genetic, behavioral, and physical isolation between lake sturgeons in Lake Superior and surrounding populations.

Similarly, the Service incorrectly interpreted a 2018 study from the same authors to conclude that the populations are not reproductively isolated. In that study, the authors found that 10.8 percent of the sturgeon in the St. Louis River, which feeds into Lake Superior, came from Lake Huron.[101] The Service used this finding to claim there is a significant degree of physical exchange between the two populations. However, this section of the study makes no mention of whether sturgeon from Lake Huron are successfully interbreeding with the St. Louis River populations. Indeed, in the next paragraph, the study suggests that genetic diversity in the St. Louis River remains relatively low, which may indicate that migrating sturgeon are not successfully interbreeding with existing St. Louis River populations and that the two populations are still distinct.[102] In addition, the Service's conclusion ignored the study's other findings that suggest marked physiological and behavioral separation between the Lake Superior sturgeon population and other populations in the Great Lakes. Specifically, the study noted that "[g]enetic differentiation among spawning populations in Lake Superior is relatively high, indicating low levels of natural effective migration."[103] Thus, the 2018 Welsh study provides genetic evidence

[96] SAF, *supra* note 59, at 3 (citing Amy Welsh et al., *Genetic Assessment of Lake Sturgeon Population Structure in the Laurentian Great Lakes*, 28 N. AMER. J. FISHERIES MGMT. 572, 582 (2008)).
[97] Welsh, *supra* note 96, at 582 (emphasis added).
[98] *Id.* at 583.
[99] *Id.* at 582
[100] *Id.* at 580 (noting the high degree of differentiation between "[c]ollections from the Bad and White rivers in the Lake Superior drainage" and "the rest of the Great Lakes populations[.]").
[101] *See* SAF, *supra* note 59, at 3 (citing Amy Welsh et al., *A Reintroduced Lake Sturgeon Population Comes of Age: a Genetic Evaluation of Stocking Success in the St. Louis River*, 35 J. APPLIED ICHTHYOLOGY 149, 156 (2018)).
[102] Welsh, *supra* note 101, at 156.
[103] *Id.* at 155 (internal citation omitted).

of physiological, ecological, and behavioral separation between the Lake Superior population and the rest of the species.

The Service's use of the genetics studies for the Lake Superior sturgeon population arbitrarily and capriciously runs counter to the findings of the studies and therefore violates the ESA's best available science requirement. Moreover, the Service's failure to explain its decision in light of contradictory evidence among the studies is independently arbitrary and capricious.

2) Western Lake Michigan population

Similarly, the Service's treatment of genetic data available about the Western Lake Michigan population is arbitrary and capricious because the Service relied on implausible misinterpretations of the studies it cited and ignored contradictory results.

The Service arbitrarily dismissed the results of a study finding genetic differentiation and distinctiveness between the Western and Eastern Lake Michigan sturgeon populations based on an erroneous conclusion that the genetic differentiation finding only relates to stocking decisions and not whether the populations are distinct.[104] Welsh et al. (2010) found statistically significant genetic differentiation between 257 out of 276 populations across the Great Lakes, including each pairwise comparison between Western and Eastern Lake Michigan populations,[105] suggesting that these populations are reproductively isolated and separate. However, the Service dismissed this result by stating that the authors of the study only "defined" the areas of genetic differentiation "for the sole purpose of making stocking decisions," and arguing that the finding "does not mean these areas are reproductively isolated."[106] The Service offered no explanation for why the *purpose* of this statistical analysis justifies ignoring the clear results. In fact, contrary to the Service's assertion, a finding of genetic differentiation for the purpose of stocking decisions *does* suggest reproductive, behavioral, and physiological separation. The purpose of identifying genetically distinct populations when making stocking decisions is to avoid a phenomenon known as an "outbreeding depression."[107] An outbreeding depression occurs where interbreeding between genetically distinct populations produces offspring with reduced chances of reproductive success.[108] The reduction in reproductive success occurs in part because interbreeding between distinct populations results in the loss of population-specific adaptations that may aid in reproduction or survival.[109] Stocking presents a heightened risk of outbreeding because stocked fish, unlike fish born in the wild, are not imprinted to particular spawning grounds and are consequently more likely to "stray" or move between distinct populations.[110] It is important to identify genetic differences before making stocking decisions because stocked fish may disrupt the low natural rates of physical and reproductive exchange that currently account for the "substantial genetic diversity" among lake sturgeon populations.[111] In other words, the entire exercise of identifying genetic differences for the purpose of stocking decisions

[104] SAF, *supra* note 59, at 3.
[105] Welsh et al., *supra* note 86, at 17.
[106] SAF, *supra* note 59, at 3.
[107] Welsh, *supra* note 86, at 4, 21.
[108] *Id.* at 4.
[109] *Id.*
[110] *Id.*
[111] *Id.*

presupposes a high natural degree of separation between the populations that may be affected by stocking programs. Contrary to the Service's assertions, these genetic differences are statistically significant, reflective of reproductive isolation, and manifest as distinct physiological adaptations to each subpopulation's environmental needs. The Service's dismissal of this evidence amounted to an implausible misinterpretation and was thus arbitrary and capricious.

Separately, the Service misconstrued available evidence on the lake sturgeon's straying behavior. The Service cited Homola et al.'s 2012 paper documenting "straying" between the Eastern and Western Lake Michigan populations to conclude that there is no marked separation between them.[112] This conclusion contradicts the study's specific results on the behavior and reproductive success of straying individuals. Specifically, the study's statistical results "suggest[] either that the individuals that stray are reproductively unsuccessful [] or that contemporary straying rates are not reflective of historical rates of gene flow."[113] While the study does document physical straying behavior, its primary contribution is genetic and statistical evidence that is highly suggestive of reproductive isolation. The Service's failure to acknowledge this discrepancy was arbitrary and capricious and ignored the strong evidence of marked separation supplied by the study.

3) Mississippi River basin populations

The Service's analysis of the populations in the Mississippi River basin similarly misconstrues the available evidence. The Service cited the 2002 Knights study to conclude that the Missouri River, the Ohio River, the Arkansas-White River, and the Upper and Lower Mississippi River populations were not markedly separated because movement across dams was possible and the "rate of passage…can range from intermittent to high[.]"[114] Contrary to this assertion of regular movement, the study observed 31 sturgeon in the Upper Mississippi River and found that these sturgeon tend to return to "core areas," which "may be limited in number and unique to a group or substock of lake sturgeon with only infrequent exchange of fish between areas."[115] In fact, the study identified only *one* lake sturgeon that moved between the two areas of study—tagging sites 150 km apart along the Upper Mississippi River—during the entire year and a half that the authors tracked the two respective populations.[116] In short, the Service relied on a study documenting the movement of one individual sturgeon to conclude that the populations were not markedly physically separated. Yet the Knights study strongly suggests behavioral and physical separation even within the Upper Mississippi River. The Service's use of

[112] SAF, *supra* note 59, at 3.
[113] Jonathan Homola et al., *Genetically Derived Estimates of Contemporary Natural Straying Rates and Historical Gene Flow Among Lake Michigan Lake Sturgeon Populations*, 141 TRANS. AM. FISHERIES SOC'Y 1374, 1384 (2012).
[114] SAF, *supra* note 59, at 4 (citing Knights et al., *Habitat and Movement of Lake Sturgeon in the Upper Mississippi River System*, 131 TRANS. AM. FISHING SOC'Y 507 (2002)).
[115] Knights et al., *Habitat and Movement of Lake Sturgeon in the Upper Mississippi River System*, 131 TRANS. AM. FISHERIES SOC'Y 507, 517 (2002).
[116] *Id*.

this study to suggest a lack of separation between all populations within the Mississippi River basin amounts to an implausible misinterpretation of the data available to it.[117]

4) Northwestern Minnesota population

The Service's selective reading of available data rendered its analysis of the distinctness of the Northwestern Minnesota population highly suspect. The Service relied on a 2017 study from the COSEWIC to claim that there is no marked separation between the Red River Basin and Rainy Lake-Rainy River-Lake of the Woods populations and populations in Canada because Canadian anglers have caught fish traced to stocking efforts in the Red River in Minnesota.[118] However, the study itself is strongly suggestive of behavioral separation and reproductive isolation between these stocked individuals who stray and natural populations. The paragraph the Service relied on to rebut the claim of reproductive isolation states that these captures correspond to stocking events, and that, to date, "there is no conclusive evidence of stocked fish reproducing."[119] In other words, the study finds no evidence that the two populations are interbreeding and highlights the challenges facing stocking programs aimed at overcoming this behavioral separation. The Service's contrary use of the study to suggest a lack of marked separation amounts to an implausible misinterpretation.

II. The Service inadequately assessed the effects of climate change and failed to rely on the best available science, in violation of Section 4 of the ESA.

The Service must make listing decisions "solely on the basis of the best scientific and commercial data available."[120] This holds true even if the data are uncertain or "quite inconclusive."[121] Courts have repeatedly emphasized that this interpretation of the ESA's best available science requirement aligns with Congress's intent that "preventive action to protect species be taken sooner rather than later," and "before a species is 'conclusively' headed for extinction."[122] Moreover, while courts give some deference to the agency's determination of which data and studies are the "best available," this deference does not "lessen the agency's burden to articulate a satisfactory explanation for its action."[123] Here, the Service disregarded the ESA's requirement to rely on the best available science by (1) failing to consider adequately the effects of climate change on lake sturgeon and relying impermissibly on scientific uncertainty to

[117] The Service's interpretation also relies on a strained reading of the DPS Policy to require complete and impermeable physical separation before concluding that two populations are discrete. This reading is belied by DPS Policy's inclusion of three other forms of marked separation, *see* discussion, *supra* Part I.A. In fact, this reading produces absurd results when, as here, it permits the Service to conclude that two populations are not markedly separated because exactly one fish was observed to move between populations.

[118] SAF, *supra* note 59, at 5 (citing COSEWIC 2017, *supra* note 12, at 62).

[119] COSEWIC 2017, *supra* note 12, at 62.

[120] 16 U.S.C. § 1533(b)(1)(A).

[121] *In re Polar Bear Endangered Species Act Listing & 4(d) Rule Litig.,* 794 F. Supp. 2d 65, 106 (D.D.C. 2011) (quoting *Sw. Ctr. for Biological Diversity v. Babbitt*, 215 F.3d 58, 60 (D.C. Cir. 2000)).

[122] *Defs. of Wildlife v. Babbitt*, 958 F. Supp. 670, 680 (D.D.C. 1997) (citing S. Rep. No. 93-307 (1973)); *see also Trout Unlimited v. Lohn*, 645 F. Supp. 2d 929, 949 (D. Or. 2007); *WildEarth Guardians v. Salazar*, 2014 WL 10209231, at *2 (D.N.M. July 30, 2014).

[123] *Ctr. for Biological Diversity v. U.S. Fish & Wildlife Serv.*, 488 F. Supp. 3d 1219, 1227 (S.D. Fla. 2020) (quoting *State Farm*, 463 U.S. at 42).

avoid listing; and (2) mishandling and selectively applying the conclusions of several studies, thereby failing to engage in reasoned decision-making with the best available science.

A. The Service's climate change analysis arbitrarily resolved uncertainty in favor of not listing and ignored the best available science.

The Service's climate change analysis is arbitrary and capricious and ignores the best available science. The Service arbitrarily decided that uncertainty as to the precise effects of climate change on lake sturgeon viability should be resolved in favor of not listing the species without explaining why uncertainty justified that result. The Service also ignored the best available science by implausibly concluding that lake sturgeon will be able to adapt to any possible negative effects of climate change. Such a conclusion was not justified by the evidence before the Service and is not a rational basis on which the Service can justify its decision.

First, the Service's failure to articulate the connection between climate uncertainty and its listing decision is arbitrary and capricious and violates the ESA's best available science requirement. The ESA requires the Service to make listing determinations "solely on the basis of the best scientific and commercial data available."[124] While the ESA does not require "conclusive or ironclad" data, the Service must still identify uncertainties and explain why these uncertainties favor its listing decision.[125] Under the ESA's best available science requirement, "incomplete information . . . does not excuse the failure to comply with the statutory requirement[s] . . . using the best information available" and Congress did not create an exception to these statutory obligations for "inexact information."[126] The Service must do more than "simply invoke 'scientific uncertainty' to justify its action."[127] It must instead "rationally explain why [] uncertainty regarding the impact of" climate change favors a decision not to list a species.[128] For example, in *Center for Biological Diversity v. Zinke*, the Ninth Circuit found the Service acted arbitrarily and capriciously when it insufficiently explained its decision not to list the arctic grayling despite "acknowledg[ing] the warming of water temperatures and decreasing water flow because of global warming," which could have a deleterious impact on the species.[129] Similarly, as explained below, the Service here invoked scientific uncertainty in explaining why the threats posed by climate change did not justify listing the lake sturgeon, but it failed to explain how uncertainty as to climate change's precise effects justifies its conclusion not to list the lake sturgeon.[130]

In the SAF and SSA, the Service extensively discussed the negative effects of climate change on much of the lake sturgeon's current habitat.[131] Indeed, the SAF directly stated that climate change is a "primary factor[]" threatening lake sturgeon viability not only on its own but

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[124] 16 U.S.C. § 1533(b)(1)(A).
[125] *WildEarth Guardians v. Haaland*, 561 F. Supp. 3d 890, 899–900 (C.D. Cal. 2021) (quoting *Zinke*, 900 F.3d at 1073).
[126] *Conner v. Burford*, 848 F.2d 1441, 1454 (9th Cir. 1988).
[127] *Greater Yellowstone Coalition, Inc. v. Servheen*, 665 F.3d 1015, 1028 (9th Cir. 2011).
[128] *Id*. (citing *State Farm*, 463 U.S. at 52).
[129] *Zinke*, 900 F.3d at 1073.
[130] *See* SAF, *supra* note 59, at 16–17.
[131] *See id*., at 11, 16–17; SSA, *supra* note 5, at 23–28, 44, 122–27.

also by interacting with other stressors, such as dams.[132] The Service noted that climate change will increase water temperatures and the occurrence of extreme events, change hatch timing, harm individual growth, and cause harmful algal blooms and hypoxia.[133] Specifically, the SAF found that the "most significant potential impact from climate change on lake sturgeon is the projected increase in temperature," which will decrease the quality and quantity of spawning and nursery habitats by causing habitat temperatures to rise past suitable thresholds for successful spawning and recruitment.[134] The Service also noted that temperature increases are likely to disrupt reproduction timing and growth periods.[135] Crucially, in the SSA, the Service projected that due to climate change, average air temperatures will increase substantially by the year 2100 across the lake sturgeon range,[136] likely warming water in lake sturgeon spawning grounds beyond the species' thermal limits.[137]

After discussing climate change's negative potential impact on lake sturgeon, the Service relied on scientific uncertainty to justify its position that threats posed by climate change are not a primary stressor that would justify listing the sturgeon, claiming that "[t]here *may* be positive and negative effects of climate change and it is uncertain how lake sturgeon will respond to those changes."[138] The Service invoked this uncertainty despite acknowledging the degree to which climate change would exacerbate the effects of non-climate change stressors it had already identified.[139] Nowhere did the Service articulate a rational basis for concluding that the supposed uncertainty surrounding the acknowledged threat of climate change—a threat the Service itself acknowledged—meant that the listing was unjustified. Indeed, by identifying climate change as a "primary factor"[140] affecting lake sturgeon viability, and by recognizing that climate change was likely to exacerbate other threats facing the sturgeon, the Service assumed a burden to provide a "rational[] expla[nation] why the uncertainty regarding the impact of" climate change on lake sturgeon "counsels in favor of" not listing the species. [141] The Service failed to meet that burden.

Second, the Service failed to fulfill its statutory obligation to rely on the best available science in its selective use of scientific evidence regarding climate change's impact on lake sturgeon viability. Listing decisions have been reversed as arbitrary and capricious where their analysis amounts to "an implausible misinterpretation" of the evidence upon which it relies.[142] Here, the Service implausibly misinterpreted the scientific evidence to justify its conclusion that climate change as a stressor did not warrant listing because lake sturgeon *may* be able to adapt to

[132] *See* SAF, *supra* note 59, at 11, 43.
[133] *See id*. at 41.
[134] *See id*.
[135] *See id*.
[136] *See* SSA, *supra* note 5, at 124–26.
[137] *See id*. at 25.
[138] *See* SAF, *supra* note 59, at 42 (emphasis added); *see also* SSA, *supra* note 5, at 24 ("There is [sic] much uncertainty in the degree to which climate change will impact lake sturgeon, particularly in the response of lake sturgeon to changes in temperature and precipitation.").
[139] *See* SSA, *supra* note 5, at 24 ("The degree to which climate change may negatively impact lake sturgeon is likely to be a function of the level of other stressors such as dams and overfishing; climate change is likely to exacerbate the effects of these stressors.").
[140] *See* SAF, *supra* note 59, at 11; SSA, *supra* note 5, at 14.
[141] *See Greater Yellowstone*, 665 F.3d at 1028.
[142] *Jewell*, 176 F. Supp. 3d at 1004 (internal citations omitted).

its negative effects.[143] The evidence before the agency did not support this conclusion, making it arbitrary and capricious and in violation of the ESA's best available science requirement.

The Service misinterpreted the general scientific evidence of lake sturgeon adaptability to climate change. The Service asserted that "the adaptive capacity of the species will likely give it the ability to withstand climate change."[144] However, the Service primarily focused on only one effect of climate change—warmer water temperature—citing a few studies that suggested the *potential* adaptability of lake sturgeon to disrupted reproduction timing.[145] The Service failed to present any evidence that the species can adapt to the many other negative effects of climate change identified in the SSA, including changes in water level, water flow, and warm temperature days; as well as increases in severe weather events, disease and parasite transmission, hypoxia, eutrophic conditions, and toxicant accumulation.[146] Crucially, several scientists who reviewed the SSA drafts commented on the Service's inadequate consideration of many of these more variable climate change effects.[147] The Service's failure to address these negative impacts of climate change which were brought to its attention means that it has "entirely failed to consider an important aspect of the problem," rendering its determination arbitrary and capricious.[148]

Compounding this analytical error, the SAF entirely ignored the Service's own admission in the SSA, supported by four separate studies, that "the adaptability of the species is likely low due to the long generation times for lake sturgeon"[149] and that "[o]ne of the consequences of reductions in census population sizes during the past 150 years may be reductions in effective population size (i.e., adaptive resources of the population)."[150] These findings are inconsistent with the Service's conclusion that the lake sturgeon's adaptive capacity can successfully mitigate climate change's effects on the species.

These errors are magnified by the Service's inadequate DPS analysis.[151] Had the Service properly followed its own DPS Policy, it would have considered each of the nine petitioned subpopulations "as if it were" its own species, requiring the Service to consider climate change's impact on each population's habitat and adaptability based on geographically-specific evidence, or the "best scientific or commercial data available" *relevant to the DPS*.[152] In other words, the Service would be required to analyze habitat viability and adaptability for lake sturgeon populations in Lake Superior, separate from those in Western Lake Michigan, separate from those in the Mississippi River basin, and so forth. The Service's own discussion in the SAF points to the need for more regionally specific analysis regarding the effects of climate

[143] *See* SAF, *supra* note 59, at 39–40, 43.
[144] *See id*.
[145] *See id*. at 24–28.
[146] *See id*.
[147] *See* Draft SSA Peer Review Comments, comment numbers 138, 142, 575, 576.
[148] *State Farm*, 463 U.S. at 43.
[149] *See* SAF, *supra* note 59, at 39.
[150] *See* SSA, *supra* note 5, at 6.
[151] *See* discussion, *supra* Part I.
[152] *See* DPS Policy, *supra* note 41.

change.[153] Because the Service erred in finding none of the subpopulations to be discrete, thus truncating the DPS analysis at the outset, the magnitude of climate change's disproportionate effects on certain populations are diluted because the Service analyzed the effect on habitat and adaptability only in aggregate.

In conclusion, the Service's reliance on uncertainty and implausible interpretations of the scientific evidence on lake sturgeon adaptability to the deleterious effects of climate change was arbitrary and capricious. The Service failed to "consider [] important aspect[s] of the problem" and provided explanations that "run counter to the evidence before the agency."[154]

B. The Service's mishandling of an array of scientific studies violated the ESA's best available science requirement and its duty under the APA to engage in reasoned decision-making by selectively elevating facts while ignoring the studies' primary conclusions.

The Service acted arbitrarily and capriciously and violated the ESA's best available science requirement when it engaged in selective analysis of the studies upon which it relied. Courts have reversed or vacated the Service's decisions where they "run[] counter to the evidence before the agency."[155] The Service has been found to violate its statutory duties when it "cherry pick[s]" specific portions of the studies while ignoring "key findings and conclusions," that contradict the Service's ultimate decision.[156] Similarly, the Ninth Circuit has reversed the Service's analysis where it ignores a study's "primary conclusion" leading to a conclusion without basis in fact.[157] Here, the Service repeatedly ignored the key findings of the studies before it to render a "not warranted" decision for the lake sturgeon that is contrary to the evidence before it.

As a first example, the Service's cherry picking in its analysis of the severity of entrainment, which occurs when water intake systems draw aquatic life into those systems, was arbitrary and capricious and violated the ESA's best available science requirement. The Service noted that if a lake sturgeon is entrained, it risks "turbine mortality"[158] (i.e., death), and if the sturgeon does survive, it will "generally be displaced, sometimes permanently."[159] However, the Service downplayed the severity of entrainment by claiming that entrainment is "relatively rare[,] and populations where it has been observed are not greatly affected."[160] To support its position, the Service cited to the 2017 Committee on the Status of Endangered Wildlife in Canada ("COSEWIC") assessment and status report on the lake sturgeon.[161] However, the Service mischaracterized this study. The quote "relatively rare" was taken from a portion of the

[153] *See* SAF, *supra* note 59, at 17 (noting the range-wide but variable and uncertain effects of climate change on lake sturgeon habitat).
[154] *State Farm*, 463 U.S. at 43.
[155] *Tucson Herpetological Soc'y v. Salazar*, 566 F.3d 870, 878 (9th Cir. 2009) (quoting *State Farm*, 463 U.S. at 43).
[156] *Ctr. for Biological Diversity v. U.S. Fish & Wildlife Serv.*, 342 F. Supp. 3d 968, 974 (N.D. Cal. 2018).
[157] *Tucson Herpetological Soc'y*, 566 F.3d at 879 (internal citations omitted).
[158] *See* SSA, *supra* note 5, at 21.
[159] *See id.*
[160] *See* SAF, *supra* note 59, at 14.
[161] *See* COSEWIC 2017, *supra* note 12.

study that discusses entrainment specific to only three rivers in Canada.[162] However, in the preceding two paragraphs, the study notes other geographic areas in Canada where "[h]igh rates of adult entrainment"[163] have occurred and where "large juveniles . . . were determined to be highly susceptible (~21.1% entrained per year)."[164] The Service did not reference this portion of the study. Instead, it used the description of entrainment in a specific geographic area in Canada to conclude that entrainment is not a threat for the entire population of lake sturgeon in the United States. This selective analysis represents the type of "cherry pick[ing]"[165] that has been found to be arbitrary and capricious and in violation of the ESA's best available science requirement.

III. The Service's evaluation of the adequacy of existing conservation efforts was arbitrary and unlawful.

The Service erroneously treated stocking as a panacea that fully resolves the significant threats posed to lake sturgeon viability by dams, barriers, and climate change. Because these threats continue to imperil stocked and wild fish alike, the Service's decision to rely on stocking is akin to fixing a leaky bucket by adding more water. During the SSA drafting process, several peer reviewers expressed similar or related concerns about the conservation efforts analysis and the reliance on stocking, yet the service did not respond.[166] Such reliance failed entirely to "consider [] important aspect[s] of the problem" and "r[an] counter to the evidence before the agency,"[167] making it arbitrary and capricious and contrary to the best available science.

The Service analyzed stocking against the backdrop of what the Service itself acknowledged to be a dire viability crisis: 58.5 percent of the historically occupied analysis units—more than half of the species' historical range in the United States—no longer support self-sustaining lake sturgeon populations.[168] The Service identified numerous threats facing the lake sturgeon, including channelization and dredging,[169] commercial harvesting,[170] pollution,[171] and disruption in food supplies from invasive species.[172]

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[162] *Id.* at 92.
[163] *Id.* at 91.
[164] *Id.* at 92.
[165] *Ctr. for Biological Diversity*, 342 F. Supp. 3d at 974.
[166] *See* Draft SSA Peer Review Comments, comment numbers 55, 56, 137, 188, 326, 333, 334, 357, 358, 505, 506, 511, 514, 602.
[167] *State Farm*, 463 U.S. at 43.
[168] SSA, *supra* note 5, at ii; SAF, *supra* note 59, at 47–49 (180 AUs extirpated or functionally extirpated out of 257 total AUs).
[169] *See* SSA, *supra* note 5, at 22 ("Since the late 1800s, channelization and dredging has been impacting lake sturgeon riverine habitat across the range").
[170] *See id.* at 16 ("Currently, illegal harvest of lake sturgeon represents a minor stressor to lake sturgeon viability, but could become a more significant stressor in the future.").
[171] See *id.* at 23, 32, 39, 92, 95, 100–01.
[172] *See id.* at 28 (noting that invasive species "are not necessarily contributing substantially to lake sturgeon declines, but they all contribute to limiting the lake sturgeon's ability to recover").

Chief among the threats facing the lake sturgeon, however, are dams[173] and climate change.[174] In fact, the Service concluded that dams are the "greatest negative influence" to lake sturgeon viability.[175] The Service recognized at least four significant harms that the lake sturgeon faces because of dams: reduced habitat connectivity,[176] disruption of food chains,[177] negative impacts on water quality,[178] and changes in the natural flow regime of rivers, which can be devastating to lake sturgeon eggs and impair larval recruitment.[179] The Service also noted that entrainment at dams directly kills adult and juvenile lake sturgeon.[180] Because lake sturgeon have long lifecycles, the full effect of dams and barriers constructed in the last century may not yet be fully realized.[181] Indeed, the negative effects of dams on lake sturgeon habitat are so significant that they inhibited the expected population rebound after the closures of nearly all commercial fisheries.[182] The Service also acknowledged climate change as a "primary factor[]" threatening lake sturgeon viability not only on its own but also through its interaction with other stressors, including dams.[183]

Faced with this range-wide crisis of disruption and extirpation, the Service relied almost entirely on stocking—the replenishment of populations with captive-reared fish—to justify its decision not to list the lake sturgeon.[184] In its 12-Month Finding, the Service identified stocking as the primary factor mitigating the threats to lake sturgeon posed by damming, barriers, and climate change.[185] However, the best available evidence does not support a conclusion that places all hope of future lake sturgeon viability on the uncertain success of stocking.

The long-term efficacy of stocking is uncertain, and overreliance on its success contradicts the best available science. The efficacy of stocking efforts takes decades to assess because of the lake sturgeon's long lifecycle. For instance, a study in 2018 announced the

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[173] *See id.* at 17 ("Among all the stressors currently impacting lake sturgeon, infrastructure related to the control of water systems have the highest degree of adverse effects on the species throughout its range in both Canada and the United States.").

[174] *See id.* at 23 ("Global climate change has the potential to exacerbate existing stressors such as pollution, overfishing, water diversion, and introduction of nonnative fishes.").

[175] *Id.* at 44

[176] *Id*. at 13.

[177] *Id*. at 28.

[178] *Id*. at 21.

[179] *Id*. at 20.

[180] SAF, *supra* note 59, at 14.

[181] *Id.* at 13 ("However, the effects of habitat fragmentation on population size can be delayed, as adult lake sturgeon abundance may not decline for many decades due to lake sturgeon longevity.").

[182] *Id*. at 12 (discussing how dams have prevented expected population rebound after the cessation of commercial fishing operations).

[183] *See id*. at 11, 43.

[184] 12-Month Finding, *supra* note 2, at 30313 ("The primary conservation measure for the lake sturgeon is stocking of captive-reared lake sturgeon.").

[185] *Id*. The SSA and SAF both discussed other conservation efforts but concluded that stocking was "the most important and effective management tool." SAF, *supra* note 59, at 19; SSA, *supra* note 5, at 43. For instance, the Service explained that fish passages and dam removals might mitigate the dangers posed by damming and barriers but repeatedly noted that such efforts are "difficult" or even "impossible" to implement. *See* SSA, *supra* note 5, at 43; SAF, *supra* note 59, at 19, 40–41.

success of a stocking program initiated 35 years earlier, in 1983.[186] Another study predicts 35 to 40 years of stocking effort are necessary before one might find initial signs of natural reproduction.[187] Compounding this uncertainty, stocking introduces risks of outbreeding depression, loss of genetic variation within a population, in-breeding depression, and artificial selection.[188] The Service dismissed the threat posed by genetic risks from stocking as "minor."[189] However, the evidence identified in the SSA is inconclusive: stocking may have deleterious genetic effects that are difficult to measure because of the slow lifecycle and inaccessibility during non-spawning periods.[190] In short, the Service lacked adequate evidence to conclude that stocking would resolve the threats identified throughout the SAF, SSA, and 12-Month Finding.

Moreover, the Service's reliance on stocking as the primary conservation measure runs counter to the evidence before the Service. Successful stocking programs tend to coincide with other conservation measures aimed at habitat management and restoration.[191] The studies relied upon by the Service do not isolate the effect of stocking from the contribution of these other measures. For instance, the Great Lakes Fisheries Commission Report of 2010, cited in the SSA and SAF, states that it is necessary to remedy the impediments that lead to the original population's extinction, decline, or lack of recovery before stocking to create a self-sustaining population.[192] Similarly, the Michigan Department of Natural Resources Fisheries Division Special Report—referenced twenty-seven times across the SSA and SAF—warns that "[t]he amount of existing high gradient spawning habitat will directly control success of maintaining or establishing self-sustaining populations."[193] Consequently, the Report emphasizes that habitat protection and restoration is "critical," while describing stocking as "supplemental" and independent of whether a population is genuinely self-sustaining.[194] Climate change and dams—through their effects on habitat availability, water quality, and water temperature—impair the efficacy of stocking as a conservation measure.[195] In other words, the efficacy of stocking is limited by the fact that it is vulnerable to the very threats that the Service claims it will mitigate.

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[186] Amy B. Welsh et al., *A reintroduced lake sturgeon population comes of age: A genetic evaluation of stocking success in the St. Louis River*, 35 J. Applied Ichthyology 149, 156 (2019); *see also* R.M. Bruch et al., *Status of Lake Sturgeon (*Acipencer fulvescens *Rafinesque 1817) in North America*, 32 J. Applied Ichthyology 162, 162 (2016) ("Recovery programs initiated in the late 1970s are now just beginning to show signs of natural recruitment from populations re-built with stocked fish.").

[187] Bruch et al., *supra* note 186, at 181.

[188] SSA, *supra* note 5, at 29.

[189] SAF, *supra* note 59, at 18.

[190] SSA, *supra* note 5, at 30.

[191] Bruch et al., *supra* note 186, at 181.

[192] Amy B. Welsh et al., *Genetic Guidelines for the Stocking of Lake Sturgeon (*Acipenser fulvescens*) in the Great Lakes*, Great Lakes Fishery Commission, Miscellaneous Publication 27 (2010); *see also* J.E. Ganus et al., *Quantification of emigration and habitat use inform stocking rates of lake sturgeon (*Acipencer fulvescens *Rafinesque 1817) in the Cumberland River, Tennessee, USA*, 34 J. Applied Ichthyology 331, 337 (2018); Bruch et al., *supra* note 186, at 182.

[193] Elizabeth Hay-Chmielewski & Gary Whelan, *Lake sturgeon rehabilitation strategy, Michigan Department of Natural Resources*, Fisheries Special Report 1, 20 (1997).

[194] *Id*. at 5, 7.

[195] Bruch et al., *supra* note 186, at 181.

Ultimately, conservation efforts targeting habitat viability and restoration are necessary to ensure that stocking efforts do more than merely add stocked fish to a habitat that cannot support them.

In fact, the Service recognized the paramount importance of combining stocking with other measures in their Policy Regarding Controlled Propagation of Species Listed Under the Endangered Species Act, which states that "[c]ontrolled propagation is not a substitute for addressing factors responsible for an endangered or threatened species."[196] The logic of this policy is simple: stocked fish are not magically immune to the deleterious effects of damaged habitat, poor water quality, and reduced range. Yet, despite this policy and the scientific consensus that stocking must be combined with other conservation measures to address the underlying causes of population decline, the Service's 12-Month Finding relies primarily on stocking without significant discussion of necessary, related conservation measures. This omission violated the ESA's best available science requirement and "entirely failed to consider an important aspect of the problem."[197]

Additionally, the Service's reliance on stocking as the primary mitigating conservation effort is arbitrary and capricious because of the Service's failure to apply its Policy for Evaluation of Conservation Efforts ("PECE").[198] The PECE, adopted by the Service and NMFS in 2003, provides guidance for determining whether a conservation effort mitigates the need to list or the required degree of protection. In particular, "the point of the Policy was to establish criteria for determining when the Service could deem otherwise incomplete and unproven conservation efforts sufficiently certain to be implemented and effective to be relied on in evaluating ESA's listing factors."[199] The PECE prohibits reliance on a conservation effort in a listing decision unless the measure is "certain to be implemented" and "certain to be . . . effective."[200] While the PECE is guidance, it nonetheless reflects the Service's formalized understanding of Congress's intent,[201] and it is "the agency's duty to explain its departure from prior norms."[202]

The Service ignored the PECE and failed to explain its departure from prior norms. While the SAF mentions several ongoing stocking programs on which the 12-Month Finding relies, neither document presents any analysis of these factors under PECE. On the implementation prong, PECE requires that there be a "high level of certainty" that the necessary funding is secured to ensure implementation.[203] The Service presented no basis for such certainty

[196] Policy Regarding Controlled Propagation of Species Listed Under the Endangered Species Act, 65 Fed. Reg. 56919 (Sept. 20, 2000).
[197] *State Farm*, 463 U.S. at 43.
[198] Policy for Evaluation of Conservation Efforts When Making Listing Decisions, 68 Fed. Reg. 15100 (Mar. 28, 2003).
[199] *Defs. of Wildlife v. Jewell*, 815 F.3d 1, 8 (D.C. Cir. 2016).
[200] 68 Fed. Reg. at 15115.
[201] *Id.* at 15114.
[202] *Atchison, T. & S. F. Ry. Co.*, 412 U.S. at 808.
[203] 68 Fed. Reg. at 15114–15 ("1. The conservation effort, the party(ies) to the agreement or plan that will implement the effort, and the staffing, funding level, funding source, and other resources necessary to implement the effort are identified. . . . 7. A high level of certainty is provided that the party(ies) to the agreement or plan that will implement the conservation effort will obtain the necessary funding.").

in the SAF or SSA.[204] On the efficacy prong, PECE requires that "the nature and extent of threats being addressed by the conservation effort are described, and how the conservation effort reduces the threats is described."[205] The Service failed under either prong by failing to provide sufficient evidence that stocking will be effective or will occur at all.

Finally, the Service's errors in the DPS analysis aggravate its errors here. Had the Service analyzed any of the nine petitioned lake sturgeon DPS "as if it were" its own species, the Service would be required to assess the severity of threats and the adequacy of stocking measures on a population-specific basis, rather than on the lake sturgeon as a whole. For example, dams have a far more acute impact on the Mississippi River basin subpopulations than in the Great Lakes subpopulations.[206] Similarly, stocking efforts vary widely across the studied subpopulations,[207] and, given the heterogeneity of the threats posed by damming and dredging, the predicted success of these efforts will similarly vary. Treatment of the species in the aggregate inflated the population against which each threat's existence and severity would be assessed. The Service's failure to follow its own DPS Policy and attendant decision not to recognize any lake sturgeon DPSs improperly obscured the disparate threats and overstated the conservation measures for each lake sturgeon subpopulation.

In sum, while the Service described certain threats facing lake sturgeon, it offered no reasonable basis for its conclusion that stocking is a sufficient conservation measure to mitigate these threats. Thus, the Service's failure to analyze the implementation and effectiveness of stocking under its own policy is arbitrary and capricious.

IV. The Service erred in analyzing whether the lake sturgeon was endangered or threatened in a "significant portion of its range."

The Service erred in determining that the lake sturgeon was not threatened or endangered in a "significant portion of its range" ("SPOR"). The ESA requires the Service to list a species if

[204] Neither the SSA's Conservation Efforts section (42–44) nor the Current Condition analysis (44–111), which discuss stocking efforts in general and particular to each AU, make any mention of funding or certainty of implementation. The SAF similarly does not discuss the implementation of stocking except noting that "Many of these lake sturgeon management plans include objectives to identify new areas that would be suitable for reintroduction or supplementation from stocking; however, any expansion in stocking programs would rely on funding opportunities." SAF, *supra* note 59, at 20. This comment indicates that funding is recognized as a limitation on stocking programs success.

[205] 68 Fed. Reg. at 15115. Other criteria include "2. Explicit incremental objectives for the conservation effort and dates for achieving them are stated. 3. The steps necessary to implement the conservation effort are identified in detail. 4. Quantifiable, scientifically valid parameters that will demonstrate achievement of objectives, and standards for these parameters by which progress will be measured, are identified. 5. Provisions for monitoring and reporting progress on implementation (based on compliance with the implementation schedule) and effectiveness (based on evaluation of quantifiable parameters) of the conservation effort are provided. 6. Principles of adaptive management are incorporated." *Id.*

[206] SAF, supra note 59, at 13.

[207] *Id*. at 28 (noting that stocking programs exist in any fashion in six of eight representative units); *see also id*. at 34 (noting the absence of a stocking program in the Ohio River Basin); *id.* at 33 (noting the limited nature of stocking efforts in the Upper Mississippi River).

the species is endangered or threatened "throughout all or a significant portion of its range."[208] In this case, the Service's interpretation of "significant portion of its range" was facially impermissible because (1) it failed to articulate a reasonable standard for what makes a portion significant, and (2) failed to adequately consider the lake sturgeon's lost historical range. The end result is that the Service erroneously declined to list a species as endangered or threatened in a significant portion of its range, despite the Service's own admission that the lake sturgeon is extirpated or functionally extirpated in 58.5 percent of its US range and has low resilience in a further 23 percent of its US range. [209]

A. The Service failed to articulate a rational standard for what makes a portion significant.

In determining that the lake sturgeon is not endangered or threatened in a significant portion of its range, the Service erred by failing to articulate a rational standard by which a portion is considered significant. That standard was most recently articulated in *Defenders of Wildlife v. U.S. Fish and Wildlife Service*, where the Service assessed significance based on whether portions of the gray wolf range contributed "meaningfully" to resiliency, redundancy, or representation of the gray wolf entity being evaluated.[210] The court rejected such a construction of "significant," holding that the Service must explain sufficiently how it draws the line in deeming a portion "meaningful" and thus "significant."[211] In other words, the Service defined "significant" by pointing to three other terms ("resiliency, representation, and redundancy"), but the Service did not provide any threshold to make it possible for a court to assess whether a portion "meaningfully" contributed to any of the terms.[212] The Service's standard thus failed to fall within the range of allowable agency discretion because the standard "lack[ed] objective guideposts or factors against which the Court can judge the exercise of discretion."[213]

In this case, the Service chose an approach that is deficient for similar reasons. In the SAF, the Service first screened for potentially significant portions by focusing analysis on "portions of the species' range that contribute to the conservation of the species in a *biologically meaningful* way."[214] The Service went on to ask whether threats and their effects on species are greater "in any *biologically meaningful* portion of the species' range."[215] In the rest of the SAF, the Service examined a series of potentially significant portions based on this notion of "biological significance" before concluding that none of the screened-for portions were significant. This method of analysis replicates the fundamental error of *Defenders of Wildlife v. U.S. Fish and Wildlife Service,* applying a significance standard that replaces "significant" with "biologically meaningful" without providing a measuring stick for biological meaningfulness.[216] Under the Services' test, it is impossible to discern what facts or standards render a given portion

[208] 16 U.S.C. § 1532(6), (20).
[209] SSA, *supra* note 5, at ii; SAF, *supra* note 59, at 47–49 (180 AUs extirpated or functionally extirpated, divided by 257 total AUs).
[210] *Defs. of Wildlife v. U.S. Fish & Wildlife Serv.*, 584 F.Supp.3d 812, 827 (N.D. Cal. 2022).
[211] *Id*. at 828.
[212] *Id*.
[213] *Id*.
[214] SAF, *supra* note 59, at 47 (emphasis added).
[215] *Id*.
[216] *See Defs. of Wildlife*, 584 F.Supp.3d at 828.

biologically meaningful. The closest the Service comes to defining biologically meaningful is to tie a portion's meaningfulness to whether it has habitat of "higher quality" or "unique value."[217] That explanation does not offer a sufficiently discernible standard for a court to determine when habitat has high enough "quality" or "value" to warrant a significance finding. Just as in *Defenders of Wildlife*, the Service's decision to equate significance with an undefined notion of "biological meaningfulness" failed to articulate a rational threshold for significance "against which the Court can judge [the Service's] exercise of discretion"[218] and is therefore unlawful.

In addition to failing to provide a sufficiently discernible standard for a reviewing court to judge the Service's exercise of discretion, the Service's application of the purported standard for biological meaningfulness (habitat of "high quality" or "unique value")[219] also seems to render the standard entirely meaningless. In the SAF, the Service divided the lake sturgeon's range into three "biologically relevant"[220] areas: The Hudson Bay drainage (45 percent of the range), the Atlantic Drainage (33 percent of the range), and the Gulf of Mexico drainage (22 percent of the range).[221] In total, these portions cover 100 percent of the lake sturgeon's range. Yet, examining each drainage in turn, the Service concluded that none of these portions of the lake sturgeon's range contained "higher quality habitat" or provided "unique value" to the species.[222] It borders on the absurd for the Service to consider the entirety of the lake sturgeon's range and find that no portion of that range contains habitat of high quality or unique value, especially considering that these terms—left undefined by the Service—would ordinarily seem to entail a comparative inquiry. After all, if *no single one* of the lake sturgeon's habitats qualifies as "higher quality" or of "unique value" than the others, one must ask: higher quality than what, and unique value compared to what? In short, the path to the Service's conclusion cannot "reasonably be discerned."[223]

B. The Service failed to consider the lake sturgeon's lost historic range as a reason to consider it endangered or threatened in a SPOR.

A species can be endangered or threatened in a SPOR if "there are major geographical areas in which it is no longer viable but once was."[224] Courts have repeatedly held that "where . . . the area in which the [species] is expected to survive is much smaller than its historical range, the Secretary must at least explain her conclusions that the area in which the species can no longer live is not a 'significant portion of its range.'"[225] Otherwise, "an important factor—the

[217] SAF, *supra* note 59, at 48.
[218] *Defs. of Wildlife*, 584 F.Supp.3d at 828.
[219] SAF, *supra* note 59, at 48.
[220] *Id.* at 49.
[221] *Id*.
[222] *Id.* at 48–49.
[223] *Ctr. for Biological Diversity v. U.S. Fish & Wildlife Serv*., 690 F.Supp.3d 322, 344 (S.D.N.Y. 2023) (quoting *Karpova v. Snow*, 497 F.3d 262, 268 (2d Cir. 2007)).
[224] *Defs. of Wildlife v. Norton*, 258 F.3d 1136, 1145 (9th Cir. 2001) (citing *Asarco, Inc. v. EPA*, 616 F.2d 1153, 1159 (9th Cir. 1980)).
[225] *See id*. (citing *Asarco,* 616 F.2d at 1159); *see also Humane Soc'y of U.S. v. Zinke*, 865 F.3d 585, 606 (D.C. Cir. 2017).

possible enduring consequences of significant loss of historical range"[226] will be left out of the analysis all together.

In this case, the Service acknowledged that the lake sturgeon has low or worse resiliency in 81.5 percent of its AUs.[227] Moreover, 58.5 percent of historically occupied AUs—representing more than half of the species' historical range in the United States—no longer support self-sustaining lake sturgeon populations.[228] The SSA and the SAF explain that the extirpated and functionally extirpated AUs are concentrated in the southern and central portions of the species' historical range, including the Missouri, lower and middle Mississippi, Ohio, Tennessee, and Cumberland river basins.[229] These areas once supported robust, reproducing populations but now persist, if at all, only through stocking.[230] By contrast, the few populations in "high" or "moderate" condition are almost entirely confined to the Great Lakes, St. Lawrence and Canadian drainages.[231]

Despite evidence of significant loss of range, the Service nevertheless concluded that the lake sturgeon "remain distributed in the four major North American drainages it occupied historically" and thus not endangered or threatened in a significant portion of its range.[232] This conclusion fails to grapple with the magnitude and ecological consequences of the range contraction that the Service itself meticulously outlined in the SSA and thus fails to provide an adequate explanation for why "the area in which the species can no longer live is not a 'significant portion of its range.'"[233] This omission is particularly consequential given the SSA's explicit finding that the lake sturgeon's representation and adaptive capacity have "been reduced from historical levels."[234] The Service's conclusion that the species is not endangered or threatened in a SPOR—despite dramatic range constriction and extirpation—papers over a massive loss of geographic and ecological diversity and is thus arbitrary and capricious.

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[226] *Humane Soc'y*, 865 F.3d at 606; *Ctr. for Biological Diversity v. U.S. Fish & Wildlife Serv.*, CV 24-86-M-DWM, 2025 BL 274998, at *24 (D. Mont. Aug. 5, 2025) (holding that the ESA requires the Service to consider historical range in its SPOR analysis).

[227] SSA, *supra* note 5, at 114.

[228] *Id*.

[229] *Id*. at ii–iii; SAF, *supra* note 59, at 36–37.

[230] *See* SSA, *supra* note 5, at 112 ("The upper Mississippi River representation unit has two highly resilient analysis units; however, the rest of the Mississippi River basin (Middle and Lower Mississippi, Ohio River basin, Tennessee and Cumberland River representation units) and the Coosa River basin are mostly made up of low resiliency, functionally extirpated, or extirpated analysis units.").

[231] *Id*.

[232] SAF, *supra* note 59, at 8, 47–50.

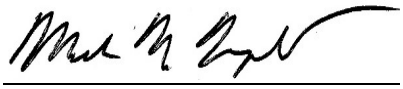
[233] *Norton*, 258 F.3d at 1145 (citing *Asarco*, 616 F.2d at 1159).

[234] SSA, *supra* note 5, at iii.

CONCLUSION

In sum, as documented in this letter, the Service's determination that listing the lake sturgeon is not warranted is arbitrary and capricious and violates the ESA. If the Service does not act to correct these violations within sixty days, the Center will pursue litigation in federal court. Please contact us if you have any questions or would like to discuss this matter.

Sincerely,



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