PUBLISHED

UNITED STATES COURT OF APPEALS
FOR THE FOURTH CIRCUIT

No. 20-2159

APPALACHIAN VOICES; WILD VIRGINIA; WEST VIRGINIA RIVERS COALITION; PRESERVE GILES COUNTY; PRESERVE BENT MOUNTAIN, a chapter of Blue Ridge Environmental Defense League; WEST VIRGINIA HIGHLANDS CONSERVANCY; INDIAN CREEK WATERSHED ASSOCIATION; SIERRA CLUB; DEFENDERS OF WILDLIFE; CHESAPEAKE CLIMATE ACTION NETWORK; CENTER FOR BIOLOGICAL DIVERSITY,

Petitioners,

v.

UNITED STATES DEPARTMENT OF THE INTERIOR; DEB HAALAND, in her official capacity as Secretary of the U.S. Department of the Interior; UNITED STATES FISH AND WILDLIFE SERVICE, an agency of the U.S. Department of the Interior; AURELIA SKIPWITH, in her official capacity as Director of the U.S. Fish and Wildlife Service; CINDY SCHULZ, in her official capacity as Field Supervisor, Virginia Ecological Services, Responsible Official,

Respondents,

MOUNTAIN VALLEY PIPELINE, LLC,

Intervenor.

On Petition for Review of the United States Fish and Wildlife Service's Biological Opinion and Incidental Take Statement. (CP16-10-000)

Argued: October 29, 2021 Decided: February 3, 2022

Before GREGORY, Chief Judge, and WYNN and THACKER, Circuit Judges.

Vacated and remanded by published opinion. Judge Wynn wrote the opinion, in which Chief Judge Gregory and Judge Thacker joined.

ARGUED: Elizabeth Fay Benson, SIERRA CLUB, Oakland, California, for Petitioners. Kevin William McArdle, UNITED STATES DEPARTMENT OF JUSTICE, Washington, D.C., for Respondents. George Peter Sibley, III, HUNTON ANDREWS KURTH, LLP, Richmond, Virginia, for Intervenor. **ON BRIEF:** Nathan Matthews, SIERRA CLUB, Oakland, California; Benjamin A. Luckett, Derek O. Teaney, APPALACHIAN MOUNTAIN ADVOCATES, Lewisburg, West Virginia, for Petitioners. Jean E. Williams, Acting Assistant Attorney General, Environment and Natural Resources Division, UNITED STATES DEPARTMENT OF JUSTICE, Washington, D.C.; S. Amanda Bossie, UNITED STATES DEPARTMENT OF THE INTERIOR, Washington, D.C., for Respondents. J. Pierce Lamberson, HUNTON ANDREWS KURTH LLP, Richmond, Virginia; Sandra A. Snodgrass, HOLLAND & HART LLP, Denver, Colorado; W. Parker Moore, Katrina M. Krebs, BEVERIDGE & DIAMOND, PC, Washington, D.C., for Intervenor.

WYNN, Circuit Judge:

Petitioners, a collection of environmental nonprofit organizations, challenge the Fish and Wildlife Service's 2020 Biological Opinion and Incidental Take Statement for the Mountain Valley Pipeline. They allege, among other things, that the agency failed to adequately consider the project's environmental context while analyzing impacts to two species of endangered fish, the Roanoke logperch and the candy darter. We agree, and therefore vacate the 2020 Opinion and Incidental Take Statement and remand for further proceedings.

I.

Before we can analyze the merits of this case, we must lay out some background details. We begin by briefly describing the relevant legal framework. Then, we turn to the facts and procedural history of this case. Finally, we describe the biological context for the two endangered species at issue.

A.

The Endangered Species Act of 1973 ("Endangered Species Act" or "the Act") represents "the most comprehensive legislation for the preservation of endangered species ever enacted by any nation." *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 180 (1978); Jacob Malcom & Andrew Carter, *Better Representation Is Needed in U.S. Endangered Species Act Implementation*, 2 Frontiers in Conservation Sci., April 20, 2021, at 1, https://doi.org/10.3389/fcosc.2021.650543 ("The U.S. Endangered Species Act . . . is often considered the strongest conservation law in the world for imperiled wildlife.") (saved as ECF opinion attachment). "The plain intent of Congress in enacting this statute was to halt and reverse

the trend toward species extinction, whatever the cost." *Tenn. Valley Auth.*, 437 U.S. at 184. To that end, the Endangered Species Act requires federal agencies "to afford first priority to the declared national policy of saving endangered [or threatened] species"—even when this goal conflicts with agencies' "primary missions." *Id.* at 185. The Act also prohibits "[v]irtually all dealings with [listed] species" by any individual or entity "except in extremely narrow circumstances." *Id.* at 180.

These "broad[ly] sweep[ing]" policies are codified in Sections 7 and 9 of the Endangered Species Act. *Id.* at 188. Section 7 requires federal agencies to ensure that "any action authorized, funded, or carried out by [the] agency . . . is not likely to jeopardize the continued existence of any [listed] species." 16 U.S.C. § 1536(a)(2). To "jeopardize the continued existence" means "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." 50 C.F.R. § 402.02.

This substantive duty to avoid jeopardy is policed by a procedural consultation requirement. 16 U.S.C. § 1536(a)(2). Whenever an agency action "may affect listed species," the agency must formally consult with the Fish and Wildlife Service. 50 C.F.R. § 402.14(a). During consultation, the Fish and Wildlife Service must formulate a "biological opinion" on whether that action, in light of the relevant environmental context, "is likely to jeopardize the continued existence of [those] species." *Id.* § 402.14(g). In making this determination, the Fish and Wildlife Service must "use the best scientific and commercial data available." 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.14(g)(8).

Section 9 of the Endangered Species Act broadly prohibits the "take" of any listed species. 16 U.S.C. § 1538(a)(1)(B). To "take" means to "harass, harm, . . . wound, [or] kill, . . . or to attempt to engage in any such conduct." *Id.* § 1532(19). If the Fish and Wildlife Service determines that an agency action is not likely to jeopardize a listed species but is "reasonably certain" to lead to incidental "take" of that species, it must provide the action agency with an incidental take statement. 50 C.F.R. § 402.14(g)(7), (i). This statement shall specify the "amount or extent" of incidental take, "reasonable and prudent" mitigation measures, and "terms and conditions" to implement those measures. *Id.* § 402.14(i)(1). Any incidental take consistent with these limits is not prohibited by Section 9. *Id.* § 402.14(i)(5). But whenever these limits are exceeded the action agency must "reinitiate consultation immediately." *Id.* § 402.14(i)(4).

B.

The Mountain Valley Pipeline (the "Pipeline" or the "Project") is a 42-inch diameter, 304-mile proposed natural gas pipeline stretching from West Virginia to Virginia. The proposed route crosses seventeen counties and more than 1,100 streams, and will disturb 6,951 acres of land, including 4,168 acres of soils that have the potential for severe water erosion. Nearly one-quarter of the proposed Pipeline will traverse slopes greater than 30%.[1] When fully complete, the Pipeline will deliver up to two billion cubic feet of natural gas per day to markets in the mid-Atlantic and Southeast.

[1] For comparison, black diamond ski slopes—among the steepest and most difficult runs on any mountain—typically "have a gradient of 40% or higher." SKI Profiles, *Ski Slope Levels: What Are They and What Skill Do I Need?* (Nov. 12, 2019),

The Federal Energy Regulatory Commission ("FERC") authorized construction of the Project on October 13, 2017. Mountain Valley Pipeline, LLC, 161 FERC ¶ 61,043 (2017) (order issuing certificates). Because the Project could impact listed species, FERC consulted with the Fish and Wildlife Service, as required by Section 7 of the Endangered Species Act. About a month later, the Fish and Wildlife Service submitted its original Biological Opinion and Incidental Take Statement to FERC. This opinion concluded the Project was not likely to jeopardize any of the listed species it examined, including the Roanoke logperch and the Indiana bat.

On July 27, 2018, this Court found the U.S. Forest Service violated the National Environmental Policy Act ("NEPA") when it adopted FERC's Environmental Impact Statement for the Project. *Sierra Club, Inc. v. U.S. Forest Serv.*, 897 F.3d 582, 596 (4th Cir.), *reh'g granted in part on other grounds*, 739 F. App'x 185 (4th Cir. 2018). In relevant part, we held that the Forest Service arbitrarily adopted FERC's flawed sedimentation analysis when assessing impacts to the Jefferson National Forest. *Id.* A few months later, U.S. Geological Survey scientist Dr. Paul Angermeier sent comments to the Fish and Wildlife Service, pointing out that the same arbitrary assumptions undergirded its 2017 Biological Opinion's assessment of the Project's impacts on the logperch. He also identified several other "unjustified" analytical choices that caused the Fish and Wildlife Service to "significantly underestimate potential impacts" of the Project on the logperch.

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https://skiprofiles.com/ski-slope-levels-what-skill-do-i-need/ (saved as ECF opinion attachment).

J.A. 1358–66.[2] Around the same time, the Fish and Wildlife Service published a final rule listing the candy darter as endangered. Endangered and Threatened Wildlife and Plants; Endangered Species Status for the Candy Darter, 83 Fed. Reg. 58,747 (Nov. 21, 2018) (codified at 50 C.F.R. pt. 17).

On August 12, 2019, several of the Petitioners filed a petition for review with this Court and separately requested that the Fish and Wildlife Service stay its 2017 Biological Opinion. The agency denied the stay request because Mountain Valley Pipeline, LLC ("Mountain Valley") had already voluntarily suspended certain activities. On August 21, these groups requested a judicial stay pending review of their petition. Shortly after, this Court issued an order staying the 2017 Biological Opinion.

During this same time period, FERC reinitiated consultation for the Project with the Fish and Wildlife Service. On September 4, 2020, the Fish and Wildlife Service issued a new Biological Opinion ("BiOp" or "2020 BiOp") and Incidental Take Statement. The Fish and Wildlife Service determined that the Project was likely to adversely affect five listed species: a shrub called the Virginia spiraea, the Roanoke logperch, the candy darter, the Indiana bat, and the northern long-eared bat. However, the agency ultimately found that the Project was unlikely to jeopardize any of these five species.

On October 27, 2020, Petitioners filed a petition for review. A few days later we granted Mountain Valley's motion to intervene.

[2] Citations to the "J.A." refer to the Joint Appendix filed by the parties in this appeal. Citations to the "S.J.A." refer to the Sealed Joint Appendix.

C.

Petitioners' current petition for review concerns three endangered species: the Roanoke logperch, candy darter, and Indiana bat.[3] We need only describe the factual context for the first two.[4]

[3] Throughout this opinion, we refer to the Roanoke logperch as the "logperch" and the candy darter as the "darter." This is for ease of reference only, and is not meant to imply that the logperch is not a species of darter (it is), or that we are talking about any other species sharing the logperch or darter names.

[4] Because the Fish and Wildlife Service's deficient analysis of the logperch and darter requires us to vacate and remand, we find it unnecessary to address Petitioners' claims concerning the arbitrary nature of the Incidental Take Statement for the Indiana bat. *See Or. Nat. Res. Council v. Allen*, 476 F.3d 1031, 1041 (9th Cir. 2007) (holding that when the "underlying BiOp has been [vacated], the Incidental Take Statement lacks a rational basis"); *see also id.* at 1036–37 ("Without understanding the scope and purpose of the action itself—information contained in the BiOp—there is no way to know whether the take being authorized is properly 'incidental.'").

However, on remand, we recommend that the Fish and Wildlife Service further explain why it anticipates no effects to the bat from clearing more than 1,000 acres of suitable but unoccupied summer habitat. In 2017, the agency found that the "*majority* of effects to [the bat]" from the nearby Atlantic Coast Pipeline "will occur" from tree clearing of this same habitat type—even though no bats were identified in summer surveys of these areas. J.A. 1512 (emphasis added). These effects were anticipated because bats, including pregnant females, may use these areas "as a travel corridor between hibernacula and roost trees" in non-summer months. J.A. 1512.

In contrast, for the 2020 BiOp the Fish and Wildlife Service found that clearing suitable but unoccupied summer habitat would have *no* adverse effects on the bat because 2015–16 summer survey results "indicate that [Indiana bats] are not present." J.A. 82. But summer surveys would necessarily fail to account for bats traveling through these areas during non-summer months. The Fish and Wildlife Service appreciated this fact in 2017; it anticipated impacts to the bat from clearing suitable unoccupied summer habitat even though no bats were found there during the summer. On remand, the agency must explain why it has now come to a different conclusion based on similarly negative summer-only survey results.

1.

The Roanoke logperch is an endangered freshwater fish endemic to Virginia and North Carolina. The logperch inhabits medium to large warmwater streams and requires "[m]icrohabitats with loosely embedded substrate free of silt." J.A. 45. They reach sexual maturity after two to three years but can live up to 6.5 years. Logperch are benthic (bottom-dwelling) sight feeders that "flip rocks with their snout to expose invertebrates and ingest the exposed prey." J.A. 46. Increased sedimentation can wipe out many of the invertebrates that logperch feed on and interfere with their ability to see prey. Sedimentation can also interfere with egg and larval development and cause the production of fewer and smaller eggs.

We also encourage the agency to further clarify—in the BiOp—why its 2015–16 Indiana bat surveys are still valid. It is unclear from the record whether surveys from this time period are valid for a minimum of two, three, or five years. *Compare* J.A. 82 (2020 BiOp noting that "[s]ince 2018" the agency "has accepted negative surveys rangewide for a minimum of 5 years . . . [while] prior to that it was a minimum of 2 years"), *with* J.A. 1282 (letter from Fish and Wildlife Service Deputy Assistant Regional Director noting that a bat survey completed using pre-2018 guidelines "remains valid for 3 years"). Though these minimum time frames will undoubtedly be exceeded on remand, "[t]here is no automatic expiration of survey results . . . as these are *minimum*[]" time frames. J.A. 82 (emphasis added). And it probably still makes sense to rely on these older surveys as the last—and therefore best—snapshot of bat activity in the area pre-Project. After all, most of the suitable unoccupied summer habitat has already been cleared. But if that is so, the agency must make it explicit.

Figure 1: Adult male Roanoke logperch. J.A. 1613.

The Roanoke logperch is only found in four river systems within Virginia and North Carolina: the Nottoway, Pigg, Roanoke, and Smith Rivers. These four river systems are home to seven distinct populations. The Project will impact two of these populations located in the Pigg and Roanoke Rivers. Because these two watersheds "cover a large geographic extent, contain an estimated large population, and run a lower risk of being susceptible to extirpation," they are expected to "underpin the recovery of the species." J.A. 73. The Roanoke River population in particular "harbors the majority of the species' extant genetic diversity" and therefore "should receive the highest priority for protection." J.A. 1238. In total, the Project will impact 6.7 kilometers of habitat in the Pigg River system, resulting in take of 6.7% of the Pigg River population. The Project will also impact 17.6 kilometers of habitat in the Roanoke watershed, resulting in take of 14.9% of the total estimated Roanoke River population.

2.

The candy darter is an endangered freshwater fish endemic to Virginia and West Virginia. It is a "habitat specialist" that is "typically found in high- to moderate-gradient, cool- or cold-water stream ecosystems." J.A. 50. This species has a "relatively short life cycle, reaching sexual maturity by age 2 and often dying during their third year." J.A. 50. The candy darter is "generally intolerant of excessive stream sedimentation"; indeed, "[e]xcessive sedimentation was likely a primary cause of the [darter's] historical decline." J.A. 50, 53. The darter is not as mobile as its logperch cousin, meaning it "will likely not avoid areas of heavy sediment deposition by moving to other areas of suitable habitat within the system." J.A. 111.

Figure 2: Adult male candy darter. J.A. 1416.

Eighteen fragmented populations of candy darter remain. Many of these populations are threatened by excessive sedimentation and hybridization with the closely related variegate darter. Due largely to the increasing threat of hybridization, a 2018 Species Status Assessment Report predicted the species' "most likely future scenario" is near-total

extirpation across its current range, which "significantly increases the candy darter's risk of extinction over the next 25 years." J.A. 1408, 1462. Importantly, the two populations that will be impacted by the Pipeline—the Gauley River and Stony Creek populations—have yet to experience significant hybridization. Because they are "among the most genetically pure populations" remaining, they are "*essential* to the recovery of the species." J.A. 75 (emphasis added). In total, the Pipeline is projected to impact 2 of the 44 kilometers of proposed critical habitat in the Upper Gauley River and 1 of the 31 kilometers of proposed critical habitat in Stony Creek.[5]

II.

This Court has original and exclusive jurisdiction to review the BiOp under the Natural Gas Act. *See* 15 U.S.C. § 717r(d)(1). "Because the Endangered Species Act does not specify a standard of review, we apply the general standard of review of agency action established by" the Administrative Procedure Act. *Sierra Club v. U.S. Dep't of the Interior*, 899 F.3d 260, 270 (4th Cir. 2018) (citation and internal quotation marks omitted).

Under the Administrative Procedure Act, we must "hold unlawful and set aside agency action, findings, and conclusions found to be . . . arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." 5 U.S.C. § 706(2)(A). Agency action is arbitrary and capricious "if the agency has relied on factors which Congress has not

[5] The Fish and Wildlife Service did not calculate a numeric incidental take estimate for the darter because "data is either unavailable (Gauley River) or lacks the precision needed to generate meaningful take estimates (Stony Creek), and such data cannot be readily obtained." J.A. 172.

intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise." *Motor Vehicle Mfrs. Ass'n of U.S. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983).

"Review under this standard is highly deferential, with a presumption in favor of finding the agency action valid." *Ohio Valley Env't Coal. v. Aracoma Coal Co.*, 556 F.3d 177, 192 (4th Cir. 2009). "Nevertheless, we must conduct a 'searching and careful' review to determine whether the agency's decision 'was based on a consideration of the relevant factors and whether there has been a clear error of judgment.'" *Sierra Club*, 899 F.3d at 270 (quoting *Marsh v. Or. Nat. Res. Council*, 490 U.S. 360, 378 (1989)). In determining whether such an error was made, the "reviewing court may look only to [the agency's] *contemporaneous* justifications" for its actions. *Dow AgroSciences LLC v. Nat'l Marine Fisheries Serv.*, 707 F.3d 462, 467 (4th Cir. 2013). Because "an agency's action must be upheld, if at all, on the basis articulated by the agency itself," "courts may not accept appellate counsel's *post hoc* rationalizations for agency action." *State Farm*, 463 U.S. at 50.

Petitioners advance numerous challenges to the 2020 BiOp. We start by assessing Petitioners' claim that the Fish and Wildlife Service did not adequately analyze the environmental context for the Roanoke logperch and candy darter. Because we agree with Petitioners' argument, we conclude we must vacate and remand on that basis. Next, we

address additional minor challenges further attacking the agency's analysis and Incidental Take Statement. We conclude these additional challenges are meritless.

A.

When it comes to protecting listed species, environmental context is critical. *See Pac. Coast Fed'n of Fishermen's Ass'ns v. U.S. Bureau of Reclamation*, 426 F.3d 1082, 1093 (9th Cir. 2005) (holding a proper jeopardy analysis requires investigating whether "jeopardy might result from the agency's proposed actions in the present and future human and natural contexts"). If the Fish and Wildlife Service conducted its "jeopardy analysis in a vacuum," focusing only on the individual agency action at issue, then "a listed species could be gradually destroyed, so long as each step on the path to destruction [wa]s sufficiently modest." *Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv.*, 524 F.3d 917, 929–30 (9th Cir. 2008). But this "slow slide into oblivion is one of the very ills the [Endangered Species Act] seeks to prevent." *Id.* at 930.

The Act guards against this danger by requiring the Fish and Wildlife Service to formulate its biological opinion in three primary steps.

First, the Fish and Wildlife Service must "[r]eview *all* relevant information provided by the [action] agency or *otherwise available*." 50 C.F.R. § 402.14(g)(1) (emphases added). This requirement meshes with, and is partially derived from, the Act's mandate to "use the best scientific and commercial data available." 16 U.S.C. § 1536(a)(2). These are not passive directives; rather, the Fish and Wildlife Service "must seek out and consider all existing scientific data relevant to the decision it is tasked with making." *Defs. of Wildlife v. U.S. Dep't of the Interior*, 931 F.3d 339, 346 (4th Cir. 2019).

Second, the Fish and Wildlife Service must "[e]valuate" four different categories of information: (1) the "current status" of the listed species; (2) the "environmental baseline"; (3) the "cumulative effects" of non-federal action; and (4) the "effects of the [agency] action." 50 C.F.R. § 402.14(g)(2), (3). This case primarily concerns the middle two categories: the "environmental baseline" and "cumulative effects."

The "environmental baseline" is defined by the Fish and Wildlife Service's regulations as "the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action."[6] 50 C.F.R. § 402.02. This includes "the past and present impacts of *all* Federal, State, or private actions and other human activities in the action area" as well as the "anticipated impacts" of contemporaneous actions. *Id.* (emphasis added). This definition is further fleshed out in the Fish and Wildlife Service's Consultation Handbook, which describes the "environmental baseline [a]s a 'snapshot' of a species' health at a specified point in time." U.S. Fish & Wildlife Serv. & Nat'l Marine Fisheries Serv., Endangered Species Consultation Handbook 4-22 (1998) [hereinafter "Consultation Handbook"].[7] This "snapshot" folds in the "effects of past and ongoing human and natural

[6] The action area is the area "to be affected directly or indirectly by the Federal action." 50 C.F.R. § 402.02.

[7] This document provides internal guidance for the Fish and Wildlife Service during consultation. Notice of Availability of Final Endangered Species Consultation Handbook for Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act, 64 Fed. Reg. 31,285 (June 10, 1999). Though it is over twenty years old, the definition of environmental baseline has changed only slightly since, and the Fish and Wildlife Service still considers the Consultation Handbook relevant.

factors leading to the current status of the species," as well as an analysis of the local ecosystem and the species' habitat in the action area. *Id.*

"[C]umulative effects" are defined by the Fish and Wildlife Service's regulations as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area." 50 C.F.R. § 402.02. "'[R]easonably certain to occur' does *not* require a guarantee the action will occur," but wholly "[s]peculative non-Federal actions that may never be implemented are not factored into the 'cumulative effects' analysis." Consultation Handbook at 4-30 (emphasis added). This definition is "narrower" than that found in since-repealed implementing regulations for NEPA, although there was certainly overlap between the two.[8] *Id.* at 4-31 (suggesting the Fish and Wildlife Service "can review the broader NEPA discussion of cumulative effects" in any NEPA analyses conducted for a project and then "apply the [Endangered Species] Act's narrower cumulative effects definition" to those analyses).

Though climate change could be considered a cumulative effect, *see Turtle Island Restoration Network v. U.S. Dep't of Com.*, 878 F.3d 725, 736 (9th Cir. 2017), it does not fit neatly into just this category. We take no position on whether climate change is best addressed as a baseline factor, cumulative effect, some mixture of the two, or something else entirely. *See Wild Fish Conservancy v. Irving*, 221 F. Supp. 3d 1224, 1234 (E.D. Wash.

[8] This regulation was still in effect when FERC prepared its original Environmental Impact Statement for the Project. The regulation defined cumulative impacts as "impacts on the environment which result from incremental impact of the [proposed] action when added to other past, present, and reasonably foreseeable future actions." J.A. 1566 (quoting 40 C.F.R. § 1508.7 (1978)).

2016) ("It is, of course, not the Court's place to tell the agency *how* to . . . consider climate change in its analysis, it simply must consider it."); J.A. 49 (Fish and Wildlife Service mentioning climate change as part of its environmental baseline analysis for the logperch); Response Br. at 21 (Fish and Wildlife Service referring to climate change as a "current and future baseline" factor). It is clear, however, that climate change typically must form part of the analysis in some way. *S. Yuba River Citizens League v. Nat'l Marine Fisheries Serv.*, 723 F. Supp. 2d 1247, 1274 (E.D. Cal. 2010) (reviewing cases finding that the "failure to discuss the impacts of climate change rendered BiOps arbitrary and capricious").

Third, and finally, the Fish and Wildlife Service must "*[a]dd* the effects of the action and cumulative effects to the environmental baseline and[,] *in light of* the status of the species and critical habitat, formulate [its] opinion as to whether the action is likely to jeopardize the continued existence of [the] listed species." 50 C.F.R. § 402.14(g)(4) (emphases added). In effect, the Fish and Wildlife Service must make its jeopardy determination while viewing the action "against the aggregate effects of everything that has led to the species' current status and, for non-Federal activities, those things [reasonably certain] to affect the species in the future." Consultation Handbook at 4-35.

Petitioners here allege issues with the second and third steps. We consider them each in turn.

1.

Petitioners first argue—at the second primary step of the Fish and Wildlife Service's biological-opinion process—that the agency failed to adequately evaluate the "environmental baseline" and "cumulative effects" for two listed species: the Roanoke

logperch and the candy darter. They also allege that the agency neglected to fully consider the impacts of climate change. We agree on all counts.

i.

We turn first to the Fish and Wildlife Service's evaluation of the environmental baseline. As noted above, the agency must evaluate the environmental baseline within "*the action area*." 50 C.F.R. § 402.02 (emphasis added). The action area is the area "to be affected directly or indirectly by the Federal action." *Id.* In this case, the action area includes the Pipeline construction right-of-way and waterbodies that may be impacted by the Project. We conclude that while the BiOp ably describes the range-wide conditions of the Roanoke logperch and the candy darter, it fails to adequately evaluate the environmental baseline for these species within the action area itself.

To begin, the BiOp's evaluation of the environmental baseline for the logperch is sparse and scattered.[9] It starts by discussing the species' range-wide status and population-level threats, though the latter information is fifteen years old. *See* J.A. 45–48 (referencing a 2007 Fish and Wildlife Service study). It also mentions watershed-level characteristics of the Roanoke and Pigg Rivers. The BiOp then narrows its focus, describing basic habitat

[9] Only some of what follows is actually within the "Environmental Baseline" section of the BiOp. But this is a distinction without a difference; the question is whether this factor was evaluated by the Fish and Wildlife Service, not what section of the BiOp it is in. *Cf. Oceana, Inc. v. Pritzker*, 125 F. Supp. 3d 232, 242 (D.D.C. 2015) (concluding that the agency properly analyzed cumulative impacts by relying on population trends and trajectories set forth in the "Status of the Species" and "Environmental Baseline" sections of the biological opinion); 5 U.S.C. § 706 (requiring courts to "review the whole record" when assessing agency actions).

conditions for some, but not all, of the Project's crossings.[10] *Compare, e.g.*, J.A. 72 (noting the Harpen Creek crossing "was classified as low gradient with shallow riffles that exhibit heavy embeddedness and siltation"), *with* J.A. 71–72 (neglecting to describe the in-stream habitat for the North Fork Roanoke River 1 crossing). It also mentions that the logperch's "decline *in the action area* is primarily the result of *destruction and modification of habitat* and fragmentation of the species range." J.A. 72 (emphases added). It then zooms back out to note that, generally speaking, the "[p]rimary causes of [logperch] habitat degradation include chemical spills, non-point runoff, channelization, impoundments, impediments, and siltation." J.A. 72–73.

This is an inadequate evaluation. In effect, the Fish and Wildlife Service is attempting to pass off its summary of range-wide conditions and threats as an action-area analysis. But vaguely referring to the "destruction and modification of habitat" within the action area, without explaining the specific causes or extent of this local degradation, leaves us guessing at what the baseline condition for the logperch might actually be.

In fact, other portions of the record suggest that a host of unaddressed stressors might already be impacting logperch in the action area. For example, the Fish and Wildlife Service acknowledges that "there are *numerous* state and private activities currently

[10] Though we applaud the Fish and Wildlife Service for describing the habitat conditions for at least a few of the crossings, these crossings are not the only part of the action area. The action area also includes stream segments upstream and downstream of the crossing, as well as "stream[s] expected to experience a measurable increase in [P]roject-related sediment" and "the mixing zone in a stream segment where sediment from tributaries (crossed or receiving sediment from the [P]roject) is delivered to streams of interest." J.A. 40.

occurring within the action area." J.A. 141 (emphasis added). However, it never tells us what these activities are, or what impact they may be having. Similarly, Mountain Valley noted that "[n]umerous known third-party land disturbance activities (e.g., agriculture, timber, mining, and off-road vehicle tracks) exist *immediately adjacent* to the aquatic species streams and the[ir] tributaries." J.A. 430 (emphasis added); *see also* J.A. 1558 (2017 Environmental Impact Statement showing mining activity along the proposed Pipeline route in watersheds supporting the logperch). Yet the BiOp fails to evaluate the impact of these "immediately adjacent" operations.

Even if we were to agree that the Fish and Wildlife Service's one-sentence recitation of general threats to the logperch passes as an action-area analysis—and we do not—there are several other factors it neglected to discuss. For example, the agency previously flagged "watershed urbanization," road development, and loss of "woody debris" due to local deforestation as important stressors for the Roanoke and Pigg River populations generally. J.A. 1667–70. But the Fish and Wildlife Service fails to analyze whether these population-level stressors are still impacting logperch within the action area.

To be sure, the Fish and Wildlife Service has a stronger argument that it properly evaluated the environmental baseline for the candy darter.[11] The BiOp starts by describing the species' conservation needs, current distribution, and range-wide threats. Next, it notes the genetic importance of the Upper Gauley River and Stony Creek populations—the two

[11] Some of the material that follows is sourced from the Fish and Wildlife Service's discussion of the status of proposed critical habitat. But again, it does not matter where this information is evaluated within the BiOp, so long as it is evaluated.

populations the Project will impact—and describes the general health of these populations. It also extensively describes the ecological conditions in these areas, including data on local forest cover, water temperatures, anthropogenic impairments, invasive species, and habitat connectivity.

Nonetheless, the Fish and Wildlife Service's evaluation still falls short. Though the agency admirably describes conditions at the population level, it never narrows its analysis to focus on the specific action area. If it had, it might have noted that the lower reaches of Stony Creek—precisely where the Pipeline will cross—are "adjacent to a large underground limestone mine, an associated lime plant, a railroad spur line, and a paved road." J.A. 1443. In addition, the "lower portions of Stony Creek dry up periodically as a result of water leaking into a local mine"—presumably the same limestone mine. S.J.A. 1888. Yet these stressors are not expressly addressed in the BiOp.

The Fish and Wildlife Service and Mountain Valley advance two primary counterarguments. First, they argue that the Fish and Wildlife Service was not required to "provide an inventory" of "each activity that has occurred or is occurring in the action area." Response Br. at 18; *see also* Intervenor's Br. at 21–22. Rather, the definition of "environmental baseline" requires the Fish and Wildlife Service to describe the "condition" of the listed species and assess "impacts" of human activities in the action area. Response Br. at 18; Intervenor's Br. at 21. Requiring more, they contend, would "graft extra procedural requirements onto the regulations." Intervenor's Br. at 22; *see also* Response Br. at 18.

This argument is a red herring. It is true that the Endangered Species Act implementing regulations do not require the Fish and Wildlife Service to list past and ongoing activities. *See* 50 C.F.R. § 402.02. In fact, merely listing activities fails to satisfy the agency's regulatory responsibilities. *Defs. of Wildlife v. Babbitt*, 130 F. Supp. 2d 121, 128 (D.D.C. 2001) ("There must be an analysis of the status of the environmental baseline given the listed impacts, not simply a recitation of the activities of the agencies."). But Petitioners are not asking for a list of past and present activities; they are asking for the *impacts* of those activities to be accounted for—as required by the Act. *See id.* And neither the Fish and Wildlife Service nor Mountain Valley adequately explain how the BiOp could account for these impacts if the activities giving rise to them are never even mentioned.

For example, how can the agency account for impacts on the logperch stemming from the loss of "woody debris" in the Roanoke and Pigg watersheds if it never even discusses this stressor at the action-area level? The answer, according to the Fish and Wildlife Service's second counterargument, lies in the magic of statistical modeling. In essence, the agency argues that since it incorporated the results of two population and risk-projection models—one for the logperch and one for the darter—into the BiOp, it necessarily "account[ed] for *all* potential" "past and ongoing stressors in the action area." Response Br. at 16–17, 23 (emphasis added). Because these models reflect "the aggregate effects of *everything* that has led to the current status of the affected populations," parsing out and analyzing "each past and ongoing activity"—like the limestone mine—"would add no value and is not required." *Id.* at 19, 23 (emphasis added).

The Fish and Wildlife Service stretches this argument—and these models—much too far. To start, this explanation isn't found anywhere in the record. The Fish and Wildlife Service never says that it is relying on these models to evaluate the environmental baseline. Nor do the BiOp or the studies describing the models contain any language suggesting that these models account for "*all* potential stressors" or constitute "*everything* that has led to the current status of the affected populations." Thus, these explanations are no more than impermissible post hoc rationalizations. *E.g.*, *Dow AgroSciences*, 707 F.3d at 467–68 ("[A] reviewing court may look only to these *contemporaneous* justifications in reviewing the agency action."); *N.C. Wildlife Fed'n v. N.C. Dep't of Transp.*, 677 F.3d 596, 604 (4th Cir. 2012) ("[A]n agency's action must be upheld, if at all, on the basis articulated by the agency itself," and the "'basis articulated by the agency' is the administrative record, not subsequent litigation rationalizations." (quoting *State Farm*, 463 U.S. at 50)).

Even if the Fish and Wildlife Service had adequately explained its reliance on the models, it is hard to see how these models satisfy the agency's burden to evaluate the environmental baseline within the action area. Both models are general population-level models. The 2016 logperch model was designed to calculate minimum viable population size and related extinction risk for each of the seven logperch populations writ large. It was not designed to assess environmental characteristics and conditions at a smaller scale. Similarly, the 2018 darter model was created to evaluate the current and future conditions and "resiliency" of individual populations and subpopulations. J.A. 1446. So, it is also not well suited for evaluating conditions at the level of the action area here.

Sensing this disconnect, the Fish and Wildlife Service attempts to paper over this difference in scope by suggesting that these studies reflect the "impacts of past and ongoing stressors in the action area *because the action area is within the watersheds* occupied by those populations." Response Br. at 16–17 (emphasis added). In effect, the Fish and Wildlife Service is saying conditions within the action area must be the same as conditions within the larger watershed because the former is located within the latter. That is pure speculation; it is like saying that economic conditions in Kansas are the same as those within the United States as a whole because the former is located within the latter. Though these models are certainly *relevant* predictors of conditions within the action area, because they were calculated at a different level of generality, the Fish and Wildlife Service must at least explain why it believes these population-level models reflect conditions within the action area. *See* 50 C.F.R. § 402.02 (explaining the environmental baseline analysis must assess "the condition of the listed species or its designated critical habitat *in the action area*" (emphasis added)). The failure to do so here was arbitrary and capricious.

Instead of acknowledging that its models may be imperfect, the Fish and Wildlife Service argues the opposite, claiming they account for "*all* potential stressors" and "*everything* that has led to the current status of the affected populations." Response Br. at 19, 23 (emphasis added). But these models simply do not do what the agency claims. For example, the "relatively simple" logperch model included just a few factors: initial population size, population growth, environmental stochasticity, and certain catastrophe and augmentation regimes. J.A. 1614; *see* J.A. 1614–18. However, only fish kills from anthropogenic discharges—like a chemical spill—counted as "catastrophes." J.A. 1617.

The study explicitly excluded "floods and droughts" as catastrophes and did not consider impacts from "non-point runoff, channelization, impoundments, impediments, and siltation"—even though the BiOp labeled these as the "[p]rimary causes of [logperch] habitat degradation." J.A. 48, 72–73. Nor did it consider any sublethal effects or changes in habitat conditions. Thus, the Fish and Wildlife Service's claim that this model accounts for "*everything*" impacting the logperch is not supported by the record.

Similar concerns plague the candy darter model. This "semiquantitative" model considered eight factors, including water quality and forest cover. J.A. 1478–80. In 2018, the Fish and Wildlife Service—which developed the model—forthrightly acknowledged that "there is uncertainty associated with this model and some of the supporting data." J.A. 1446; *see also* J.A. 1432 (noting "darter demographic and genetic data" used to build out the model "are sparse"). Fast forward three years and the agency now claims that this limited model folds in the impacts of "*all* potential stressors," including, for example, the limestone mine. Response Br. at 23 (emphasis added). But as Petitioners point out, the mine apparently threatens the Stony Creek darters with *dewatering*, not just impacts to water chemistry. The Fish and Wildlife Service never explains how its limited model accounts for these impacts. Nor does the agency explain how the model folds in the impacts of other recognized causes of habitat degradation, including impoundments, channelization, and urbanization. Thus, despite the agency's assurances, the darter model does not implicitly account for "*all* potential stressors" on the species.

In sum, the Fish and Wildlife Service failed to adequately evaluate the "effects of past and ongoing human and natural factors leading to the current status of the species" in

the action area. Consultation Handbook at 4-22. Though it advances numerous post hoc rationalizations to show it evaluated these factors, they are both impermissible and unpersuasive.

ii.

Next, we assess whether the Fish and Wildlife Service properly evaluated cumulative effects—"those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area," 50 C.F.R. § 402.02—impacting the Roanoke logperch and candy darter. We conclude it did not.

The Fish and Wildlife Service's ostensive cumulative effects analysis—for all five studied species—is less than a page. It references a list of six future non-Federal projects described in Mountain Valley's 2020 Supplement to its Biological Assessment. This list was "compiled from publicly available Construction Stormwater permits in West Virginia and Virginia." J.A. 567. The Fish and Wildlife Service dismisses four of these six projects as ongoing or completed, and thus already accounted for in the environmental baseline. It then disregards the two remaining projects because it "could find no available information" on one and "there are no anticipated impacts on listed species" for the other. J.A. 141.

The Fish and Wildlife Service and Mountain Valley do not argue that this analysis, standing alone, is sufficient. Nor could they. Documents in the record—including FERC's 2017 Environmental Impact Statement—suggest that the action area is likely to be impacted by numerous non-Federal activities, including oil and gas extraction, mining, logging, water withdrawals, agricultural activities, road improvement, urbanization, and

anthropogenic discharges.[12] None of these future impacts are expressly addressed in the BiOp or in documents that it relies on. Rather, the Fish and Wildlife Service and Mountain Valley argue once more that they were implicitly evaluated when the agency incorporated the logperch and darter models' projections.

For reasons similar to those explained above, we reject this argument. To wit, the Fish and Wildlife Service did not say it was relying on these models to account for cumulative impacts in the BiOp; this appears to be a post hoc rationalization. To be sure, we must "uphold a decision of less than ideal clarity if the agency's path may reasonably be discerned." *Bowman Transp., Inc. v. Arkansas-Best Freight Sys., Inc.*, 419 U.S. 281, 286 (1974). But we fail to see how the Fish and Wildlife Service's sparse and scattered references to *population-level* analyses of "extinction risk," J.A. 48, or "resiliency," J.A. 53–54, were intended to pass for an evaluation of cumulative impacts within the "action area." Even if they were, these "relatively simple" models fail to include numerous factors that can impact the logperch and darter, J.A. 1614, including those factors discussed above as well as one to which we now turn: climate change.

[12] As noted above, the prior definition of cumulative effects under NEPA is broader than that for the Endangered Species Act. In addition, the Project's NEPA analysis extended far beyond the geographic boundaries of the action area. But the 2017 Environmental Impact Statement is still a helpful starting place to analyze cumulative effects under the Endangered Species Act. *See* Consultation Handbook at 4-31 ("One of the first places to seek cumulative effects information is in documents provided by the action agency such as NEPA analyses for the action.").

iii.

As noted above, it is not clear whether the Fish and Wildlife Service should consider climate change as part of the environmental-baseline analysis, the cumulative-effects analysis, or both. But for our purposes, it makes no difference; the only question is whether the agency properly evaluated it at all. We conclude it did not.

In total, the BiOp spends one sentence discussing the impacts of climate change. In its analysis of the environmental baseline for the logperch, the Fish and Wildlife Service notes that "[c]limate change is an increasing threat to [logperch] with storm events increasing in frequency and intensity, resulting in increased periods of higher water volume, flow rates, and turbidity that affect the [logperch]'s abilities to forage, shelter, and reproduce." J.A. 49. And though other documents in the record suggest climate change poses a "persistent threat" to the candy darter, J.A. 721, the Fish and Wildlife Service never mentions climate change in connection with the darter in the BiOp itself.

Perhaps wisely, neither the Fish and Wildlife Service nor Mountain Valley argue this is a sufficient analysis. *Irving*, 221 F. Supp. 3d at 1233–34 (finding a "general[]" discussion of the effects of climate change insufficient when other documents in the record hinted at climate impacts within the action area). Rather, they argue that it was not necessary to specifically address climate change since the logperch and darter models implicitly account for potential climate impacts.[13] But once again, the Fish and Wildlife

[13] Mountain Valley also argues that the impacts of climate change were extensively discussed in the candy darter's 2018 Species Status Assessment, which is included in the record. Though the Fish and Wildlife Service may rely on documents in the record to

Service never explained in the BiOp that it was relying on these models to account for the effects of climate change. Thus, these are impermissible post hoc rationalizations. *Dow AgroSciences*, 707 F.3d at 467–68.

Even if the Fish and Wildlife Service had articulated its modeling rationale when it issued the BiOp, we would find that evaluation arbitrary and capricious. To start, the 2016 logperch study did not even *mention*—much less fully account for—climate change. Nonetheless, the agency and Mountain Valley claim that the model's inclusion of "environmental stochasticity" (defined as "unpredictable fluctuations in environmental conditions") means the study—and thus the BiOp—necessarily considered climate change. Response Br. at 19; *see* Intervenor's Br. at 28–29 (same). Yet the BiOp makes no such claim. This argument thus stacks one post hoc rationalization upon another (that the Fish and Wildlife Service relied on the logperch model to account for the effects of climate change).

At any rate, "environmental stochasticity" and climate change are not synonymous. In the study, this stochasticity factor captured the difference between predicted and actual population growth for a single test population—the seemingly random departures from the model. The study assumed these differences were due to the "environment" writ large,

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support its evaluation of climate change, there is no evidence it did so here. Since "the climate change issue was not meaningfully discussed in the biological opinion, . . . it [is] impossible to determine whether the information [in the Status Assessment] was rationally discounted . . . or arbitrarily ignored." *Nat. Res. Def. Council v. Kempthorne*, 506 F. Supp. 2d 322, 369 (E.D. Cal. 2007). And we "may not supply a reasoned basis for the agency's action that the agency itself has not given." *State Farm*, 463 U.S. at 43 (citing *SEC v. Chenery Corp.*, 332 U.S. 194, 196 (1947)).

rather than, say, errors in estimating actual population size—which it acknowledged was a "tenuous assumption." J.A. 1617. Critically, the study then assumed a "constant" amount of environmental stochasticity for each model run for every population. J.A. 1614. But as the Fish and Wildlife Service itself acknowledged, climate change is expected to be an "increasing threat"—not a constant one. J.A. 49. Thus, even if random departures from a simplistic model could be chalked up to "climate change," the model failed to account for the one thing we know about climate change: that it will get worse over time. *Cf. Pac. Coast Fed'n of Fishermen's Ass'ns v. Gutierrez*, 606 F. Supp. 2d 1122, 1184 (E.D. Cal. 2008) (finding a biological opinion failed to consider the increasing effects of climate change by relying "on past hydrology and temperature models" that assumed constant environmental conditions).

A similarly arbitrary assumption undergirds the Fish and Wildlife Service's reliance on the darter model. That model incorporated multiple elements, including "forest cover." As the agency notes, forest cover can mediate the effects of water temperature increases, including increases caused by climate change. Therefore, the agency argues that it implicitly considered the water-warming effects of climate change by incorporating the results of the model into the BiOp. But again, the BiOp is devoid of such an explanation, meaning this is yet another post hoc rationalization layered upon its first post hoc rationalization (that it considered climate change by referencing the darter model). What's more, increases in water temperature are not the only potential impact of climate change. For example, climate change is also expected to increase the frequency and intensity of flooding, and thus sedimentation. Yet there is no evidence that the darter model was

intended to capture these effects, much less capture the "*increasing* threat" posed by climate change. J.A. 49 (emphasis added).

Ultimately, the Fish and Wildlife Service asks us to find that it evaluated the impacts of climate change based on a series of stacked post hoc rationalizations. Yet even if those rationalizations were contemporaneous, we would still find them arbitrary and capricious.

2.

Petitioners next contend—at the third primary step of the biological-opinion process—that the Fish and Wildlife Service failed to incorporate its environmental-baseline and cumulative-effects findings into its jeopardy determinations for the logperch and darter. We agree.

As noted above, the Endangered Species Act requires the Fish and Wildlife Service to "*[a]dd* the effects of the action and cumulative effects to the environmental baseline" when determining whether an action is likely "to reduce appreciably the likelihood of both the survival and recovery of a listed species." 50 C.F.R. §§ 402.02 (defining "jeopardize the continued existence of" as used in § 402.14(g)(4)), 402.14(g)(4) (emphasis added). This step is critical to ensure that the action is not analyzed "in a vacuum." *Nat'l Wildlife Fed'n*, 524 F.3d at 929. Thus, for obvious reasons, "[s]imply reciting the activities and impacts that constitute the baseline [and cumulative effects] and then separately addressing only the impacts of the particular agency action in isolation is not sufficient." *Babbitt*, 130 F. Supp. 2d at 127–28; *see also Am. Rivers v. Fed. Energy Regul. Comm'n*, 895 F.3d 32, 47 (D.C. Cir. 2018) (finding a biological opinion arbitrarily "failed to incorporate the environmental baseline into its jeopardy analysis").

Because the Fish and Wildlife Service failed to properly evaluate the Project's environmental context at step two, its no-jeopardy conclusions for the Roanoke logperch and candy darter at step three—which purport to fold these flawed evaluations into the agency's analysis—are necessarily arbitrary. *See* 50 C.F.R. §§ 402.02, 402.14(g)(4) (requiring the Fish and Wildlife Service to determine whether the proposed action, *considered in its proper context*, "is likely to jeopardize the continued existence of [the] listed species," meaning the action "reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of [that] species"). Therefore, we find it unnecessary to further analyze Petitioners' step-three concerns.

On remand, the agency must ensure that it analyzes the Project "against the aggregate effects of everything that has led to the species' current status and, for non-Federal activities, those things [reasonably certain] to affect the species in the future." Consultation Handbook at 4-35. We agree with the Fish and Wildlife Service that this does not mean it must "include the entire environmental baseline [or cumulative effects] *in* the 'agency action' subject to review." Response Br. at 13 (emphasis added) (quoting *Nat'l Wildlife Fed'n*, 524 F.3d at 930). Under our precedent, "an agency action can only jeopardize a species' existence if *that agency action* causes some deterioration in the species' pre-action condition." *Defs. of Wildlife*, 931 F.3d at 353 (emphasis added) (quoting *Nat'l Wildlife Fed'n*, 524 F.3d at 930) (cleaned up). In other words, an agency action cannot be barred *solely* because baseline conditions or cumulative effects already imperil a species. *See Ctr. for Biological Diversity v. U.S. Fish & Wildlife Serv.*, 807 F.3d 1031, 1052 (9th Cir. 2015).

But we caution that when baseline conditions or cumulative effects *are* "already jeopardiz[ing] a species, an agency may not take action that *deepens* the jeopardy by causing additional harm." *Defs. of Wildlife*, 931 F.3d at 353 (emphasis added) (quoting *Nat'l Wildlife Fed'n*, 524 F.3d at 930 (faulting the Fish and Wildlife Service for the same error)). Put differently, if a species is already speeding toward the extinction cliff, an agency may not press on the gas. We urge the Fish and Wildlife Service to consider this directive carefully while reassessing impacts to the two endangered fish at issue, especially the apparently not-long-for-this-world candy darter.

B.

Though the serious errors described above require us to vacate and remand the 2020 BiOp and Incidental Take Statement, Petitioners also identify other issues in both documents that they claim further support vacatur. For example, Petitioners allege that the Fish and Wildlife Service (1) arbitrarily limited the scope of the action area; (2) erroneously excluded the Blackwater River from its logperch analysis; and (3) crafted "unlawfully vague" incidental take limits for the logperch and darter. Opening Br. at 48. None of these arguments have merit.

1.

Petitioners first critique the Fish and Wildlife Service's calculation of the aquatic action area. To define this action area, the agency used the results of a sedimentation model prepared by Mountain Valley to determine which waterbodies might be impacted by the Project. The Fish and Wildlife Service then expanded the action area to include stream segments 200 meters upstream and 800 meters downstream of (1) waterbodies with an

open-cut crossing; and (2) the confluence of unoccupied but potentially impacted tributaries with species-occupied streams, termed "mixing zones." J.A. 39–40. In its analysis, the agency noted that multiple scientific studies had found that aquatic habitat conditions were unaffected more than 500 meters downstream of pipeline crossings. "To be protective of the" listed species and "address uncertainty" regarding the extent of the sediment plume in mixing zones, J.A. 103–04, the Fish and Wildlife Service "conservatively" defined the action area "as *twice* the maximum 500-meter area documented in the studies, extending from 200 meters above the crossing [or confluence with the unoccupied tributary] to 800 meters below," Response Br. at 29.

Petitioners quibble that an 800-meter downstream limit is arbitrary if the science supports a 500-meter impact area. They also point out that studies assessing impacts from crossings may not be applicable to mixing zones. But we find it hard to fault the Fish and Wildlife Service for conservatively expanding the action area to ensure that it is capturing all possible effects to these imperiled species, or extending the results from pipeline-crossing studies to an analogous context. These are precisely the sort of judgment calls that are entitled to our deference. *Ctr. for Biological Diversity*, 807 F.3d at 1043 ("[T]raditional deference to the agency is at its highest where a court is reviewing an agency action that required a high level of technical expertise.").

Petitioners also argue that "anecdotal" evidence from Dr. Angermeier suggests sediment impacts may extend several kilometers downstream from a crossing. Opening Br. at 51. But the Fish and Wildlife Service was well within its rights to ignore such "anecdotal" evidence and instead rely on numerous published scientific studies to define

the action area. *See Ctr. for Biological Diversity*, 807 F.3d at 1050 (rejecting a claim that the agency ignored the best available science when the petitioners failed to show their concerns "were supported by better science [than] that used in the [BiOp]").

2.

Next, Petitioners contend that the Fish and Wildlife Service failed to justify its exclusion of the Blackwater River from its logperch analysis. All six of the Project's crossings in the Blackwater River drainage contain suitable habitat for the logperch.[14] In general, the agency assumed that logperch were present in waterbodies containing suitable habitat. Therefore, a straightforward application of the agency's own criteria would seem to require the Fish and Wildlife Service to analyze impacts to the logperch within the Blackwater River drainage. However, the agency ultimately decided to exclude the Blackwater River crossings from consideration based on several factors: (1) traditional survey efforts have not documented logperch presence in the watershed; (2) recent environmental DNA ("eDNA") sampling[15] did not detect logperch; and (3) no in-stream work would occur at these crossings during logperch spawning season.

[14] In total, the Project is expected to cross fourteen waterbodies that either contain suitable habitat for the logperch or are "known to support" logperch. J.A. 69.

[15] Though it sounds complex, eDNA sampling is elegantly simple in design. Because fish continually release DNA molecules into the water via sloughed skin, scales, mucus, and feces, scientists can capture and filter water from a stream and scour it for specific species' DNA. These results can help "corroborate or supplement existing information indicating the probable [presence or] absence of a species in [that] area." J.A. 70 n.4.

Petitioners point out that the Blackwater has been traditionally undersampled and that the Fish and Wildlife Service itself acknowledges that eDNA analysis is not a "definitive means for determining presence/probable absence." J.A. 70 n.4. They also note that time-of-year restrictions do not protect logperch from upland disturbances associated with the Project or the long-term impacts from open-cut stream crossings. While Petitioners' individual critiques of each factor cited by the agency have some persuasive heft, Petitioners do not identify anything in the record that shows logperch *are* in fact present in the Blackwater River drainage. Nor do Petitioners account for how these three factors interact synergistically. Given the absence of contrary evidence, when we consider these factors *together*, we have little trouble concluding that the Fish and Wildlife Service "provided a [sufficiently] cogent justification" for excluding the Blackwater River watershed from further study.[16] *Am. Whitewater v. Tidwell*, 770 F.3d 1108, 1116 (4th Cir. 2014).

[16] While the agency properly justified excluding the Blackwater River drainage from its analysis, we are concerned that it did not fully follow through on that assessment. To wit, though the Fish and Wildlife Service purported to exclude the Blackwater River drainage from its jeopardy analysis, it later relied on suitable habitat in the Blackwater watershed for one of the calculations supporting its recovery analysis.

Specifically, the Fish and Wildlife Service found no impacts to logperch recovery were likely in part because "[t]he amount of habitat to be impacted is minor (0.9%) compared to the overall amount of [logperch] habitat available in [Virginia]." J.A. 149. But this "overall amount" of suitable habitat includes stream miles in the Blackwater River drainage. As Petitioners point out, this means the agency excluded the Blackwater from the numerator—the "amount of habitat to be impacted"—but added it to the denominator—the "overall amount" of suitable habitat in Virginia. This sounds like the agency is trying to have it both ways. And it seems problematic to exclude an entire watershed from analysis

3.

Petitioners also contend that the incidental take limits for the logperch and darter are too "vague" to be enforceable. Opening Br. at 46. As noted above, an incidental take statement must specify the "amount or extent" of incidental take. Typically, this requires the Fish and Wildlife Service to identify the number of individual animals subject to take. *See* 50 C.F.R. § 402.14(i)(1). However, a "surrogate"—such as "[a] similarly affected species or habitat or ecological conditions"—may be used if the biological opinion: (1) describes "the causal link between the surrogate and take of the listed species"; (2) explains "why it is not practical to express the amount or extent of anticipated take or to monitor take-related impacts in terms of individuals of the listed species"; and (3) "sets a *clear standard* for determining when the level of anticipated take has been exceeded." *Id.* § 402.14(i)(1)(i) (emphasis added). Here, because the Fish and Wildlife Service determined that an individual-based limit was impractical for the logperch and darter, it crafted take thresholds based on a sediment-concentration surrogate.

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because no logperch are present then add that watershed back into the analysis to artificially lower the percentage of habitat impacted.

Because we already concluded that the Fish and Wildlife Service's jeopardy analysis—including its recovery assessment for the logperch—is arbitrary and capricious, we find it unnecessary to further analyze this potential "having it both ways" scenario. But we encourage the agency to explain this discrepancy on remand if it intends to continue adding the Blackwater River to the denominator in its recovery calculations.

Petitioners argue that this standard isn't "clear."[17] Specifically, they contend that (1) it is ambiguous whether Mountain Valley must be solely responsible for an exceedance, and (2) it is unclear how any exceedance will be attributed to Mountain Valley as opposed to some other source. Both arguments are nonstarters.

To start, the Incidental Take Statement explicitly—and repeatedly—states that its sediment-concentration thresholds are tied to "*[P]roject*-related" sediment releases. J.A. 169, 173 (emphasis added). It also provides that take only occurs when downstream sediment concentrations reach certain levels "above *background*." J.A. 169, 173 (emphasis added). Thus, Mountain Valley must be solely responsible for exceeding these take thresholds.

Mountain Valley's monitoring plan[18] also provides a clear mechanism for determining responsibility for an exceedance. Specifically, Mountain Valley has installed

[17] Petitioners also argue that the agency's chosen surrogate—a "continuous" sediment-concentration threshold—was an arbitrary policy change from a framework used to measure anticipated take of bull trout in Washington State. We fail to see how a surrogate framework for a different species in a different state prepared by a different field office is a "policy or practice" that the Fish and Wildlife Service's Virginia Field Office is bound to explain its departure from. Reply Br. at 16. Even if it was a policy change, the agency explained that its new, "continuous" threshold is more consistent with the published scientific study underlying the bull-trout framework than the surrogate used in Washington State was. Nevertheless, to avoid further confusion, we encourage the agency to expound upon the reasons for its departure from the bull-trout framework on remand.

[18] Petitioners also criticize the monitoring plan for failing to include monitoring stations in streams where the agency's adopted sediment model did not predict sediment increases. However, Petitioners do not identify any fundamental flaws with this model—in fact, they identify no flaws at all. Rather, Petitioners note that there is a "degree of uncertainty associated with [Mountain Valley's] modeling." Opening Br. at 48. But uncertainty is inherent in any model. And since Petitioners failed to establish that the

monitoring stations above and below the action area (and even some within the action area) to determine the background concentration entering the area and the concentration leaving it. Whenever these stations register a potential exceedance, Mountain Valley is required to alert FERC and the Fish and Wildlife Service; conduct an inspection of the affected stream, monitoring equipment, and nearby erosion-and-sedimentation controls; identify potential non-Project sources of sedimentation; "make a preliminary determination of whether Project-related sediment in fact caused [an exceedance]"; and report all findings to the federal agencies. J.A. 341–45.

Petitioners complain that this gives "too much latitude" to Mountain Valley to decide whether an exceedance was Project related. Opening Br. at 47. But under the monitoring plan, it is the federal agencies that are responsible for making the ultimate determination regarding responsibility for an exceedance, not Mountain Valley. *See* J.A. 371–72 (noting the information reported by Mountain Valley, "along with the preliminary causation assessment that Mountain Valley is required to provide," allow the Fish and Wildlife Service "to *independently* determine whether any such exceedance is attributable to the [P]roject, and, if so, to request that FERC immediately reinitiate Section 7

"model bears no rational relationship to the [situation] to which it is applied," we must defer to the agency's choice of model. *San Luis & Delta-Mendota Water Auth. v. Locke*, 776 F.3d 971, 994 (9th Cir. 2014) (citation omitted).

The model here predicted no impacts to the various additional stream segments identified by Petitioners in their brief. Since Endangered Species Act regulations only require monitoring where take is expected to occur, *see* 50 C.F.R. § 402.14(i)(3) (requiring the action agency "to monitor the impacts of incidental take"), the agency did not err by refusing to require Mountain Valley to monitor these additional locations.

consultation" (emphasis added)). Petitioners counter that this still allows Mountain Valley "to select *which* facts surrounding an exceedance to present to the agencies." Reply Br. at 26 (emphasis added) (internal quotation marks omitted). If Petitioners are hinting that Mountain Valley cannot be trusted to accurately report the facts surrounding an exceedance, we reject that implication. Because the monitoring plan provides a "clear" mechanism for assessing responsibility for an exceedance, as well as a clear chain of command, we find the Fish and Wildlife Service's selected take surrogate appropriate.

III.

While Petitioners' more minor challenges lack merit, the serious errors detailed above at steps two and three of the jeopardy analysis render the 2020 BiOp arbitrary and capricious. We recognize that this decision will further delay the completion of an already mostly finished Pipeline, but the Endangered Species Act's directive to federal agencies could not be clearer: "halt and reverse the trend toward species extinction, whatever the cost." *Tenn. Valley Auth.*, 437 U.S. at 184. On remand, the Fish and Wildlife Service should consider this mandate carefully, especially given the precarious state of the candy darter.

"We have not addressed all of the [Petitioners'] complaints because, on remand, they can be aired and addressed in the renewed agency process." *Dow AgroSciences*, 707 F.3d at 475. At this point, we find it sufficient to vacate the 2020 BiOp and Incidental Take Statement and require the Fish and Wildlife Service "to address not only the flaws we identified but also any additional matters that may be raised on remand." *Id.*

VACATED AND REMANDED