CENTER for BIOLOGICAL DIVERSITY Because life is good.

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Sent via Electronic Mail and Certified Mail

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Re: Notice of Intent to Sue for Violations of the Endangered Species Act with Respect to EPA's Revised Nationwide Water Quality Criteria for Cadmium.

Dear Administrator Wheeler and Assistant Administrator Ross,

This letter serves as formal notice by the Center for Biological Diversity ("Center") to the Environmental Protection Agency ("EPA") of violations of Section 7 of the Endangered Species Act ("ESA"),[1] in connection with the EPA's most recent decision to revise the nationwide water quality criteria for cadmium[2] under Section 304 of the Clean Water Act ("CWA").[3] This notice is provided pursuant to Section 11(g) of the ESA.[4]

The Center is a non-profit, public interest organization with offices across the United States and Mexico. The Center and its over 1.7 million members and online activists are dedicated to protecting diverse native species and habitats through science, policy, education, and law. The Center's freshwater and oceans campaigns seek to protect endangered species from pervasive threats like water pollution. Our members are concerned that EPA, in failing to consult under the ESA on issues such as approving increased heavy metal concentrations in waterways, is failing to protect endangered species from these threats.

Cadmium is a heavy metal with no biological function that pollutes our waterways and is toxic to threatened and endangered species, including sturgeon, salmon, and mussels. EPA violated the ESA when it failed to engage in programmatic consultation to consider the impacts of its decision to revise the nationwide water quality criteria for cadmium under CWA Section 304 on

[1] 16 U.S.C. § 1536.
[2] Recommended Aquatic Life Ambient Water Quality Criteria for Cadmium – 2016, 81 Fed. Reg. 19,176 (Apr. 4, 2016).
[3] 33 U.S.C. § 1314(a).
[4] 16 U.S.C. § 1540(g).

listed species.[5] Because states must consider EPA's criteria when establishing water quality standards—indeed, and they routinely adopt EPA's criteria without any changes—EPA's decision to change the criteria has real impacts on endangered species nationwide, which certainly triggers the ESA's low "may affect" threshold for consultation. By revising the criteria for cadmium without first consulting with the Fish and Wildlife Service ("FWS") and National Marine Fisheries Service ("NMFS") (collectively "the Services"), EPA violated the ESA.

The Center and its members are harmed by EPA's continuing failure to take meaningful action to protect threatened and endangered species in setting water quality criteria for heavy metal pollution.

I. LEGAL BACKGROUND

A. The Endangered Species Act

The ESA was enacted "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved . . . [and] a program for the conservation of such endangered species and threatened species."[6] The ESA vests primary responsibility for administering and enforcing the statute to the Secretaries of Commerce and Interior, who have delegated this responsibility to NMFS and FWS, respectively.[7]

The ESA defines "conservation" to mean "the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this [Act] are no longer necessary."[8] To fulfill the substantive purposes of the ESA, each federal agency—including EPA—is required to consult with FWS and/or NMFS to "insure that any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the adverse modification of habitat of such species . . . determined . . . to be critical."[9]

The definition of agency "action" is broad and encompasses "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies."[10] This definition includes, but is not limited to, "(a) actions intended to conserve listed species or their habitat; (b) the promulgation of regulations; (c) the granting of licenses, contracts, leases, easements, rights-of-way, permits, or grants-in-aid; or (d) actions directly or indirectly causing modifications to the land, water, or air."[11]

Under the Services' joint regulations implementing the ESA, if a discretionary action "may affect" a listed species or critical habitat, the action agency must initiate ESA consultation at the

[5] 33 U.S.C. § 1314(a).
[6] 16 U.S.C. § 1531(b).
[7] 50 C.F.R. § 402.01(a), (b).
[8] 16 U.S.C. § 1532(3).
[9] *Id.* § 1536(a)(2).
[10] 50 C.F.R. § 402.02.
[11] *Id*.

"earliest possible time."[12] Effects determinations are based on "all consequences to listed species or critical habitat" that are caused by the proposed action, "including the consequences of other activities that are caused by the proposed action" and effects that "may occur later in time."[13] The threshold for a "may affect" determination and the required ESA consultation is "low" to ensure that listed species are not jeopardized.[14] An action agency is relieved of the obligation to consult on its actions only where the action will have no effect on listed species or designated critical habitat.[15]

For broad federal programs that may affect listed species, action agencies and the Services must engage in "programmatic consultation" to consider the cumulative impacts of the program and to guide implementation by establishing criteria to avoid, minimize, or offset adverse effects on listed species and critical habitat.[16] Such analysis "allows for a broad-scale examination of a program's potential impacts on a listed species and its designated critical habitat—an examination that is not as readily conducted when the later, action-specific consultation occurs on a subsequent action developed under the program framework."[17] Programmatic consultation further allows the Services to review the programmatic-level impacts of the agency action and implement program-level mitigation or other requirements (*e.g.* data collection and reporting). The action agency must then undertake a further project-specific consultation for specific actions taken under the program.[18]

As the Supreme Court explained in *Tennessee Valley Authority v. Hill*, the language of Section 7 "admits of no exception" and Congress was well aware of the "broad sweep" of Section 7.[19] "The plain intent of Congress in enacting this statute was to halt and reverse the trend toward species extinction, *whatever the cost*. This is reflected not only in the stated policies of the Act, but in literally every section of the statute."[20] In passing the ESA, Congress intended to give

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[12] *Id.* § 402.14(a); *see also Ass'n of Home Builders v. Defs. of Wildlife*, 551 U.S. 644 (2007).
[13] 50 C.F.R. § 402.02.
[14] *Karuk Tribe of Cal. v. U.S. Forest Serv.*, 681 F.3d 1006, 1027 (9th Cir. 2012); *see also Western Watersheds Project v. Kraayenbrink*, 632 F.3d 472, 496 (9th Cir. 2011); Interagency Cooperation – ESA of 1973, as Amended; Final Rule, 51 Fed. Reg. 19,926, 19,949 (June 3, 1986) ("Any possible effect, whether beneficial, benign, adverse, or of an undetermined character, triggers the formal consultation requirement.").
[15] Interagency Cooperation – ESA of 1973, as Amended; Final Rule, 51 Fed. Reg. 19,926, 19,949 (June 3, 1986) ("[T]he burden is on the Federal agency to show the absence of likely, adverse effects to listed species or critical habitat as a result of its proposed action in order to be excepted from the formal consultation requirement.").
[16] *See* 50 C.F.R. §§ 402.02, 402.14(i)(6). *See also Cottonwood Env't Law Ctr. v. U.S. Forest Serv.*, 789 F.3d 1075, 1082 (9th Cir. 2015) ("[P]roject-specific consultations do not include a unit-wide analysis comparable in scope and scale to consultation at the programmatic level."); *Nat'l Wildlife Fed'n v. Brownlee*, 402 F. Supp. 2d 1, 3, 9-11 (D.D.C. 2005) (requiring consultation on 2002 issuance of Nationwide Permit 12 to avoid piecemeal destruction of species and habitat).
[17] Interagency Cooperation – ESA of 1973, as Amended; Incidental Take Statements, 80 Fed. Reg. 26,832, 26,836 (May 11, 2015).
[18] *Id.*
[19] *See Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 173, 188 (1978) ("In passing the Endangered Species Act of 1973, Congress was also aware of certain instances in which exceptions to the statute's broad sweep would be necessary. Thus, § 10, [] creates a number of limited 'hardship exemptions,' none of which would even remotely apply to the Tellico Project. In fact, there are no exemptions in the Endangered Species Act for federal agencies, meaning that under the maxim *expressio unius est exclusio alterius,* we must presume that these were the only 'hardship cases' Congress intended to exempt.").
[20] *Id.* at 184 (emphasis added).

endangered species priority over the primary missions of federal agencies like the EPA.[21] Whether real or illusory, efficiency is not the goal of the ESA, the prevention of extinction is the goal of the ESA.

B. The Clean Water Act

The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[22] To achieve this, the CWA instituted a "national goal that wherever attainable, . . . water quality . . . provide[] for the protection and propagation of fish, shellfish, and wildlife and provide[] for recreation in and on the water."[23]

Water quality standards are integral for achieving the CWA's objectives. The CWA sets up a framework pursuant to which states propose water quality standards to EPA for approval.[24] States do not, however, submit water quality standards in a vacuum. The CWA requires that EPA create criteria for states to rely on in setting appropriate water quality standards:

> The Administrator, after consultation with appropriate Federal and State agencies and other interested persons, shall develop and publish, within one year after [the date of enactment of the CWA] (and from time to time thereafter revise) criteria for water quality accurately reflecting the latest scientific knowledge (A) on the kind and extent of all identifiable effects on health and welfare including, but not limited to, plankton, fish, shellfish, wildlife, plant life, shorelines, beaches, esthetics, and recreation which may be expected from the presence of pollutants in any body of water, including ground water…[25]

States must take EPA's water quality criteria into consideration when proposing standards to EPA for approval.[26] Pursuant to EPA's regulations, all proposed water quality standards must be based on either: (1) EPA's water quality criteria; (2) EPA's water quality criteria, modified to reflect site-specific conditions; or, (3) other "scientifically defensible" methods.[27] If states decide not to adopt EPA's criteria, they must explain that deviation to EPA.[28] Thus, at a bare minimum, states must consider EPA's criteria and often adopt them without any changes. Indeed, as explained in more detail below, it is rare that states ever deviate from EPA's water quality criteria when they propose water quality standards to EPA.

Both water quality criteria and standards must protect wildlife. Congress stated that the purpose of EPA's water quality criteria is to "provide timely guidance on what constitutes water quality adequate to assure in any given situation a *balanced, indigenous population of shellfish, fish, and wildlife*, and allows recreational activities, in and on the waters."[29] Likewise, the water quality

[21] *Id*. at 185.
[22] 33 U.S.C. § 1251(a).
[23] *Id.* § 1251(a)(2).
[24] *Id.* § 1313.
[25] *Id.* § 1314(a).
[26] 40 C.F.R. § 131.20(a).
[27] *Id.* § 131.11(b)
[28] *Id.* § 131.20(a).
[29] S. REP. 95-370 at 51 (1977) (emphasis added).

standards that states propose to EPA must protect all existing uses in a waterbody, including the protection of aquatic life such as threatened or endangered species.[30]

II. FACTUAL BACKGROUND

A. Cadmium's Impact on Listed Species

Cadmium is a naturally occurring, relatively rare metal found in mineral deposits that is distributed widely in the environment.[31] While cadmium can enter waterways as a result of natural processes such as erosion, in unpolluted freshwaters, cadmium concentrations are typically very low and are frequently below analytical detection limits.[32] For those waters where cadmium is present, anthropogenic sources account for the vast majority—more than 90 percent—of the total cadmium present in surface water.[33] Atmospheric particulate deposition from fossil fuel combustion (including coal) contributes approximately 40 percent, while the application of phosphate fertilizer for agriculture releases 33 to 56 percent of the total anthropogenic cadmium to the environment.[34] Cadmium is often detected in runoff from urban and industrial areas, and rivers are a major secondary source of cadmium to the ocean.[35] As of 2007, cadmium had been identified at 1,014 of the 1,669 most serious hazardous waste sites on the National Priorities List.[36] Of these 1,014 sites, cadmium was identified in surface waters at 354 sites, and in ground water at 675 sites.[37]

Cadmium, which has no biological function in living organisms, is toxic at low concentrations to plants, fish, birds, mammals (including humans), and microorganisms.[38] This heavy metal causes a range of impacts, including both acute and sublethal effects, on aquatic organisms.[39] Cadmium is a teratogen, meaning that it causes malformations of embryos, and is also a carcinogen.[40] In aquatic organisms, exposure adversely effects "growth, reproduction, immune and endocrine systems, development, and behavior."[41] In a 2005 study that compared the acute toxicity of 63 heavy metals to a widespread crustacean found in both fresh and brackish water (*Hyalella Azteca*), cadmium was the most toxic.[42] Cadmium bioaccumulates in all levels of the

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[30] 33 U.S.C. § 1313(c)(2)(a).
[31] EPA, EPA-820-R-16-002, *Aquatic Life Ambient Water Quality Criteria – Cadmium* 6 (2016).
[32] *Id.* at 8.
[33] *Id.* at 7.
[34] *Id.*
[35] *Id.* at 8.
[36] U.S. Dep't of Health & Human Servs., Public Health Serv. Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Cadmium* 277 (2012), *available at* https://www.atsdr.cdc.gov/toxprofiles/tp5.pdf.
[37] *Id.* at 288.
[38] Levit, Stuart M., *A Literature Review of Effects of Cadmium on Fish* 2 (2010), *available at* https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/alaska/sw/cpa/Documents/L2010CadmiumLR122010.pdf.
[39] *Id.*
[40] EPA, EPA-820-R-16-002, *Aquatic Life Ambient Water Quality Criteria – Cadmium* 10 (2016).
[41] *Id.*
[42] Borgmann, U., et al., *Toxicity of Sixty-Three Metals and Metalloids to Hyalella azteca at Two Levels of Water Hardness,* 24 Env't Toxicology and Chemistry 641–52 (2005).

food chain in both aquatic and terrestrial organisms.[43] In both freshwater and marine animals, cadmium can bioaccumulate to "concentrations hundreds to thousands of times higher than in the water."[44] Bioconcentration factors range from 3 to 4,190 in fresh water organisms and from 5 to 3,160 in saltwater organisms.[45] A 1985 Department of the Interior study examined concentrations of cadmium in a variety of aquatic and terrestrial flora and fauna and identified the following trends relevant here: (1) in general, marine organisms contain "significantly higher cadmium residues" than freshwater organisms; (2) cadmium tends to concentrate in the liver and kidneys of vertebrates; (3) cadmium concentrations are higher in older organisms, especially in marine vertebrates; and (4) cadmium concentrations are "dependent upon the species analyzed, the season of collection, ambient cadmium levels, and the sex of the organism."[46]

Elevated concentrations of cadmium have been identified in sturgeon, several species of which are endangered. For example, shortnose sturgeon collected from the Delaware and Kennebec Rivers had total toxicity equivalent concentrations of cadmium above adverse effect concentration levels.[47] In addition, a study identified cadmium levels above background in the kidneys of Missouri River Pallid sturgeon.[48]

Sturgeon may have increased exposures to cadmium pollution because, as EPA explained in its 2016 water quality criteria, up to 93 percent of cadmium entering surface waters "strongly absorb[s] to clays, muds, humic and organic materials," which removes it from the water column where it is not bioavailable except to benthic feeders and bottom dwellers.[49] Sturgeon are indeed benthic species[50] and as a result, are susceptible to cadmium exposure from sediment. Studies show that sturgeon ingest large quantities of sediment. For example, the United States Geologic Survey analyzed the gastrointestinal tracts of 37 juvenile white sturgeon captured from a reservoir of the Columbia River in northeastern Washington where large quantities of slag had been deposited.[51] Slag was identified in 76 percent of the guts examined and comprised up to over 10 percent of the non-digestible weight found in the gut.[52] Because the study sorted slag from other non-digestible materials, it is likely that the percentage of sediment in the gastrointestinal tracts was even higher. In Oregon, a study of the stomachs of 42 juvenile white sturgeon from the lower Columbia River documented that 34 contained sediment and that the

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[43] U.S. Dep't of Health & Human Servs., Public Health Serv. Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Cadmium* 293 (2012), *available at* https://www.atsdr.cdc.gov/toxprofiles/tp5.pdf.
[44] *Id*.
[45] *Id.*
[46] *Id.* at 304.
[47] Shortnose Sturgeon Status Rev. Team for NMFS, *Biological Assessment of Shortnose Sturgeon (Acipenser brevirostrum)* 81 (2010).
[48] Ruelle, R. and Keenlyne, K.D., FWS, *Contaminants in Missouri River Pallid Sturgeon*, 50 Bull. Env. Contam. Toxicol. 898, 904 (1993).
[49] EPA, EPA-820-R-16-002, *Aquatic Life Ambient Water Quality Criteria – Cadmium* 9 (2016).
[50] EPA for NMFS, *Biological Evaluation [for] the Approval of Virginia's Water Quality Standards Title 9 VACS 25-260 Water Quality Standards Regulations Adoption of Ammonia and Cadmium* 12 (Oct. 15, 2018).
[51] Parsley, Michael J., et al., U.S. Geological Surv., 2010-1193, *Characterization of the Contents and Histology of the Gastrointestinal Tracts of White Sturgeon (Acipenser transmontanous) Captured from Upper Lake Roosevelt, Washington, October 2008* 1-2 (2010), *available at* https://pubs.usgs.gov/of/2010/1193/.
[52] *Id.* at 5.

sediment accounted for up to approximately 50 percent of the stomach by weight.[53] For sturgeon, "an evaluation of ambient aquatic exposures alone [is] inadequate," in part because sturgeon ingest sediment that may include particulate-bound cadmium. [54]

Cadmium is considered one of the most toxic metals to fish and causes a range of impacts.[55] Acutely, cadmium causes gill toxicity leading to the organism's inability to breathe.[56] Cadmium also causes a range of sublethal effects in fish. For example, cadmium competes with calcium uptake because the two chemicals are similar, which can cause skeletal malformations and acute hypocalcemia, which is characterized by cadmium accumulation in tissues and decreased calcium concentrations in plasma.[57] Cadmium also causes disease of the gill, liver, and kidneys in fish, renal tubular damage, alterations of free radical production and the antioxidant defense system, immunosuppression, and structural effects on invertebrate gills.[58] Cadmium pollution has also been shown to negatively impact the shortnose sturgeon's physiological processes and ability to withstand stress.[59] This heavy metal also causes neurotoxic effects in fish that can manifest in altered behavior, the most widely observed of which is hyperactivity.[60] Hyperactivity makes fish more likely to be seen and attacked by predatory fish.[61] In predatory fish, hyperactivity results in lower success rates for detecting, orienting to, and swallowing prey.[62] Indeed, most fish that exhibited hyperactive behavior as a result of long-term exposures ultimately perished.[63]

Salmonid species appear to be particularly sensitive to cadmium.[64] Cadmium is known to disrupt the endocrine functions of Atlantic salmon, as well as other listed salmonids in the Pacific northwest, and is thereby negatively impacting the reproductive capabilities of these endangered species.[65]

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[53] Romano, M.D., et al., *Seasonal Presence and Diet of White Sturgeon in Three Proposed In-River, Deep-Water Dredge Spoil Disposal Sites in the Lower Columbia River* 18 (2002). In: Exhibit K-1, Evaluation Report, White and Green Sturgeon, pp. 5-23, for the U.S. Army Corps of Engineers, Columbia River Channel Improvement Project: Final Supplemental Integrated Feasibility Report and Environmental Impact Statement (2003).
[54] NMFS, *Enclosure 1: NMFS Comments on EPA's Draft Aquatic Life Ambient Water Quality Criteria for Cadmium* 2 (2016).
[55] NMFS, *Jeopardy and Destruction or Adverse Modification of Critical Habitat, ESA Biological Opinion for EPA's Proposed Approval of Certain Oregon Administrative Rules Related to Revised Water Quality Criteria for Toxic Pollutants* 270 (2012).
[56] *Id.* at 271.
[57] EPA, EPA-820-R-16-002, *Aquatic Life Ambient Water Quality Criteria – Cadmium* 10 (2016).
[58] *Id.*
[59] NMFS, *Final Recovery Plan for the Shortnose Sturgeon (Acipenser brevirostrum)* 49 (1998).
[60] NMFS, *Jeopardy and Destruction or Adverse Modification of Critical Habitat, ESA Biological Opinion for EPA's Proposed Approval of Certain Oregon Administrative Rules Related to Revised Water Quality Criteria for Toxic Pollutants* 271 (2012).
[61] *Id.*
[62] *Id.*
[63] *Id.*
[64] *Id.* at 270.
[65] NMFS & FWS, *Final Recovery Plan for the Gulf of Maine Distinct Population Segment of Atlantic Salmon (Salmo salar)* 1-39 (2005); *see also* NMFS, *Jeopardy and Destruction or Adverse Modification of Critical Habitat, ESA Biological Opinion for EPA's Proposed Approval of Certain Oregon Administrative Rules Related to Revised Water Quality Criteria for Toxic Pollutants* 270 (2012).

While not as much is known about the impact of cadmium on sea turtles, numerous studies have identified elevated levels. A 2017 paper review of the available scientific literature on metals contamination in sea turtles found that of the most toxic metals (lead, mercury, and cadmium), the concentration of cadmium in sea turtle blood was the highest.[66] Among the non-essential metals, cadmium was found in all reported tissues, with the highest concentrations found in the kidneys.[67] Similarly, a 2018 study of 137 specimens of green sea turtles collected from around the world identified cadmium in all of the samples, with the highest bioconcentration in the kidneys.[68] Specimens from the Pacific Ocean had higher cadmium concentrations in the liver than samples from the Atlantic Ocean.[69] Cadmium concentrations measured in tissues were generally greater than concentrations found in other marine organisms, including dolphins.[70]

Cadmium also negatively impacts mussels. The recovery plan for the Cumberland and Tennessee River mussels explains that many endangered freshwater mussels are "among the most intolerant organisms to heavy metals," and "[c]admium appears to be the heavy metal most toxic to mussels."[71] Cadmium has been correlated with the decline of the dwarf wedgemussel,[72] and the FWS has identified cadmium as "acutely toxic" to juvenile mapleleaf mussels.[73] Alarmingly, the FWS has noted that, "[v]irtually nothing is known about the sublethal impacts in mussels to long-term exposure to metals at low concentration . . . . Sublethal effects are frequently observed at concentrations only one-half the lethal concentration, which indicates that freshwater mussels become stressed at metal concentrations much lower than those reported in acute toxicity tests."[74] Thus, even small amounts of cadmium may have disproportionately adverse effects for endangered species—like the Alabama cave shrimp—as they tend to bioaccumulate contaminants rather than metabolizing and releasing them.[75]

In summary, both FWS and NMFS have identified cadmium pollution as a threat to listed species under their jurisdiction. To date, more than 25 recovery plans identify cadmium as potentially toxic or harmful to water dependent threatened or endangered species. Some of the species harmed by cadmium pollution include the fine-rayed pigtoe pearly mussel, shiny pigtoe

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[66] Cortés-Gómez, A.A. et al., *The Current Situation of Inorganic Metals in Marine Turtles: A General Review and Meta-Analysis*, 229 Env't Pollution 567, 567, 572-76 (2017).
[67] *Id.* at 582.
[68] Fraga, N.S., et al., *Cadmium in Tissues of Green Turtles (Chelonia mydas): A Global Perspective for Marine Biota*, 637-38 Science of the Total Env't 389, 392-93 (2018).
[69] *Id.* at 396.
[70] *Id.*
[71] Butler, R.S. & Biggins, R.G., FWS, *Recovery Plan for Cumberland Elktoe (Alasmidonta atropurpurea), Oyster Mussel (Epioblasma capsaeformis), Cumberlandian Combshell (Epioblasma brevidens), Purple Bean (Villosa perpurpurea), and Rough Rabbitsfoot (Quadrula cylindrica strigillata)* 37 (2004)*; see also* Roberts, A.D., FWS, *Scaleshell Mussel Recovery Plan (Leptodea leptodon)* 19 (2010); *see also* Butler, R.S. et al., FWS, *Recovery Plan for Endangered Fat Threeridge, Shinyrayed Pocketbook, Gulf Moccasinshell, Ochlockonee Moccasinshell, Oval Pigtoe and Threatened Chipola Slabshell, and Purple Bankclimber* 55 (2003).
[72] Moser, A.G., FWS, *Dwarf Wedge Mussel (Alasmidonta heterodon) Recovery Plan* 14 (1993).
[73] Heath, D.J. et al., FWS, *Winged Mapeleaf Mussel Recovery Plan (Quadrula fragosa)* 9 (1997).
[74] Whiting, R. et al., FWS, *Higgens Eye Pearlymussel (Lampsilis higginsii) Recovery Plan: First Revision* 12 (2004).
[75] Jacobson, T.R. & Hartfield, P., FWS, *Alabama Cave Shrimp (Palaemonias alabamae) Recovery Plan* 10-11 (1997); *see also* Keller, A.E. & Zam, S.G., *The Acute Toxicity of Selected Metals to the Freshwater Mussel, Anodonta Imbecilis,* 10 Env't Toxicology & Chemistry, 539-46 (1991).

pearlymussel, tan riffle shell mussel, Alabama cave shrimp, Atlantic salmon, Snake River sockeye and chinook salmon, Barton Springs salamander, Chriricahua leopard frog, clubshell, northern riffleshell, Cumberland elktoe, oyster mussel, Cumberland combshell, purple bean, rough rabbitsfoot, scaleshell mussel, dwarf wedgemussel, higgins eye pearly mussel, fat threeridge, shinyrayed pocketbook, gulf moccasinshell, ochlockonee moccasinshell, oval pigtoe, chipola slabshell, purple bankclimber, Illinois cave amphipod, killer whale, Ozark cavefish, pallid sturgeon, pecos bluntnose shiner, Puget Sound salmon, shortnose sturgeon, delta smelt, Sacramento splittail, spectacled eider, Cook Inlet beluga whale, and the winged mapleleaf mussel.[76] Information from these recovery plans has never been incorporated into any of EPA's assessments of cadmium when it set water quality criteria.

B. EPA's Regulation of Cadmium

EPA first promulgated ambient water quality criteria for cadmium under Section 304(a) in 1980, and has since updated the criteria in 1985, 1995, 2001, and in 2016.[77] The criteria have changed through the years. In 1980, EPA set the freshwater acute exposure criterion at 1.5 µg/L total recoverable cadmium and the freshwater chronic exposure criterion at 0.012 µg/L as a 24-hour average, normalized to a hardness of 50 mg/L as calcium carbonate ($CaCO_3$).[78] For saltwater, EPA set the acute exposure criterion at 59 µg/L and the chronic exposure criterion at 4.5 µg/L as a 24-hour average.[79]

In 1985, EPA updated the freshwater acute exposure criterion to 1.8 µg/L total recoverable cadmium as a one-hour average that should not be exceeded more than once every three years, and the freshwater chronic exposure criterion at 0.66 µg/L as a four-day average that should not be exceeded more than once every three years, normalized to a hardness of 50 mg/L as calcium carbonate.[80] EPA noted that the criteria may not protect brook trout, brown trout, or striped bass.[81] For saltwater concentrations, the acute exposure criterion was set at 43 µg/L as a one-hour average that should not be exceeded more than once every three years and the chronic exposure criterion at 9.3 µg/L as a four-day average that should not be exceeded more than once every three years.[82]

In 1995, EPA updated the freshwater acute exposure criterion to 2.067 µg/L total recoverable cadmium as a one-hour average that should not be exceeded more than once every three years, and the freshwater chronic exposure criterion to 1.429 ug/L as a four-day average that should not be exceeded more than once every three years, normalized to a hardness of 50 mg/L as calcium carbonate.[83] The revisions to the freshwater criteria thus represented a weakened standard compared to the 1985 criteria. EPA did not update the saltwater criteria in 1995.

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[76] See attached recovery plans in Appendix A.
[77] EPA, EPA-820-R-16-002, *Aquatic Life Ambient Water Quality Criteria – Cadmium* 1-2 (2016).
[78] EPA, EPA 440/5-80-025, *Ambient Water Quality Criteria for Cadmium* B-15 (1980).
[79] *Id.*
[80] EPA, EPA 440/5-84-032, *Ambient Water Quality Criteria for Cadmium – 1984* 21 (1985).
[81] *Id.*
[82] *Id.* at 22.
[83] EPA, EPA-820-B-96-001, *1995 Updates: Water Quality Criteria Documents for the Protection of Wildlife in Ambient Water* B-1-2 (1996).

In 2001, EPA updated the freshwater acute exposure criterion to 2.0 µg/L dissolved cadmium as a one-hour average that should not be exceeded more than once every three years, and the freshwater chronic exposure criterion to 0.25 µg/L as a four-day average that should not be exceeded more than once every three years, normalized to a total hardness of 100 mg/L as calcium carbonate.[84] For saltwater concentrations, the criteria were set at 40 µg/L for acute toxicity as a 24-hour average that should not be exceeded more than once every three years and 8.8 µg/L for chronic toxicity as a four-day average that should not be exceeded more than once every three years.[85] This was the first revision where EPA used dissolved cadmium versus total recoverable cadmium in setting the water quality criteria.[86]

In 2015, EPA proposed to revise the aquatic life ambient water quality criteria for cadmium. EPA proposed to update the freshwater acute exposure criterion to 2.1 µg/L as a one-hour average that should not be exceeded more than once every three years, and the freshwater chronic exposure to 0.73 µg/L, as a four-day average that should not be exceeded more than once every three years normalized to a total hardness of 100 mg/L as calcium carbonate.[87] EPA proposed to revise the acute saltwater criteria to 35 µg/L as a one-hour average that should not be exceeded more than once every three years and the chronic saltwater criteria to 8.3 µg/L as a four-day average that should not be exceeded more than once every three years.[88] Following an external peer review, EPA released the draft criteria for public comment.[89]

In response to the public comments, EPA finalized the draft criteria in 2016 and revised the freshwater acute exposure criterion to 1.8 µg/L dissolved cadmium as a one-hour average that should not be exceeded more than once every three years and 0.72 µg/L for freshwater chronic exposure, as a four-day average that should not be exceeded more than once every three years, normalized to a total hardness of 100 mg/L as calcium carbonate.[90] For saltwater concentrations, the acute exposure criterion was set at 33 µg/L as a one-hour average that should not be exceeded more than once every three years and the chronic exposure criterion was set at 7.9 µg/L, as a four-day average that should not be exceeded more than once every three years.[91] Overall, the revised criteria were slightly stronger for marine/estuarine waters and acute freshwater exposure, but a weaker standard for chronic freshwater exposure.[92]

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[84] *See also* EPA, EPA-822-R-01-001, *2001 Update of Ambient Water Quality Criteria for Cadmium* 31-32 (2001).
[85] *Id.*
[86] EPA changed its measure from total recoverable cadmium to dissolved cadmium, "to more accurately account for bioavailability and reflect the latest EPA policy for metals risk assessment." EPA, EPA-820-R-16-002, *Aquatic Life Ambient Water Quality Criteria – Cadmium* 3-4 (2016).
[87] EPA, EPA 820-F-15-008, *Draft Aquatic Life Ambient Water Quality Criteria Update for Cadmium – 2015* (2015), *available at* https://www.epa.gov/sites/production/files/2015-11/documents/cadmium_draft-factsheet.pdf (last assessed Dec. 15, 2020).
[88] *Id.*
[89] *Id.*
[90] Recommended Aquatic Life Ambient Water Quality Criteria for Cadmium – 2016, 81 Fed. Reg. 19,176 19,177 (Apr. 4, 2016).
[91] *Id.*
[92] *Id.*

In response to the proposed 2016 revisions, NMFS submitted comments to EPA, expressing concern that the proposed criteria may not be sufficient to protect listed species and alerting EPA that it did not concur with its assessment regarding the EPA's duties under Section 7 of the Act:

> EPA's reliance on ESA Section 7 consultation only when the agency approves state-proposed water quality criteria results in a piecemeal approach when considering implications of such guidelines for broadly ranging species. The segmentation of an action under ESA section 7 leads to an incomplete consideration of the effects of the action that is legally vulnerable. Both agencies need to agree on and implement an assessment strategy that takes into account the aggregate effects of EPA's authorizations of state-proposed water quality criteria such that EPA can ensure that these authorizations, taken together, do not jeopardize the continued existence of ESA-listed species or adversely modify designated critical habitat. Given the scope of the guidelines, the conclusions of such an assessment and any associated implementation guidance would need to have the same authority/regulatory implications of a section 7 consultation.[93]

The Center also recommended in its comments that EPA consult with the Services to ensure that the criteria are fully protective of listed species.[94]

EPA, in its response to comments, replied that consultation is not "legally necessary" because the criteria "do[] not impose any legally binding requirements on states."[95] EPA also stated that "national-level efforts to consult . . . would be neither efficient, likely to ensure a consistent approach to evaluating the effects of pollutants on species, nor necessary to address the effects of [the] action on species whose ranges cross state boundaries."[96]

III. EPA is in Violation of Section 7(a)(2) of the ESA for Failing to Complete Formal Programmatic Consultation on its Revised Cadmium Criteria to Protect Against Jeopardy and the Destruction or Adverse Modification of Critical Habitat

As set forth above, the ESA and its implementing regulations require that EPA consult with the Services on any "programs" that "may affect" listed species, including actions that would otherwise affect water quality.[97] This is necessary for EPA to "insure that *any action* authorized, funded, or carried out by [the] agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification [of the critical habitat] of such species."[98] Because the setting of national water quality criteria triggers state development of water quality standards that can be and often are identical to the

[93] NMFS, *Enclosure 1: NMFS Comments on EPA's Draft Aquatic Life Ambient Water Quality Criteria for Cadmium* 3 (2016).
[94] Center, *Re: EPA's draft recommended aquatic life water quality criteria for cadmium. 80 Fed. Reg. 75,097 (Dec. 1, 2015)* 1-3 (2016).
[95] EPA, *EPA Response to Public Comments on the Draft Aquatic Life Ambient Water Quality Criteria- Cadmium - 2015* 16 (2016).
[96] *Id.*
[97] 50 C.F.R. § 402.02; 50 C.F.R. § 402.14.
[98] 16 U.S.C. § 1536(a)(2) (emphasis added).

criteria themselves, the EPA's promulgation of the criteria affects listed species nationwide, and therefore certainly meets the ESA's low "may affect" threshold for triggering consultation.

EPA, however, has wrongly concluded that the setting of water quality criteria for cadmium does not trigger consultation obligations under the ESA. In its response to comments, EPA makes two arguments for why, in its opinion, it should not consult on the 2016 cadmium water quality criteria: (1) consultation is not legally necessary; and (2) nationwide consultation is not helpful.[99] Each argument will be addressed in turn.

EPA stated in its response to comments that it is not required to consult because the cadmium water quality criteria "do[] not impose any legally binding requirements."[100] This argument is irrelevant because the ESA's definition of agency action is substantively different from, and broader than, a final agency action under the Administrative Procedure Act.[101] Agency "action" under the ESA is broadly defined to include "all activities or programs of any kind" that, among other things, "*directly or indirectly* caus[e] modifications to the land, water, or air."[102] Whether an agency took an "action" for purposes of the ESA does not, therefore, turn on whether the agency imposed a legally-binding requirement or not. The only question that matters for the purposes of the ESA is whether an action will directly or indirectly affect listed species, which is a "relatively low" threshold.[103]

There can be no doubt that EPA's establishment of water quality criteria, which are published in the federal register, is an agency "action" within the meaning of the ESA because it is a programmatic action that results in modifications to water by ultimately causing revisions or updates to *every* State's water quality standards. States are required to update their water quality standards every three years.[104] If EPA has published updated water quality criteria since a state's last triennial review, there are substantive impacts. States are then required to consider EPA's new criteria and either adopt updated water quality standards or explain the decision not to do so in their submission to EPA.[105] More often than not, states choose to simply adopt EPA's criteria, given the resources that EPA invests in developing the criteria and the fact that states are submitting water quality standards for approval to EPA[106]—the very same agency that develops the water quality criteria. Therefore, EPA's decision to update the water quality criteria implicates impacts to listed species and their habitat.

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[99] EPA, *EPA Response to Public Comments on the Draft Aquatic Life Ambient Water Quality Criteria- Cadmium - 2015* 16-17 (2016).
[100] *Id.* at 16.
[101] 5 U.S.C. § 551 *et seq*. *See Bennett v. Spear*, 520 U.S. 154, 177-78 (1997) (holding that for purposes of the Administrative Procedure Act, an agency action is final if it marks the consummation of the agency's decisionmaking process and if it either determines rights or obligations or if legal consequences flow from it). The Center does not concede EPA's water quality criteria do indeed constitute final agency action for purposes of the Administrative Procedures Act.
[102] 50 C.F.R. § 402.02 (emphasis added).
[103] *Cal. ex rel. Lockyer v. U.S. Dep't of Agric*., 575 F.3d 999, 1018 (9th Cir. 2009).
[104] 33 U.S.C. § 1313(c).
[105] 40 C.F.R. § 131.20(a); Water Quality Standards Regulatory Revisions, 80 Fed. Reg. 51,020, 51,028 (Aug. 21, 2015) ("While states and authorized tribes are not required to adopt EPA's [water quality criteria], they must consider them.").
[106] 40 C.F.R. § 131.20(c).

Indeed, 18 states, territories, and/or tribes have both started to develop revised cadmium water quality standards and submitted them to EPA for approval since EPA published the 2016 cadmium water quality criteria.[107] In every single case, these entities proposed to use EPA's water quality criteria, and EPA universally approved that choice.[108] In addition, when EPA promulgated cadmium water quality standards for the state of Oregon, it used its 2016 cadmium water quality criteria.[109]

EPA's issuance of the cadmium criteria, therefore, clearly results in modifications to water quality standards, which "may affect" listed species that rely on those waters, making the issuance of the criteria an agency action subject to ESA consultation. As a result, programmatic consultation on the overarching *framework* established by EPA's cadmium criteria is necessary to ensure that the Services analyze the cumulative impact of EPA's decision and issue programmatic biological opinions establishing appropriate program-wide criteria that ensure protection of threatened and endangered species.

EPA's second argument in its response to comments is that consultation would not be helpful for three reasons: (1) it is more efficient for states to modify national recommendations, as needed, to address the presence of localized species-specific concerns; (2) nationwide consultation is unlikely to result in a consistent approach because EPA will need to consult again when states propose water quality standards to EPA for approval; and (3) states can address concerns about trans-boundary movement of cadmium or organisms when they develop water quality standards.

EPA's argument that programmatic consultation is unnecessary because of later ESA review is contrary to both the regulations and the case law. Indeed, the ESA regulations specifically contemplate that programs that "may affect" listed species are subject to programmatic consultations even though later individual actions taken under such programs may necessitate consultation as well.[110] In addition, this claim has been squarely foreclosed by several courts

[107] See Appendix B for a compilation of EPA's approval letters for cadmium following EPA's publication of the 2016 water quality criteria. In some cases, EPA's approval was subject to state-level ESA consultation. We are aware of no case where state-level ESA consultation resulted in a change to the water quality standards; however, documents necessary to confirm this were requested via the Freedom of Information Act in October of 2020 and have not yet been released.

[108] Nebraska adopted EPA's cadmium criteria for cold water and used a formula that EPA approved to adjust EPA's cadmium criteria for warm water. Letter from EPA Region 7 to Mr. Jim Macy, Director, Nebraska Department of Environment and Energy, Enclosure at 8 (Sept. 5, 2019).

[109] Aquatic Life Criteria for Cadmium in Oregon, 82 Fed. Reg. 9,166 (Feb. 3, 2017).

[110] 50 C.F.R. § 402.14(c)(4) (clarifying that, while consultation "may encompass . . . a number of similar individual actions within . . . a programmatic consultation," that "does not relieve the Federal agency of the requirements for considering the effects of the action or actions as a whole"); Interagency Cooperation—ESA of 1973, as Amended; Incidental Take Statements, 80 Fed. Reg. 26,832, 26,836 (May 11, 2015) ("Programmatic biological opinions examine how the parameters of the program align with the survival and recovery of listed species."); *see also* Endangered and Threatened Wildlife and Plants; Regulations for Interagency Cooperation, 84 Fed. Reg. 44,976, 44,997 (preamble to Services' 2019 ESA regulations reiterating that, "[a]s explained in the 2015 [regulations]," the ESA "still requires a programmatic consultation to meet the requirements of section 7(a)(2)[,]" even if "specific projects [] developed in the future [] are subject to *site-specific* stepped-down, or tiered consultations where incidental take is addressed." (emphasis added)).

that found that an agency may not avoid its ESA Section 7 duties for programmatic actions by relying on future consultations that address subsequent actions in piecemeal fashion.[111]

EPA's argument also wrongly ignores the purpose and function of programmatic consultation. State-by-state reviews cannot and do not meaningfully address the cumulative impacts to listed species of EPA's criteria. Absent review at the programmatic level, EPA does not take the cumulative loss or contamination of habitat outside an individual state into account, and so will not consider the cumulative effects of its water quality criteria across the full extent of the program. Such cumulative impacts—which may jeopardize the continued existence of species—can be analyzed only through programmatic review.[112]

EPA's argument that it is inefficient to consult at both the programmatic level and the state level also misses the mark. The Section 7 "mandate applies to *every discretionary action*—regardless of the expense or burden its application might impose."[113] A protective nationwide cadmium standard that incorporates the needs of all listed species everywhere is what the ESA requires — to give the "benefit of the doubt" to the species — not the other way around.[114]

As for the protection of species that migrate, EPA promised in its response to comments that these species would be addressed as part of state-by-state consultation. As mentioned above, 18 states, territories, and/or tribes have adopted EPA's cadmium criteria verbatim. One of these states is Virginia. In 2018, EPA issued a Biological Evaluation ("BE") for NMFS for the approval of Virginia's water quality standards that are identical to EPA's 2016 cadmium water quality criteria.[115] Virginia has several species that migrate through its waters, including sturgeon, sea turtles, and whales.[116] In its BE, EPA rationalizes that for sea turtles and whales, cadmium exposure will be minimal in part because these species migrate and thus the time they are exposed to cadmium in Virginia's waters is short.[117] EPA therefore concludes that its cadmium criteria will not adversely affect sea turtles or whales.[118] Nowhere does EPA analyze

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[111] *See e.g.*, *Lane Cty. Audubon Soc'y v. Jamison*, 958 F.2d 290, 293-94 (9th Cir. 1992) (holding that a broad "strategy" for actions that may affect listed species must undergo programmatic Section 7 consultation, even if individual actions taken under that program would be subject to project-specific consultations); *Pac. Rivers Council v. Thomas*, 30 F.3d 1050, 1055-56 (9th Cir. 1994) (similar); *Conner v. Burford*, 848 F.2d 1441, 1453-58 (9th Cir. 1988) (rejecting Services' deferral of programmatic impacts analysis to second, project-specific stage); *Cottonwood Env't Law Ctr. v. U.S. Forest Serv.*, 789 F.3d 1075, 1082 (9th Cir. 2015) (recognizing that "project-specific consultations do not include a unit-wide analysis comparable in scope and scale to consultation at the programmatic level."). *See also Pac. Coast Fed'n of Fishermen's Ass'ns v. NMFS*, 482 F. Supp. 2d 1248, 1267 (W.D. Wash. 2006) (holding that deferral of analysis to the project level "improperly curtails the discussion of cumulative effects").

[112] *See Cottonwood Env't Law Ctr. v. U.S. Forest Serv.*, 789 F.3d 1075, 1082 (9th Cir. 2015) ("[P]roject-specific consultations do not include a unit-wide analysis comparable in scope and scale to consultation at the programmatic level."); *Nat'l Wildlife Fed'n v. Brownlee*, 402 F. Supp. 2d 1, 3, 9-11 (D.D.C. 2005) (requiring consultation on 2002 issuance of Nationwide Permit 12 to avoid piecemeal destruction of species and habitat).

[113] *Nat'l Ass'n of Home Builders v. Defs. of Wildlife*, 551 U.S. 644, 671 (2007) (emphasis added).

[114] *Conner v. Burford*, 848 F.2d 1441, 1454 (9th Cir. 1988).

[115] EPA for NMFS, *Biological Evaluation [for] the Approval of Virginia's Water Quality Standards Title 9 VACS 25-260 Water Quality Standards Regulations Adoption of Ammonia and Cadmium* (Oct. 15, 2018).

[116] *Id.* at 11-12.

[117] *Id.* at 56-60.

[118] *Id.* at 60.

what happens when species *are* exposed to cadmium throughout their migratory ranges. This is precisely the point that NMFS made in their comment letter to EPA on the 2016 criteria:

> EPA's cadmium guidelines apply to all waters of the US, so exposures would occur throughout the US portion of sea turtle ranges. Further, cadmium accumulates in tissue with age, and sea turtles are understood to be very long lived species. For example, green turtles reach sexual maturity between 20 and 50 years of age. For such long lived species we would need to consider whether cadmium accumulation from US waters over a lifespan would reach tissue concentrations directly resulting in or contributing to adverse effects. Dietary exposure of the more omnivorous sea turtle species (i.e., leatherback, loggerhead) was a particular concern voiced by staff at the NMFS Southeast Regional Office.[119]

EPA's suggestion that it can protect migratory species through later consultation is therefore hollow.

Last, EPA has previously acknowledged the benefits of nationwide consultations and agreed with the Services to consult on its water quality criteria. In 2001, the EPA and the Services signed the *Memorandum of Agreement Between the EPA, FWS and NMFS Regarding Enhanced Coordination Under the CWA and ESA* to affirm where and how EPA would ensure compliance with the ESA.[120] At this time, EPA committed to consult with the Services when it develops water quality criteria.[121] EPA also recognized that consulting on its water quality criteria is beneficial:

> [C]onducting consultations on a State-by-State basis is not the most efficient approach to evaluating the effects of water pollution on endangered and threatened species throughout the country. National 304(a) consultations will ensure a consistent approach to evaluating the effects of pollutants on species and identifying measures that may be needed to better protect them. National consultations will also ensure better consideration of effects on species whose ranges cross State boundaries.[122]

EPA, therefore, previously agreed with the very arguments that NMFS made in its comments on EPA's cadmium criteria. EPA's rationale for why it has changed course is both legally[123] and factually inadequate.

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[119] NMFS, *Enclosure 1: NMFS Comments on EPA's Draft Aquatic Life Ambient Water Quality Criteria for Cadmium* 2 (2016).
[120] Memorandum of Agreement Between the EPA, FWS and NMFS Regarding Enhanced Coordination Under the CWA and ESA, 66 Fed. Reg. 11,202 (Feb. 22, 2001).
[121] *Id*. at 11,212.
[122] *Id.*
[123] The APA mandates that an agency publicly and adequately explain a new policy choice, particularly where that choice rests on contradictory factual findings. *See* 5 U.S.C. § 706(2)(A); *FCC v. Fox TV Stations, Inc.*, 556 U.S. 502, 515 (2009).

In sum, programmatic review of EPA's water quality criteria provides the only way to avoid piecemeal destruction of species and habitats, and EPA cannot circumvent its ESA obligations by relying on state-by-state reviews.

IV. CONCLUSION

If the EPA does not act within 60 days to correct the violations described in this letter, we will pursue litigation. If you have any questions, or would like to discuss this matter, please contact us.

Sincerely,

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