Beneath the Surface

The Concealed Costs of the Clean Water Rule Rollback

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NEW YORK UNIVERSITY SCHOOL OF LAW

April 2020

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Executive Summary

The Clean Water Act was designed to reduce pollution in rivers, streams, wetlands, and other waters throughout the nation. But over the past six months, the Environmental Protection Agency and Army Corps of Engineers ("the agencies")—the government agencies charged with enforcing the Clean Water Act—have limited federal protection over waters to its narrowest scope in decades. This policy report details a major flaw in the agencies' assessment that leaves their actions legally vulnerable: their failure to properly assess and quantify the environmental costs of their actions.

In restricting the scope of the Clean Water Act through two regulatory rollbacks, the agencies claim that the estimated compliance-cost savings exceed the environmental harms (in the form of forgone benefits). Yet these analyses suffer from severe methodological flaws. And correcting the analyses would very likely show that the rollbacks are net costly to society, depriving the public of potentially billions of dollars in annual forgone benefits. The agencies' flaws fall into several broad categories.

First, the agencies leave out most of the harmful impacts from their cost-benefit analyses—including impacts on safe drinking water, flooding, and habitats for aquatic and endangered species—claiming false helplessness in the face of data gaps. Second, though the agencies monetize the impact of the rollbacks on wetlands that will be lost, their analysis arbitrarily excludes most of the relevant forgone benefits. For example, they arbitrarily limit their calculations to the benefits of protecting wetlands inside a state only, ignoring the well-recognized benefits that people derive from waters outside of their state. Moreover, the agencies erroneously limit the benefits that in-state residents derive from wetlands protection, through an arbitrary assumption that allows them to undervalue the per-acre benefits and through ignoring the unique local benefits that wetlands provide. The agencies also make the unsupported assumption that states will choose to fill the regulatory gap left after the rollbacks—despite the lack of any federal mandate to do so and the fact that many states have recently demonstrated antipathy to additional clean-water regulation. And third, the agencies overvalue the cost savings of the rules.

As detailed in this report, the agencies' failure to meaningfully assess the substantial harms that will result from their rollbacks violates both regulatory precedent and the agencies' legal obligations.

Background

Factual History

The Clean Water Act prohibits the unauthorized discharge of pollution into the "waters of the United States."[1] In 2015, the agencies issued a rule defining the "waters of the United States," known as the "Clean Water Rule."[2] This definition, which expanded the area of wetlands and streams subject to federal regulatory protection, was based on scientific data establishing that these additional protections would significantly benefit downstream water quality.[3] Accordingly, an economic analysis conducted by the agencies showed that the expected benefits of the Clean Water Rule substantially outweighed the costs.[4]

But in a two-step rulemaking, the agencies have now drastically limited federal jurisdiction over several categories of water bodies, forgoing the benefits of the Clean Water Rule and ignoring the science on which it was based. Most recently, in April 2020, the agencies issued a rule altering the definition of "waters of the United States" ("Replacement Rule") and excluding from federal protection many streams and wetlands that have been protected since the 1970s.[5] Before that, in October 2019, the agencies repealed the Clean Water Rule ("Repeal Rule"), rolling back federal protections for a significant number of waters that the agencies had only a few years earlier found would have a significant impact on downstream water quality.[6]

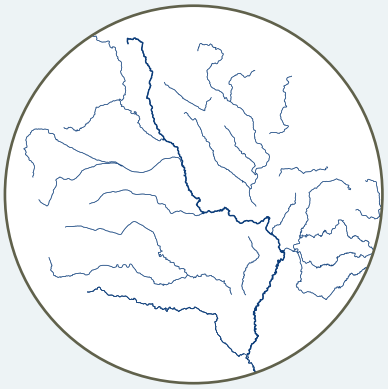
Though fashioned as two discrete rulemakings, the repeal and replacement of the Clean Water Rule was effectively one large regulatory rollback. In fact, the agencies even refer to the two regulations as "Step One" (in October 2019) and "Step Two" (in April 2020) of a two-part rulemaking.[7] During the proposal stage, both regulations were pending simultaneously and were proposed essentially for the same reason—namely, the agencies' newfound concern about the proper interpretation of their jurisdiction to regulate under the Clean Water Act.[8] According to the agencies, the Replacement Rule was issued shortly after the Repeal Rule to implement jurisdictional limits that are supposedly "clearer" than the pre-Clean Water Rule regime that the Repeal Rule temporarily restored.[9]

Both the Repeal Rule and the Replacement Rule were also published with similar economic analyses accompanying them. In those analyses, the agencies find that the estimated compliance-cost savings of each rollback are likely to exceed the monetized harms.[10] Yet, the agencies' cost and benefit calculations were close enough to one another that tweaking an assumption could easily flip their conclusions and show instead that costs exceed benefits.[11]

The Repeal Rule has been challenged in federal court by coalitions of states and environmental non-profit organizations, and the Replacement Rule is widely expected to be as well. These lawsuits will likely consider, among other issues, whether the agencies rationally interpreted their authority and properly assessed the impacts of their actions.

Figure 1. Reduced Protections Due to the Agencies' Clean Water Rule Rollbacks

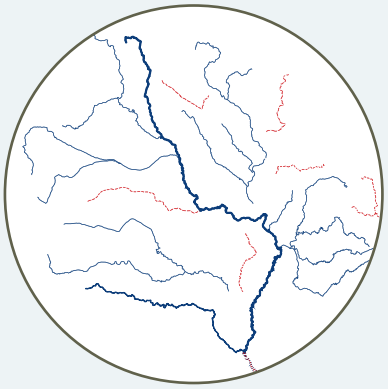
WATERSHED



Clean Water Rule (2015)

All tributaries and wetlands with a significant impact on downstream water quality are protected.

Agencies apply the best available science to make jurisdictional determinations, relying on over 1,200 peer-reviewed publications evaluating the interconnectivity of water bodies.[12]

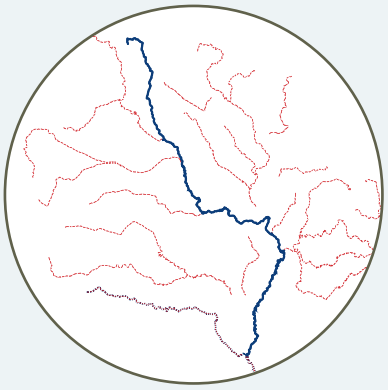


Repeal Rule (2019)

Roughly 2.84–4.65% of wetlands, streams, and other waters lose federal protection.

Agencies revert to underinclusive case-by-case analysis for whether waters are protected.

Example: Weakens protections for "headwater streams in the Blue Ridge Mountains of South Carolina and other states" with impacts on southern trout streams and downstream drinking water sources.[13]



Replacement Rule (2020)

Federal protection over waters limited to its narrowest scope in decades.

Agencies refuse to provide jurisdictional estimates, but data indicates severe reductions in tributary and wetlands coverage.

Example: Eliminates protections for numerous streams that feed Rio Grande, Canadian, Pecos, Gila, and San Juan rivers.[14]

Legal Background

The Clean Water Act's core purpose is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[15] As Justice Kennedy explained in *Rapanos v. United States*—a seminal decision on the Clean Water Act's jurisdictional reach—a water or wetland can be subject to federal regulation under the Clean Water Act so long as it "possess[es] a significant nexus to waters that are or were navigable in fact or that could reasonably be so made," including a nexus between the protection of upstream water and "downstream water quality."[16] Under this standard, the federal government may exercise jurisdiction over a non-navigable water or wetland whose connection is "so close, or potentially so close" to a navigable water, but not when it has "little or no connection."[17] For instance, Justice Kennedy recognized that wetlands frequently "perform critical functions related to the integrity of other waters—functions such as pollutant trapping, flood control, and runoff storage," and when they do so, they "possess the requisite nexus" for federal jurisdiction to attach.[18]

The "significant nexus" test allows the agencies to look at scientific data on water connectivity to determine jurisdiction and has received widespread support, as appellate courts around the country have recognized that a water can receive federal protection if such protection would significantly affect downstream water quality.[19] Yet despite the clear importance of scientific analysis in determining how best to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters"[20] under the Clean Water Act, the agencies jettison that test in the Repeal Rule and Replacement Rule and then conduct no scientific assessment whatsoever of how the loss of federal protection over the waters directly affected by the rule would harm the quality of downstream waters. Instead, the agencies claim that determining the bounds of federal regulatory jurisdiction is a purely "legal question" that cannot be "dictate[d]" by "[s]cience."[21]

This is a sharp break from the Clean Water Rule, which was predicated on ample scientific evidence showing that the waters regulated thereby met the "significant nexus" jurisdictional threshold.[22] In now interpreting the statute differently, the agencies disregard their own voluminous scientific findings establishing the significant positive impact on downstream water quality of protecting streams, wetlands, and other waters.[23]

While the agencies fail to conduct any scientific analysis, they do purport to analyze the impacts of their rulemakings through an economic analysis for each rule. In each analysis, the agencies purport to analyze how the jurisdictional changes in each rule will affect society, assessing both the compliance-cost savings to affected industry and individuals that will benefit from reduced regulation as well as some social harms to the affected public that will bear the costs of a reduction in critical clean-water protections. While the agencies' economic analyses for the Repeal Rule and the Replacement Rule cannot stand in for a comprehensive scientific analysis of the sort conducted in the Clean Water Rule, these analyses do represent the agencies' most focused attempt to assess the harms that their rules will cause.

The fact that these economic analyses are so severely flawed—ignoring both well-established science and sound economics—thus demonstrates that the agencies fail to grapple with the impacts of their rules. The agencies seemingly hope to be excused from any errors by asserting that they do not rely on their own economic analyses.[24] To that end, the agencies cite a case from the U.S. Court of Appeals for the District of Columbia Circuit, which holds that when an agency relies on a cost-benefit analysis, a "serious flaw undermining that analysis can render the rule unreasonable."[25] Presumably, the agencies hope that because they purport not to rely on their cost-benefit analyses, they cannot be held responsible for any errors therein.[26] But this argument is unpersuasive for two related reasons.

First, the agencies assert that their chosen interpretation of the Clean Water Act—a statute, once again, that is concerned primarily with water quality—is reasonable in both rules.[27] And to be reasonable, the agencies must "examine the relevant data" and consider "important aspect[s] of the problem."[28] The D.C. Circuit case that the agencies cite does not allow the agencies to evade consideration of water-quality impacts that the Clean Water Act requires. As noted above, the economic analyses represent a rare instance in which the agencies actually address the impacts of their rules on downstream water quality. The stream of errors in the two analyses—coupled with the agencies' complete lack of scientific analysis—illustrates that the agencies fail to rationally consider the harms to clean water caused by their rules, as the Clean Water Act's "significant nexus" test requires. The errors thus wholly undermine the agencies' attempts to give an explanation for their decision to worsen water quality and are sufficient to render the rules arbitrary and capricious.[29]

Second, and relatedly, the agencies tout the alleged cost savings of both the Repeal Rule and Replacement Rule—belying their claims that they did not rely on the economic analyses.[30] For the Repeal Rule, the agencies assert that their regulatory decision was chosen because it was the "most … efficient" among the available alternatives.[31] And the agencies assert that their cost-benefit analysis provides "helpful information" about the repeal,[32] emphasizing in particular their conclusion that the Repeal Rule is likely net beneficial by saving industry the costs of complying with the Clean Water Rule.[33] In the Replacement Rule, the agencies make a similar appeal to cost savings, explaining that the rule will "ease administrative burdens."[34]

The agencies cannot tout the alleged cost savings of their rules while ignoring most of the associated regulatory harms. It is a bedrock principle of the Administrative Procedure Act that administrative agencies cannot place a "thumb on the scale" by "undervaluing" and disregarding important public health and welfare harms.[35] Without a proper accounting of the forgone benefits of improved water quality, therefore, the rules cannot stand.

The Agencies Fail to Provide an Adequate Justification for Causing Grave Harm to the Nation's Waters

As explained above, to justify the rollbacks, the agencies must "examine the relevant data" and consider "important aspect[s] of the problem."[36] To satisfy that responsibility, the agencies are required to assess the impact of their chosen course from a baseline that reflects the agency's "best assessment of the way the world would look absent the proposed action"[37]—in this case, the world without either the Replacement Rule or the Repeal Rule[38]—and provide a reasoned explanation for the rollbacks.[39] Moreover, when providing an economic analysis to the public, the agencies are required to provide the data and documentation that they relied on so as to make their results reproducible.[40]

Rather than provide this analysis, the agencies have subdivided the analysis into two steps, allowing them to reset the baseline for the Replacement Rule and report smaller numbers for the costs of the two separate rules. As a result, the public is left with two analyses and that misleadingly make the rules' harms appear irrelevant.[41] But overlooking the actual harms that the rules will cause to the nation's waters would be a mistake. A review of the information that the agencies have provided for both steps shows that the agencies have incorporated numerous severe flaws into their analyses. A properly conducted economic analysis would very likely not support the agencies' chosen result. Here we explain the key methodological errors in the agencies' two analyses—beginning with the Replacement Rule, the more recent and far-sweeping of the two regulations.

A. The Economic Analysis for the Replacement Rule ("Step Two" Rule) Severely and Erroneously Undervalues the Rule's Forgone Benefits

The agencies' economic analysis for the Replacement Rule suffers from critical shortcomings that obfuscate the harms that the rule will cause. As detailed below, the agencies fail to account for most of the rule's harmful impacts, as they do not even project how many waters will be affected by most of the rule's provisions. And in the case of wetlands degradation, where the agencies actually try to quantify and monetize the rule's costs and some benefits, the agencies make numerous irrational and unsupported assumptions that result in a vast undervaluation of the rule's substantial harms. These flaws together leave the public ill-informed about the true impact of the rollback and do not satisfy the agencies' requirement that they provide a reasoned explanation for the harm they are causing.

1. The Agencies Unreasonably Fail to Estimate Most of the Rule's Widespread Social Harms

The agencies tersely acknowledge that many harmful environmental impacts are likely to result from the Replacement Rule, including pollution to drinking water, increased flood risk, increased oil spill risk, and loss of endangered and threatened species habitats.[42] By all indications, these impacts are likely to be significant. The limited data provided by the agencies suggests that up to 45 percent of a specific type of previously-protected wetland (wetlands that are categorized as adjacent to traditionally navigable waters) may lose federal protection.[43] In fact, the impact may be especially significant

in some areas: The data show, for example, that 85 percent of streams in parts of New Mexico will be categorically excluded.[44]

> According to the agencies' own data, up to 45 percent of wetlands that are adjacent to traditionally navigable waters may lose federal protection. In some areas, up to 85 percent of streams will be categorically excluded.

But by and large, the agencies entirely disregard these impacts and make no attempt to meaningfully assess their magnitude. The agencies provide some limited data on the rule's potential scope, but fail to make any comprehensive estimate of how many waters are likely to lose federal protection under most provisions of the Replacement Rule, claiming that they cannot render plausible estimates due to "limitations of the available data."[45] As a result, the agencies quantify and monetize the rule's harms only with respect to some of the harms under Section 404 of the Clean Water Act, which regulates the discharge of dredged or fill material into wetlands and other regulated waters. All of the other harms stemming from the Replacement Rule—including water quality impacts, harms to drinking water and species habitat due to the discharge of pollution into streams and wetlands no longer regulated under Section 402—are not quantified and almost entirely ignored.[46] Yet what is particularly striking is that even when limiting the analysis to only a portion of the forgone benefits, the agencies cannot say that the rule's cost savings outweigh the forgone benefits in every circumstance. In fact, the agencies concede that the cost savings of the rollback may not outweigh the environmental and public-welfare harms.[47]

As explained above, the agencies' failure to meaningfully assess the impacts of the Replacement Rule on water quality ignores the Clean Water Act's purpose and legal mandates. Longstanding agency practice on the quantification and monetization of regulatory impacts—outlined in White House guidance followed by agencies since the George W. Bush administration[48]—emphasizes the need for such an assessment. This guidance instructs agencies to make reasonable "analytical assumptions" in order to provide "quantitative information" whenever possible on key regulatory impacts, such as the number of "stream miles" affected in the case of regulations, like this one, that affect water quality.[49] While agencies will often be unable to project a regulation's "precise consequences" with certainty, agencies still must analyze statistical variability and make "plausible assumptions" about regulatory impacts to "inform decision makers and the public about the effects" of their actions.[50] Particularly in circumstances where the analysis shows that the rollbacks may not be cost-benefit justified, such as this one, the agencies are obligated to show that the assumptions that they have made to support their chosen outcome are the most appropriate set of assumptions.[51] But here, even the agencies' own analysis shows that there is too much uncertainty about whether the rollbacks are justified by their costs to proceed.

In contrast to the analysis accompanying the rollbacks, the agencies' economic analysis of the Clean Water Rule offers an example of a reasonable method for following that longstanding White House guidance. When promulgating the Clean Water Rule in 2015, the agencies recognized that it would not be possible to project its impacts on regulated waters with exact certainty.[52] Yet to provide plausible estimates, a "team of EPA experts from across the country independently examined a random sample of 188 jurisdictional determinations" made over a two-year period, and determined how many waters that had previously been deemed non-jurisdictional would become subject to federal regulation under the rule.[53] Through this analysis, and the use of plausible analytic assumptions when data was incomplete, the agencies were able to project that federal regulatory protection would increase by 2.84–4.65% under the Clean Water Rule.[54] Using this estimate, the agencies were then able to assess the magnitude and scope of the rule's myriad costs and benefits.[55] In fact, though the agencies did not monetize *all* categories of impacts in the Clean Water Rule,[56] they monetized much more than just the impacts on wetlands preservation under the Section 404 program, including impacts on pollution of tributaries from stormwater and animal-feeding facilities.[57]

> The agencies assert that "data limitations" prevent them from quantifying the amount of waters that would lose protection under the Replacement Rule, yet they were able to provide comparable estimates when they issued the Clean Water Rule.

The agencies' current analysis for the Replacement Rule stands in stark contrast to the sensible and informative approach the agencies took in the past. Time after time, the agencies now assert that "data limitations" prevent them from quantifying the amount or percentage of waters that would lose protection under the rule.[58] In reality, however, there is plenty of data available that would allow the agencies to develop reasonable estimates of the waters that would be affected—just as they did when they issued the Clean Water Rule. As Dr. Cathy Kling explained in her analysis of the proposed Replacement Rule, the agencies could have reprised their previous approach, by taking a representative sample of waters recently deemed jurisdictional and evaluating how many would retain protection under the Replacement Rule.[59] Data managed by the U.S. Geological Survey and the U.S. Fish and Wildlife Service showing wetlands, surface water features, water drainage networks, and deepwater habits nationwide are also available and could be used to perform these types of assessments.[60] But the agencies refused to take this approach, instead describing for each class of water why existing information is insufficient to make a reliable assumption, yet failing to explain why they could not augment the existing information like they did when assessing the impacts of the Clean Water Rule.[61]

The agencies' failure to present aggregate estimates of the Replacement Rule's impacts is especially unsatisfactory given that the agencies at times collected the types of information that could help form the basis for such reasonable estimates. For instance, the agencies assessed individual waters in three "case study" areas to determine how many of those waters would lose federal protection under the Replacement Rule (the case studies are further discussed below, *see infra* Sec. A(2)(b)).[62] The agencies used the same methodology to estimate the amount of waters nationwide that would lose protection under the Section 404 dredge/fill program.[63] And, behind the scenes, the agencies apparently used national datasets to estimate percentages of streams that are "intermittent," "perennial," and "ephemeral" in several parts of the United States—all crucial data points for determining the extent of the rollback[64]—yet this information came to light only through a Freedom of Information Act request, and the agencies now disavow it in their published analysis.[65] Because the agencies refuse to use any of this information to make plausible estimates of the rule's aggregate impacts outside of the Section 404 program, they effectively turn a blind eye to the extensive water pollution and resulting harms that the rule will cause.

Indeed, by failing to meaningfully assess the rule's widespread harms to water quality—despite the availability of considerable data for making reasonable quantitative estimates—the agencies' assertion that these costs are, in essence, "too uncertain … [for] valuation and inclusion" effectively and impermissibly assigns the impacts "zero" value.[66] And because they continually evade making any projections about the rule's aggregate impacts on downstream water quality, the agencies essentially disregard the numerous adverse impacts of the Replacement Rule that the Clean Water Act was designed to protect against—such as pollution to drinking water and loss of species habitat. These errors are particularly significant here given the fact that, under several of the scenarios studied by the agencies, the cost savings of the rollback may not outweigh the costs.[67]

In short, as a federal appeals court has made clear, "[r]egulators by nature work under conditions of serious uncertainty," and "[t]he mere fact that the magnitude of [a regulatory cost] is uncertain is no justification for disregarding the effect

entirely."[68] Yet by continually failing to make plausible estimates about the net impacts of the Replacement Rule—despite ample opportunity to do so—the agencies do exactly that.

This violates the law in two important ways. First, the agencies' minimal evaluation of the Replacement Rule's substantial impacts is a far cry from the "central[] relevan[ce]" that costs are normally given in agency decisionmaking,[69] and renders their claim that the rule is net beneficial nothing but "sheer speculation."[70] And second, the agencies' failure to evaluate the rule's impacts on water quality plainly violates their obligation under the Clean Water Act to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[71] After all, the agencies cannot seriously purport to uphold their obligation to protect the nation's waters when they do not even assess how severely the Replacement Rule will harm water quality.

The agencies cannot seriously purport to uphold their obligation to protect the nation's waters when they do not even assess how severely the Replacement Rule will harm water quality.

2. *The Limited Harms that Are Monetized Are Grossly Undervalued*

Because of the agencies' failure to take reasonable steps to assess the impacts of the Replacement Rule, the agencies' only attempt to quantify the costs and benefits of their jurisdictional rollbacks concerns impacts to dredging and filling under Section 404 of the Clean Water Act. The agencies project these impacts in two different ways: a) a nationwide analysis that seeks to monetize the costs and benefits of wetlands degradation on a state-by-state basis; and b) three "case studies" to assess the impacts on particular watersheds. Yet both of these methods are severely flawed and drastically undercount the harms that wetlands degradation will cause. We detail the flaws of these two methods in turn, starting with the nationwide analysis.

a. The Nationwide Analysis Disregards Most of the Harms from Wetlands Degradation and Significantly Undervalues the Rule's Costs

The agencies estimate the social costs of wetlands degradation nationwide by looking at studies that assess how much a person would be willing to pay to protect wetlands on a per-acre basis. Using this methodology, according to the agencies, deregulation of wetlands under the Replacement Rule could result in just $55 million in average annual forgone benefits, while producing annual cost savings under this scenario of $109–$214 million.[72] But Dr. Jeffrey D. Mullen, an agricultural and applied economist, submitted an analysis of the proposed Replacement Rule to the agencies, and according to Dr. Mullen, the Replacement Rule will likely deprive society of over $1.6 billion in annual wetlands-related benefits, vastly exceeding its associated compliance costs.[73]

This vast discrepancy is due to the fact that, beyond underestimating the benefits as discussed above, the estimates that the agencies do provide make clear that they reduced the valuation estimates of wetlands-related harms through a series of methodological errors. Specifically, the agencies make at least four key errors[74] in their valuation: 1) they ignore the interstate benefits of wetlands protection; 2) they disregard the unique local benefits that wetlands provide; 3) they undervalue in-state benefits; and 4) they inappropriately assume that states may regulate many of the waters losing federal protection. These analytical errors significantly skew the cost-benefit analysis underlying the Replacement Rule and improperly ignore most of the harms that the rule will cause. We discuss each of these four errors, in turn, below.

i. The Agencies Unreasonably Ignore the Interstate Benefits that Wetlands Provide

To calculate the forgone benefits of wetlands loss, the agencies estimate the wetlands acreage that will be lost in each state as a result of the rule and then, using studies that assess how much individuals would be willing to pay per acre of wetlands protection, calculate the monetary value of that lost acreage in each state. But the agencies make an elementary and obvious error in their calculation. Specifically, they assume that only individuals residing within the state of the lost wetland derive value from that wetland, assuming without justification that the benefits of wetlands protection stop at the border of each state. In other words, the agencies find that individuals derive "zero" benefit from protection of wetlands outside their home state.[75]

Of course, this violates both science and common sense. As the agencies explained in the Clean Water Rule, science clearly establishes that wetlands have considerable beneficial impacts on a wide range of other waters without respect to state boundaries, both near and far.[76] For instance, wetlands that lack a direct surface water connection to rivers and streams—and thus are likely to lose protection under the Replacement Rule—still provide physical, chemical, and biological functions that could affect the integrity of downstream waters. They reduce flooding from rivers and streams, provide nutrients that help those waters thrive, and serve as a habitat for fish and amphibians that inhabit those waters.[77]

Echoing this well-established science, numerous economic studies have concluded that individuals place considerable value on wetlands outside their own state—sometimes far beyond the state line.[78] One study, for instance, finds that more than 80% of the benefits of wetlands protection are enjoyed by out-of-state residents.[79] The agencies' finding, contrary to this data, that the benefits of wetlands protection are enjoyed only by in-state residents represents "a complete failure to reasonably reflect upon the information contained in the record."[80] While there may be "a range of values" for the benefits of out-of-state wetlands, as a federal appellate court explained when discussing the benefits of cutting carbon emissions, those benefits are "certainly not zero."[81]

To be sure, on the very last three pages of the economic analysis, the agencies briefly admit that "wetland benefits cross[] state boundaries," and conduct an alternative analysis in which they assume that out-of-state residents benefit from wetlands protection in a neighboring state if—and only if—they live in a county that directly abuts that neighboring state.[82] But cutting off forgone benefits one county into a neighboring state is just as arbitrary as cutting them off at the state line. As one study found, households as distant as 640 miles from a body of water derive economic benefit from the preservation of that water body.[83] This includes both the direct benefits that individuals receive from the ecosystem services that wetlands provide (known as "use" value) as well as the value that individuals derive from simply knowing that wetlands are being preserved (known as "non-use" or "existence" value).[84] Not surprisingly, given this arbitrary assumption, the agencies continue to drastically undervalue the harm to wetlands even under this alternative analysis. While the forgone benefits estimation only ticked slightly upward under the agencies' faulty alternative approach,[85] experts find substantial valuation increases from a genuine accounting of interstate benefits.[86]

ii. The Agencies Ignore the Unique Benefits that Individuals Receive from Local Wetlands

Because the agencies ignore the benefits that individuals derive from out-of-state wetlands, their estimate of the Replacement Rule's wetlands-related harms only accounts for the impacts on in-state residents. But here, too, the agencies make critical errors that further diminish the rule's projected harms. Specifically, they fail to account for *any* of the unique benefits that individuals who reside very close to a wetland derive from that wetland.

Children enjoying a science lesson at a local marsh in Winfield, Illinois.

While wetlands have wide-ranging impacts on distant downstream waters, as detailed above, they can also provide unique benefits at the local level. For instance, peer-reviewed science confirms that even so-called "isolated" wetlands are frequently hydrologically connected to local streams and rivers through the flow of surface water and ground water, and can serve important functions for local communities including attenuating flooding and serving as a rearing habitat for fish.[87] Unsurprisingly, therefore, individuals who live close to a particular wetland value that wetland the most. The agencies' own commissioned study, in fact, found that of all factors evaluated, none had a greater positive impact on the valuation of a wetland than residing in close proximity to that wetland.[88]

Yet when applying that study on a state-by-state level, the agencies entirely ignore this local benefit. Specifically, in calculating the forgone benefits of wetlands degradation within each state, the agencies set the local variable to zero, meaning they assume that no residents of any state live locally to the wetlands being degraded.[89] But this is irrational: When a wetland is lost in a particular state, there will be particular individuals in the state who lived near the wetland and benefitted from it especially. Accordingly, the agencies' explanation for excluding this value—that "the majority [of] the affected households are likely to be non-local"[90]—is not a reasonable justification for disregarding local benefits entirely. Even assuming the agencies are correct that local residents likely constitute a minority, the additional valuation that those individuals place on degraded wetlands could still be substantial. Federal data sets showing the location of wetlands could be used to inform plausible estimates of such a valuation.[91] But even if it was difficult to assess the precise number of people that live near a wetland due to "incomplete knowledge" and "statistical variability" between wetlands, the agencies should have made "realistic[] and scientifically balanced" assumptions, and, if necessary, "present[ed] discrete alternative scenarios" about how forgone benefits estimates would vary assuming different numbers of local residents.[92]

Yet rather than analyzing "a scientifically-supported range of values that does not begin at zero,"[93] the agencies failed to perform any analysis of the local benefit and arbitrarily assumed away this cost by stipulating that no residents live locally to any wetlands that will be degraded as a result of the Replacement Rule. This arbitrary and erroneous assumption further undervalues the rule's costs.

iii. The Agencies Undervalue In-State Benefits by Misapplying Their Own Chosen Methodology

The agencies further undervalue the benefits that individuals derive from in-state wetlands with a mathematical trick. To value wetlands benefits, the agencies commissioned a study to calculate a per-acre value for wetlands protection. That study found that individuals place a greater value on each additional acre of wetlands as the total acreage of wetlands increases.[94] And given that effect, if the analysis assumes a smaller amount of total wetlands, the value placed on losing one acre of those wetlands will be smaller than if the analysis assumes a larger amount of total wetlands. In this way, the baseline acreage used in the analysis—that is, the number of wetlands acres in an area before the rule takes effect—can have a significant impact on the results.

Yet in selecting the baseline for their economic analysis, the agencies chose an unreasonably low baseline acreage of 10,000 per state.[95] The agencies assert that 10,000 acres is appropriate for the baseline because it was the median baseline acreage in the underlying studies that the agencies evaluated.[96] But most of those studies looked at wetland changes

The Chattahoochee River—a 430-mile long river along the Georgia-Alabama border that serves as a source of drinking water for roughly 4 million individuals in Georgia, Alabama, and Florida—is one of the many interstate rivers likely to be polluted as a result of these regulatory rollbacks. Yet the agencies irrationally assume that pollution originating in one state as a result of the rollbacks will not harm the residents of other states who enjoy the river and use it as a source of drinking water. In doing so, they ignore basic science and economics.

within a "given watershed or within a few counties."[97] And here, the agencies are using that baseline to assume that each state has only 10,000 total acres of wetlands. This is an unreasonably low number, given that many states have much larger wetlands and far more than 10,000 acres of wetlands total.[98] Alaska alone, in fact, has approximately 175 million acres of wetlands.[99]

By unreasonably assuming such a small baseline acreage, the agencies significantly and arbitrarily diminish the estimate of the benefit that individuals receive from the protection of wetlands within their own state.[100] This impact is also quite significant: According to Dr. Mullen, setting the baseline to a level that better reflects the baseline in the relevant studies increases the valuation of wetlands-related forgone benefits by more than $1.2 billion annually.[101] As mentioned above, correcting for this and the agencies' failure to account for interstate benefits, Dr. Mullen finds that the Replacement Rule produces over $1.6 billion in annual wetlands-related forgone benefits, vastly exceeding its associated compliance costs.[102]

iv. The Agencies Unreasonably Assume that States Will Protect the Waters Losing Federal Protection

The agencies' fourth major error relates to state gap-filling. The agencies presume that many states may "revise [their] current laws and regulations" to cover the waters losing federal protection in the Replacement Rule, and reduce their estimates of the rule's forgone benefits on this basis.[103] This not only devalues the harms of the Replacement Rule, but also makes the rule appear more cost-benefit justified because, under the agencies' analysis, as more and more states act to fill the regulatory gap, the cost savings outweigh the forgone benefits by a greater and greater proportion.[104]

But the assumption that states will fill the regulatory void is unreasonable for multiple reasons. For one, such an assumption violates federal guidance instructing EPA not to speculate about future rulemakings.[105] There are also three primary reasons to believe that most states will not fill the regulatory gap. First, states are unlikely to fill the gap because they have an incentive to under-protect waters when at least some harms of any increased water pollution will fall on residents of another state. This is known as an interstate environmental externality.[106] Because many waters are connected without regard to state borders, the benefits of protecting waters in one state may be enjoyed by residents of neighboring states. Economic theory predicts that, as a result, states are likely to under-protect the waters within their own jurisdiction.[107] In those circumstances, federal regulation provides a clear advantage over state action in regulating waters carrying pollution across state lines.[108]

Second, states are unlikely to fill the regulatory gap because state-by-state regulation can be very costly, while federal regulation enjoys economies of scale.[109] In fact, many states may lack the resources to effectively protect their own waters. For example, Michigan—one of just two states to assume administration of the Section 404 program—generated permit fees covering less than 20% of the program's cost.[110] As fifteen state attorneys general advised the agencies, filling the regulatory gap would require states to "commit a substantial amount of state money" or "impose extremely high permit application fees to recover those costs from the regulated community," either of which "would impose a substantial burden on the states."[111] These costs make it unlikely that states would be able to step into the breach, even if they wanted to do so.[112]

And third, several states have already made clear that they are uninterested in expanding water quality protections at the state level. Indeed, although many states and organizations strongly support the Clean Water Rule,[113] other states oppose the rule. In fact, thirty-two states took the agencies to court in an attempt to stop the modest increase of federal jurisdiction resulting from the Clean Water Rule in 2015. Yet the agencies now assume that fourteen of those same states

will expand their own regulatory programs to protect the very types of waters that would have been regulated under that rule.[114] There is little basis for this implausible assumption.

The agencies briefly acknowledge the fact that cross-border externalities and intra-state dynamics often "yield inefficiently weak regulations" at the state level.[115] And as the agencies' own analysis shows, doing away with the unreasonable assumption that states will fill the gap demonstrates that the cost savings of the rollback may not outweigh the forgone benefits.[116] Given this, the agencies' decision to interpret the Clean Water Act in such a narrow way in the Replacement Rule can hardly be justified as reasonable.

* * *

Ultimately, these four key errors—disregarding benefits that cross state lines, ignoring the unique local benefits that wetlands provide, artificially undervaluing in-state benefits, and making inappropriate assumptions about state gap-filling—serve to drastically lower the forgone wetlands-related benefits of the Replacement Rule. As those are the only benefits that the agencies monetized, such errors help make the Replacement Rule appear cost-benefit justified. But as outside experts have concluded, a proper monetization of the costs and benefits of the Replacement Rule regarding wetlands services shows that the rule's environmental costs, in the form of forgone benefits, drastically outweigh the Replacement Rule's cost savings. The agencies' contrary finding ignores key data and is premised on irrational and arbitrary assumptions.

b. The Case Studies Undervalue the Harms from Wetlands Degradation Through a Series of Methodological Errors

In addition to their nationwide analysis, the agencies also estimate the costs and benefits of the Replacement Rule through three "case study" watersheds that purport to present the rule's impacts in greater detail.[117] But these case studies suffer from many of the same problems as the nationwide analysis[118] and they offer little clarity on the rule's impacts. Relying on the same alleged data limitations that rendered their national-impacts analysis so devoid of quantification, the agencies once again only attempt to monetize the rule's harms in each case study region with respect to Section 404 wetlands mitigation, with most other impacts listed as "not quantified," "not monetized," or "N/A."[119] As Dr. Kling put it, this case study analysis "begins with [the agencies'] premise that there is inadequate data," and "fills 100+ pages to come to the conclusion that they cannot say anything."[120]

Moreover, while the agencies do monetize some of the impacts of wetlands degradation under the Section 404 program and conclude that the cost savings in the case-study regions outweigh the forgone benefits, that conclusion rests on an undervaluation of forgone benefits. The agencies estimate forgone benefits in the case-study regions using just a single economic study: Blomquist and Whitehead (1998).[121] But one of that study's co-authors, John C. Whitehead, analyzed the proposed Replacement Rule and explained in a report submitted to the record that the agencies were misapplying his work, and that a proper application of his paper would reveal that the agencies were ignoring most of the wetlands-related harms in the case studies.

For one, as Dr. Whitehead advised the agencies, the agencies inappropriately use the median valuation of wetlands benefits that the study reported rather than the mean, which as Dr. Whitehead explained, "is the most conceptually appropriate measure of willingness to pay for use in benefit-cost analysis."[122] This is because the mean represents the average "aggregated over the population."[123] In contrast, the median is just the middle point in the range of estimates.

In circumstances such as this one where "the willingness to pay distribution is skewed right," (meaning that people to the right of the median are willing to pay more, relative to the median, than the people to the left of the median), the median will underestimate the harms of the regulatory rollback.[124] And the difference here is stark. The mean value here is "at least[] 3.25 times larger than the published median willingness to pay estimates."[125] In other words, the agencies undervalue the benefits that individuals derive from wetlands under this study by more than 75%. Additionally, as with their nationwide analysis, the agencies apply Dr. Whitehead's study only to estimate the harms that residents of nearby counties suffer as a result of wetlands degradation, disregarding the wetlands' substantial downstream benefits beyond those restricted boundaries.[126]

The agencies also apply an improperly narrow timeframe to their case-study analysis, assuming without justification that individuals only suffer the harms of wetlands degradation in the year that the actual degradation takes place.[127] This is clearly erroneous.[128] As Blomquist and Whitehead reported in their study, individuals are harmed from the loss of a wetland not only in the year of the actual loss, but also "each year" subsequently.[129] This makes sense, since the downstream benefits of wetlands loss—such as degradation of wildlife habitats and loss of ecosystem services—extend indefinitely. By misapplying that study—unjustifiably assuming that harm from wetlands loss is a one-time loss rather than cumulative—the agencies minimize the reported costs of their case studies and ignore the long-term benefits that wetlands provide.[130]

> The agencies' case studies undervalue the harms from wetlands degradation by approximately 98%.

Applying recommended discount rates of 3 and 7 percent,[131] we find that this error reduces the calculation of forgone benefits by at least 15 times. Properly correcting for this error shifts the analysis and shows that the wetlands impacts in the case-study regions are likely net costly.[132] Additionally, these multiple errors in the case-study analysis build on top of one another. So by devaluing the harms of wetlands 3.25-fold by inappropriately applying the median valuation—and then another 15 times by failing to account for cumulative impacts—the agencies are undervaluing the harms from wetlands degradation by nearly 98%.[133] In other words, the true value of wetlands loss—as reflected in a proper application of Blomquist & Whitehead (1998)—is almost 50 times what the agencies ascribe.

Finally, the agencies further devalue the harms in their case studies by assuming that all forgone mitigation projects would have had a 1:1 ratio of compensatory mitigation—meaning that the mitigation acres required would have been equal to the acres degraded.[134] But this is the minimum recommended ratio for wetlands that are "not rare or unique,"[135] and as the agencies explained in the Clean Water Rule, the "average amount of mitigation required" is "two acres … for every acre of impact."[136] By now assuming the lowest possible compensatory mitigation ratio—half the ratio of an average project—the agencies minimize forgone mitigation acres and thereby further devalue forgone benefits in the case studies.[137]

In sum, the three case studies fare no better at projecting the rule's harms than the nationwide analysis, as the agencies once again obscure the vast majority of the rule's wetlands-related costs and provide erroneous results. By "inconsistently and opportunistically fram[ing] the costs and benefits of the rule" at every turn, the agencies disregard bedrock principles of rational decisionmaking and fail to justify the harms that the Replacement Rule will cause.[138]

B. The Agencies' Economic Analysis for the Repeal Rule ("Step One" Rule) Suffers from Similar Flaws as the Replacement Rule

The agencies' economic analysis for the Repeal Rule is just as flawed as their analysis of the Replacement Rule. In their economic analysis, the agencies project that the Repeal Rule will result in up to $115–$174 million in cost savings and just $69–$79 million in forgone benefits.[139] But the agencies' finding that the rule is cost-benefit justified suffers from virtually the same analytic insufficiencies as their conclusion that the Replacement Rule would be net beneficial.

First, the agencies improperly present the rule as cost-benefit justified when, in fact, they monetize all of the avoided costs of the Repeal Rule while leaving many important categories of forgone benefits unquantified. Forgone benefits from rollbacks under Section 311 (the Clean Water Act provision that provides important safeguards to protect against oil spills) and under Section 404 with regard to streams, for instance, are not quantified.[140]

In addition, just like with the Replacement Rule, the agencies concede that there are circumstances where the cost-benefit analysis would flip and the cost savings might not outweigh the forgone benefits.[141] In such circumstances, when important cost categories are not quantified, "the most efficient alternative will not necessarily be the one with the largest quantified and monetized net-benefit estimate," but instead may be a regulatory option that properly accounts for these unmonetized effects.[142] In addition, in these circumstances, the agencies have a duty to ensure that their chosen assumptions are more reasonable than alternate assumptions.[143] The agencies ignore this guidance, however, resting on unsupported suppositions about how states will respond to the rollback[144] and concluding that the Repeal Rule is the "most … efficient" regulatory option without considering the significance of these important unquantified harms.[145]

Second, the largest impact that the agencies do monetize comes once again from deregulation of wetlands under the Section 404 dredge/fill program,[146] but the agencies' analysis here suffers from the same flaws as their monetization in the Replacement Rule and drastically undervalues the true costs of rolling back wetlands protections. As with the Replacement Rule,[147] the agencies irrationally disregard all benefits of wetlands protection for out-of-state residents,[148] apparently disregard the specific localized benefits that wetlands provide,[149] undervalue the benefits that in-state residents receive,[150] and make unjustified and improper assumptions about state gap-filling.[151]

As Dr. Mullen found, properly accounting for both the in-state and out-of-state benefits of wetlands protection yields forgone benefits estimates of as much as $750 million annually—far above the cost savings that the agencies project from the Repeal Rule.[152] And once again, the agencies further obscure the forgone benefits of the Repeal Rule by assuming that many states would boost their own regulatory enforcement—an assumption made all the more fanciful by the fact that many of the states that would supposedly fill the regulatory gap sued the agencies to enjoin the Clean Water Rule.[153]

When an agency issues a regulation, including a repeal of an existing regulation, it must "examine the relevant data" and consider "important aspect[s] of the problem."[154] By failing to meaningfully consider the forgone benefits of repealing and replacing the Clean Water Rule—a rule that was premised on the important benefits that would result from protecting additional waters—the agencies violate this obligation and fail to engage in reasoned decisionmaking.

C. *The Agencies Substantially Overestimate the Compliance-Cost Savings of Both Rules*

The continual undercounting of the wetlands-related harms of the Repeal Rule and the Replacement Rule is especially egregious because, when projecting the rule's cost savings for affected industry, the agencies take the opposite approach, inflating projected cost savings far beyond the agencies' original estimates of compliance costs in the Clean Water Rule. This overstatement of cost savings makes the Repeal and Replacement Rules appear further cost-benefit justified.

In the Clean Water Rule, the agencies used available agency data to catalogue wetland mitigation costs.[155] Through this method, the agencies projected that mitigating an additional 3,781 new acres of wetlands annually—the rule's projected impact under the Section 404 program—would cost industry between $89–$249 million per year.[156] This comes out to $24–$66 thousand in compliance cost for each additional acre of wetlands mitigation.

But in the two rollbacks, the agencies' per-acre mitigation cost estimate has become sharply higher. In the Repeal Rule, the agencies project a per-acre mitigation-cost savings of $51–$142 thousand—more than double the low- and high-end per-acre estimates from the Clean Water Rule.[157] These numbers then jump even higher in the Replacement Rule—issued only a few months after the Repeal Rule—with per-acre mitigation-cost estimates for the national analysis of $146–$327 thousand.[158] All in all, the high-end mitigation-cost estimates from the Replacement Rule are nearly five times higher than from the Clean Water Rule, with the low-end estimates more than six times higher. The agencies offer little explanation for this change, explaining generically that estimates were generated by "examining published studies and survey results, making phone inquiries to Corps Districts and mitigation banks, and researching web sites" that produced "a range of values for each state."[159] The agencies cite to their 2015 analysis[160] but do not explain why their cost estimates have now changed so drastically.[161]

Indeed, there is no reason to believe that such a significant revision is justified.[162] As the Supreme Court has explained, agencies must provide a "reasoned explanation" before "disregarding facts and circumstances that underlay or were engendered by the prior policy."[163] Here, especially, the agencies' inflated cost-savings estimates are significant and by themselves make the rules appear cost-benefit justified: Had the agencies used their per-acre cost-savings estimates from the Clean Water Rule—putting aside all of their errors with valuing forgone benefits—they would have found the rules to be net costly.

Figure 2. Cost-Savings Projections

The agencies substantially increased their valuation of cost savings on a per-acre basis from the Clean Water Rule in 2015, making the Replacement Rule's impacts on wetlands under the Section 404 program appear cost-benefit justified. But as shown here, these impacts are net costly assuming the same per-acre estimates that the agencies used in 2015 (adjusted for inflation).

	Low Estimate (millions 2018$)	High Estimate (millions 2018$)
Permit Cost Savings	$27.2	$27.2
Mitigation Cost Savings	~~$217.2~~ $37.7	~~$485.5~~ $103.8
Total	~~$244.5~~ $64.9	~~$512.7~~ $131.0
Mean estimate of forgone benefits	$173.2	

** Adapted from Replacement Rule Economic Analysis tbls. ES-7 & ES-8. All numbers are presented for Scenario 0.*

Conclusion

In the Replacement Rule and Repeal Rule, the agencies ignore key data and make irrational assumptions that continually serve to minimize the substantial environmental harms that will result. This stands in contrast to the agencies' work in analyzing the Clean Water Rule in 2015, when they carefully estimated the rule's regulatory impacts and determined that, due to the interconnectivity of waters and the downstream impacts from additional protections, the benefits of the rule would greatly exceed its compliance costs. In contrast to that work, here the agencies' analytic failures are likely to pose major challenges for the agencies in litigation over the legality of the Repeal Rule and Replacement Rule.

Endnotes

[1] 33 U.S.C. §§ 1311(a), 1362(12)(A) (prohibiting the unauthorized "discharge of a pollutant" into "navigable waters"); *id.* § 1362(7) (defining "navigable waters," in pertinent part, as "the waters of the United States").

[2] Clean Water Rule: Definition of "Waters of the United States," 80 Fed. Reg. 37,054 (June 29, 2015) ("Clean Water Rule").

[3] *See* EPA, Connectivity of Streams and Wetlands to Downstream Waters: A Review and Synthesis of the Scientific Evidence ES-1 to ES-6 (2015), *available at* https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=296414 ("Connectivity Report").

[4] EPA and Army Corps of Engineers, Economic Analysis of the EPA-Army Clean Water Rule, at x–xi (2015), *available at* https://www.epa.gov/sites/production/files/2015-06/documents/508-final_clean_water_rule_economic_analysis_5-20-15.pdf ("Clean Water Rule RIA").

[5] The Navigable Waters Protection Rule: Definition of "Waters of the United States," 85 Fed. Reg. 22,250 (Apr. 21, 2020) ("Replacement Rule").

[6] Definition of "Waters of the United States"—Recodification of Pre-Existing Rules, 84 Fed. Reg. 56,626 (Oct. 22, 2019) ("Repeal Rule").

[7] Replacement Rule, 85 Fed. Reg. at 22,260.

[8] *See, e.g.*, Repeal Rule, 84 Fed. Reg. at 56,626; Replacement Rule, 85 Fed. Reg. at 22,271–72.

[9] Replacement Rule, 85 Fed. Reg. at 22,270.

[10] *See* EPA and Army Corps of Engineers, Economic Analysis for the Final Rule: Definition of "Waters of the United States"—Recodification of Pre-Existing Rules xviii–xxiii (2019) ("Repeal Rule RIA"), *available at* https://www.epa.gov/nwpr/wotus-step-one-repeal; Economic Analysis for the Navigable Waters Protection Rule: Definition of "Waters of the United States" xii–xiii (2020) ("Replacement Rule RIA"), *available at* https://www.epa.gov/nwpr/navigable-waters-protection-rule-supporting-documents.

[11] *See* Replacement Rule RIA at xxii–xxiii (showing that the estimated compliance-cost savings fall within the 90% confidence range of estimated forgone benefits under all scenarios and summarizing several possible scenarios where the cost savings do not outweigh the forgone benefits); Repeal Rule RIA at 194 (showing that in a scenario where states are not filling the gap, the agencies' estimate that annual avoided costs for the wetlands mitigation program are $58.9 million to $164.1 million, while annual forgone benefits are $106 million).

[12] Connectivity Report at ES-2.

[13] Complaint ¶ 31, *South Carolina Coastal Conservation League v. EPA*, No. 19-cv-03006 (D. S.C. Oct. 23, 2019), ECF No. 1.

[14] *See* Attorneys General of New York et al., Comment Letter on Revised Definition of "Waters of the United States" 20 (Apr. 15, 2019), *available at* https://www.regulations.gov/document?D=EPA-HQ-OW-2018-0149-5467.

[15] 33 U.S.C. § 1251(a).

[16] *Rapanos v. United States*, 547 U.S. 715, 759, 769 (2006) (Kennedy, J., concurring) (internal quotation marks omitted).

[17] *Id.* at 767 (Kennedy, J., concurring).

[18] *Id.* at 779, 780 (Kennedy, J., concurring); see also *County of Maui v. Hawaii Wildlife Fund*, --- S.Ct. ---, 2020 WL 1941966, at *11 (Apr. 23, 2020) (holding that a discharge to groundwater is covered by the Clean Water Act "if that discharge is the functional equivalent of a direct discharge from the point source into navigable waters").

[19] *See* Clean Water Rule, 80 Fed. Reg. at 37,057 (explaining that the significant nexus standard had been "supported by all nine of the United States Courts of Appeals that [had] considered the issue").

[20] 33 U.S.C. § 1251(a).

[21] Replacement Rule, 85 Fed. Reg. at 22,261.

[22] Clean Water Rule, 80 Fed. Reg. at 37,056.

[23] *See, e.g.*, Connectivity Report at 4-1 to 4-45 (describing impacts of affected wetlands).

[24] *See* Repeal Rule, 84 Fed. Reg. at 56,662 ("The agencies note that the final decision to repeal the 2015 Rule and recodify the pre-existing regulations in this rulemaking is not based on the information in the agencies' economic analysis."); Replacement Rule, 85 Fed. Reg. at 22,332 ("The agencies note that the final rule is not based on the information in the agencies' economic analysis or resource and programmatic assessment. … This information was not used to establish the new regulatory text for the definition of 'waters of the United States.'" (citation omitted)).

[25] *See, e.g.*, Repeal Rule, 84 Fed. Reg. at 56,665 (citing *National Ass'n of Home Builders v. E.P.A.*, 682 F.3d 1032, 1040 (D.C. Cir. 2012)).

[26] *Id.*; *see also* Replacement Rule, 85 Fed. Reg. at 22,332.

[27] *See, e.g.*, Repeal Rule, 84 Fed. Reg. at 56,664 ("With this final rule, the agencies *exercise their discretion and policy judgment and repeal* the 2015 Rule permanently and in its entirety because the agencies believe that this approach is the most appropriate means to remedy the deficiencies of the 2015 Rule identified above, address the extensive litigation surrounding the 2015 Rule, and restore a regulatory process that

has been in place for years." (emphasis added)); Replacement Rule, 85 Fed. Reg. at 22,252 ("This definition strikes a reasonable and appropriate balance between Federal and State waters and carries out Congress' overall objective to restore and maintain the integrity of the nation's waters in a manner that preserves the traditional sovereignty of States over their own land and water resources."); *id.* at 22,277 ("The final rule therefore is also based on … the reasoned policy choices of the … agencies[.])."

[28] *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983).

[29] *See Humane Soc'y of United States v. Zinke*, 865 F.3d 585, 606 (D.C. Cir. 2017) (vacating rule as arbitrary and capricious after agency ignored a "salient factor").

[30] *See, e.g.*, Repeal Rule, 84 Fed. Reg. at 56,663–64 (explaining that the economic analysis provides "some helpful information about" the Clean Water Rule and Repeal Rule); Replacement Rule, 85 Fed. Reg. at 22,335 (finding that the Replacement Rule is "expected to result in net cost savings for all entities affected").

[31] Repeal Rule, 84 Fed. Reg. at 56,661.

[32] *Id.* at 56,663.

[33] *Id.* at 56,664.

[34] Replacement Rule, 85 Fed. Reg. at 22,269. The agencies also report in the Replacement Rule's preamble that the rule will result in cost savings and net benefits. *Id.* at 22,334.

[35] *See Ctr. for Biological Diversity v. NHTSA*, 538 F.3d 1172, 1198 (9th Cir. 2008).

[36] State Farm, 463 U.S. at 43.

[37] *See* Office of Mgmt. & Budget, Circular A-4 on Regulatory Analysis 14 (2003), *available at* https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A4/a-4.pdf ("Circular A-4"); *see also* EPA, Guidelines for Preparing Economic Analyses 5-1 (2010) ("Guidelines") (a baseline is "the best assessment of the world absent the proposed regulation or policy action").

[38] *See Air All. Houston v. EPA*, 906 F.3d 1049, 1068 (D.C. Cir. 2018) ("[T]he baseline for measuring the impact of a change or rescission of a final rule is the requirements of the rule itself, not the world as it would have been had the rule never been promulgated.").

[39] *Encino Motorcars, LLC v. Navarro*, 136 S. Ct. 2117, 2126 (2016); *FCC v. Fox Television Stations, Inc.*, 556 U.S. 502, 515 (2009).

[40] Circular A-4 at 17 ("You should clearly set out the basic assumptions, methods, and data underlying the analysis and discuss the uncertainties associated with the estimates. A qualified third party reading the analysis should be able to understand the basic elements of your analysis and the way in which you developed your estimates.").

[41] *See* Jeffrey Mullen, Ph.D., Final Review of the 2018 EPA Economic Analysis for the Proposed Revised Definition of Waters of the United States 9, *available at* https://www.regulations.gov/document?D=EPA-HQ-OW-2018-0149-9717, (Exhibit D) ("Mullen Report") (describing a lack of transparency in the proposed Replacement Rule). Dr. Mullen prepared his analysis for the Southern Environmental Law Center.

[42] Replacement Rule RIA at 105.

[43] *See* Resource and Programmatic Assessment for the Navigable Waters Protection Rule: Definition of "Waters of the United States" 27 (2020) (percentage of wetlands in sample of previously-jurisdictional waters that do not abut traditionally navigable waters), *available at* https://www.epa.gov/nwpr/navigable-waters-protection-rule-step-two-revise ("Resource and Programmatic Assessment").

[44] Replacement Rule RIA at 156 (categorizing 85% of streams in Rio Grande River Basin as ephemeral).

[45] *Id.* at 48.

[46] *See, e.g.*, *id.* at xviii (listing most forgone benefits as "not monetized" and failing to account for these harms in the total forgone-benefits assessment).

[47] *See id.* at xxii–xxiii (summarizing several possible scenarios where the cost savings do not outweigh the forgone benefits and showing that the estimated compliance-cost savings fall within the 90% confidence range of estimated forgone benefits under all scenarios).

[48] *See* Circular A-4 at 26–27. The Trump administration has instructed agencies to follow *Circular A-4*. *See* Office of Mgmt. & Budget, Memorandum: Implementing Executive Order 13,771, Titled "Reducing Regulation and Controlling Regulatory Costs" 9 (Apr. 5, 2017), *available at* https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/memoranda/2017/M-17-21-OMB.pdf.

[49] Circular A-4 at 27; *see also id.* at 26 (explaining that "[s]ound quantitative estimates of benefits and costs, where feasible, are preferable to qualitative descriptions").

[50] *Id.* at 38.

[51] *Id.* at 42 ("If benefit or cost estimates depend heavily on certain assumptions, you should make those assumptions explicit and carry out sensitivity analyses using plausible alternative assumptions. If the value of net benefits changes from positive to negative (or vice versa) . . . you should conduct further analysis to determine which of the alternative assumptions is more appropriate.").

[52] Clean Water Rule RIA at v (recognizing "uncertainty surrounding [the agencies'] estimates").

[53] *Id.* at 9.

[54] *Id.* at 12.

[55] *See id.* at 15–57.

[56] *See id.* at 54 (quantifying impacts on pollution of tributaries from stormwater and animal-feeding facilities, but not stream mitigation under Section 404, pesticide permit implementation, administration of the Section 401 program, and compliance with the Section 311 program).

[57] *Id.* at x–xi.

[58] *See, e.g.*, Replacement Rule RIA at xiv, xxii, 16, 19, 48, 52, 60, 97, 99, 120, 127, 164, 171.

[59] Dr. Kling submitted a report analyzing the proposed rule on behalf of the Office of the New York State Attorney General. *See* Catherine L. Kling, Ph.D. Expert Review of the Economic Analysis of the Proposed Revised Definition of "Waters of the United States" 3–4 (Apr. 15, 2019), *available at* https://www.regulations.gov/document?D=EPA-HQ-OW-2018-0149-5467 (Attachment B) ("Kling Report").

[60] *See* Connectivity Report at 9, 47; Roger Meyer & Andrew Robertson, Clean Water Rule Spatial Analysis 11–12 (Jan. 16, 2019), *available at* https://www.regulations.gov/document?D=EPA-HQ-OW-2018-0149-7673 (Attachment 5).

[61] *See* Resource and Programmatic Assessment at 19–34.

[62] *See* Replacement Rule RIA at 96–104.

[63] *Id.* at 172 (explaining how "[i]nputs … were derived" for nationwide assessment).

[64] Ariel Wittenberg & Kevin Bogardus, *EPA Falsely Claims 'No Data' on Waters in WOTUS Rule*, E&E News (Dec. 11, 2018), *available at* https://www.eenews.net/stories/1060109323 (reporting that an internal agency slideshow showed the percentages of streams and wetlands nationwide that would be categorically excluded from federal protection).

[65] Resource and Programmatic Assessment at 41 n.56.

[66] *See* Ctr. for Biological Diversity, 538 F.3d at 1200.

[67] *See* Replacement Rule RIA at xxii–xxiii (summarizing several possible scenarios where the cost savings do not outweigh the forgone benefits and showing that the estimated compliance-cost savings fall within the 90% confidence range of estimated forgone benefits under all scenarios).

[68] *Pub. Citizen v. Fed. Motor Carrier Safety Admin.*, 374 F.3d 1209, 1219, 1221 (D.C. Cir. 2004) (emphasis omitted).

[69] *See Michigan v. EPA*, 135 S. Ct. 2699, 2707 (2015).

[70] *See Sorenson Communs., Inc. v. F.C.C.*, 755 F.3d 702, 708 (D.C. Cir. 2014) (internal quotation marks omitted).

[71] *See* 33 U.S.C. § 1251.

[72] *Compare* Replacement Rule RIA at 220 (estimated compliance-cost savings under Scenario 3) *with id.* at 225 (estimated forgone benefits under Scenario 3).

[73] Mullen Report at 32 (estimating forgone benefits under Scenario 0).

[74] The agencies make additional errors—further diminishing their assessment of forgone benefits—that we do not focus on in this report. For instance, while the agencies briefly acknowledge that "[p]rojects may shift away from areas containing waters that require 404 permits to areas with waters that would not be jurisdictional under the [Replacement R]ule," *id.* at 71, they do not factor this effect into their cost assessment. Additionally, the agencies restrict their analysis to impacts on compensatory mitigation, *id.* at 165, disregarding reductions in on-site prevention that are also likely to result from the rule.

[75] Replacement Rule RIA at 207 (explaining that "the agencies estimate changes in benefits at the state level, assuming [willingness to pay] for out of state changes is zero").

[76] *See* Connectivity Report at 4-1 to 4-45.

[77] *Id.* at 4-1 to 4-2.

[78] *See* Kling Report at 6; Mullen Report at 14; Dr. John C. Whitehead, Comments on the Economic Analysis for the Proposed Revised Definition of 'Waters of the United States 10–11, *available at* https://www.regulations.gov/document?D=EPA-HQ-OW-2018-0149-9717 (Exhibit C) ("Whitehead Report"). Dr. Whitehead prepared his report on the proposed Replacement Rule for the Southern Environmental Law Center. *See* generally Whitehead Report at 13–14.

[79] Whitehead Report at 10 (citing John B. Loomis, *Vertically Summing Public Good Demand Curves: An Empirical Comparison of Economic Versus Political Jurisdictions*, 76 Land Econ. 312 (2000)).

[80] *Sierra Club v. Dep't of the Interior*, 899 F.3d 260, 293 (4th Cir. 2018) (internal quotation marks omitted).

[81] *Ctr. for Biological Diversity*, 538 F.3d at 1200 (agency's refusal to place a value on carbon emissions reduction was arbitrary and capricious).

[82] Replacement Rule RIA at 226.

[83] Kling Report at 6 (citing Ronald J. Sutherland & Richard G. Walsh, *Effect of Distance on the Preservation Value of Water Quality*, 61 Land Econ. 281 (1985)).

[84] An Evaluation of the Revised Definition of "Waters of the United States," by Peter Howard, PhD, Institute for Policy Integrity at NYU School of Law and Jeffrey Shrader, PhD, School of International and Public Affairs (SIPA) at Columbia University 11 (Apr. 11, 2019), *available at* https://www.regulations.gov/document?D=EPA-HQ-OW-2018-0149-5272 ("Howard & Shrader Expert Report").

[85] Replacement Rule RIA at 227.

[86] Mullen Report at 31 (estimating forgone wetlands benefits for proposed Replacement Rule under Scenario 0 at $419.5 million, assuming proper out-of-state benefits and holding constant agencies' other assumptions); *see also* Whitehead Report at 10 (finding that proper geographic scope would increase agencies' valuation of forgone benefits more than five-fold).

[87] Connectivity Report at 4-1 to 4-2.

[88] Replacement Rule RIA at 209 (reporting "local" variable as 3.130, far greater than the value of any other variable from the commissioned analysis); *see also* Klaus Moeltner, et al., *Waters of the United States: Upgrading Wetland Valuation Via Benefit Transfer*, 164 Ecological Econ. 1, 10 (2019) ("Moeltner Study") (acknowledging that "local wetlands are valued considerably higher" than non-local wetlands, by "a factor of over seven").

[89] EPA and Army Corps of Engineers, The Navigable Waters Protection Rule - Public Comment Summary Document, Topic 11: Economic Analysis and Resource and Programmatic Assessment 80 (Apr. 21, 2020), *available at* https://www.regulations.gov/document?D=EPA-HQ-OW-2018-0149-11574 ("Response to Comments").

[90] *Id.*

[91] *See supra* note 60 and accompanying text.

[92] Circular A-4 at 39.

[93] *See Ctr. for Biological Diversity*, 538 F.3d at 1200.

[94] Moeltner Study at 9.

[95] Replacement Rule RIA at 73.

[96] Response to Comments at 81.

[97] *Id.*

[98] *See* U.S. Fish & Wildlife Service, Report to Congress, Status and Trends of Wetlands in the Conterminous United States 2004 to 2009, *available at* https://www.fws.gov/wetlands/documents/Status-and-Trends-of-Wetlands-in-the-Conterminous-United-States-2004-to-2009.pdf.

[99] Alaska Dep't of Fish and Game, Featured Species: Associated Wetlands Habitats, *available at* https://www.adfg.alaska.gov/index.cfm?adfg=wetlands.main (reporting that wetlands occupy 43.3% of the state's 403,247,700 acres).

[100] Howard & Shrader Expert Report at 9–10.

[101] Mullen Report at 32 (estimating forgone benefits under Scenario 0).

[102] *Id.*

[103] Replacement Rule RIA at 27.

[104] *See id.* at xxiii (explaining that "high estimates of forgone benefits based on the 95th percentile of the WTP for wetlands are greater than the lower bound of estimated cost savings under Scenarios 1 through 3," whereas "[u]nder Scenario 0, high estimates of forgone benefits are greater than cost estimates under both low and high cost assumptions").

[105] Guidelines at 5-13 (warning against anticipating rules unless they are "imminent or reasonably anticipated with a high degree of certainty").

[106] *See* Richard L. Revesz, *Federalism and Interstate Environmental Externalities*, 144 U. Pa. L. Rev. 2341, 2343 (1996).

[107] Institute for Policy Integrity, Comment Letter to the EPA and Army Corps of Engineers on the Revised Definition of "Waters of the United States" 10–12 (Apr. 15, 2019), https://www.regulations.gov/document?D=EPA-HQ-OW-2018-0149-6898 ("Policy Integrity Comments").

[108] *See, e.g.*, David A. Dana, Essay, One Green America: Continuities and Discontinuities in Environmental Federalism in the United States, 24 Fordham Envtl. L. Rev. 103, 105 (2013) ("The emissions of pollutants crossing state boundaries or polluted water travelling downstream is the paradigmatic case on which there is the broadest normative agreement for a leading role for federal environmental law and governance. Indeed, obvious, readily identifiable cross-boundary transport of indisputably harmful pollutants via water and air is an area where even those theorists and commentators who are highly critical of the federalization of environmental governance see an appropriate role for the federal government.").

[109] Policy Integrity Comments at 12–13.

[110] Attorneys General of New York et al., Comment Letter on Revised Definition of "Waters of the United States" A-12 (Apr. 15, 2019), *available at* https://www.regulations.gov/document?D=EPA-HQ-OW-2018-0149-5467.

[111] *Id.*

[112] *See* generally Inst. for Policy Integrity, Irreplaceable: Why States Can't and Won't Make Up for Inadequate Federal Enforcement of Environmental Laws (2017), *available at* https://policyintegrity.org/files/media/EPA_Enforcement_June2017.pdf.

[113] *See, e.g.*, Complaint, *New York v. Wheeler*, No. 19-cv-11673 (S.D.N.Y.) (filed Dec. 20, 2019) (lawsuit brought by fourteen states and the District of Columbia and City of New York challenging the repeal of the Clean Water Rule).

[114] *Compare* Replacement Rule, 85 Fed. Reg. at 22,258 & n.15 *with* Replacement Rule RIA at 38–42 (assuming that numerous states will "change state programs to provide some regulatory coverage of waters that would no longer be 'waters of the United States'").

[115] Replacement Rule RIA at 35.

[116] *Id.* at xxiii (explaining that the high estimate of forgone benefits outweighs both the low and high estimate of cost savings under scenario 0, where states are not assumed to fill the gap).

[117] *See* Replacement Rule RIA at xi (explaining that "a qualitative analysis and a series of case studies, where waters potentially could be assessed on a smaller scale in specific locations" provides "the best available alternative for applied empirical work estimating the potential benefits and costs of this final rule").

[118] Just like with the nationwide analysis, the case studies rely on inappropriate assumptions about state gap-filling, *see, e.g.*, *id.* at xx–xxi, and falsely assume that only residents in-state and in certain neighboring counties are harmed by wetlands degradation, *id.* at 121.

[119] *Id.* at xviii–xix.

[120] Kling Report at 9; *see also id.* at 10 (explaining that the agencies "effectively attribute a value of zero" to most of the rule's jurisdictional impacts).

[121] Replacement Rule RIA at 121 ("To estimate the forgone benefit value of lost mitigation acres, the agencies used a benefit transfer value from Blomquist and Whitehead (1998).").

[122] Whitehead Report at 13–14. *See also* Howard & Shrader Expert Report at 10 (explaining that selecting a median value for a cost-benefit analysis is generally "not an appropriate choice").

[123] Whitehead Report at 6.

[124] *Id.*; *see also* Howard & Shrader Expert Report at 10 (explaining that selecting a median value for a cost-benefit analysis is generally "not an appropriate choice").

[125] Whitehead Report at 13–14.

[126] Replacement Rule RIA at 167 (explaining that the case studies limited forgone benefits to "households in the state where wetland losses occur and households in the counties adjacent to the affected resources that reside in the neighboring state"); Kling Report at 10 (critiquing the agencies' approach as too narrow).

[127] *See, e.g.*, Replacement Rule RIA at 121 (explaining that the agencies "estimated annual forgone benefits by multiplying per acre [willingness to pay] estimates by the total annual number of impact acres" (emphasis added)).

[128] *See* Jeffrey D. Mullen, A Comparison of the 2019 EPA Economic Analysis for the Proposed Revised Definition of "Waters of the United States" and the 2020 EPA Economic Analysis for the Final WOTUS Rule 3 (Mar. 2, 2020) (on file with Institute for Policy Integrity) ("Mullen Supplemental Review") (reporting that "foregone benefits of the [Replacement] Rule change should reflect the *cumulative* loss of wetlands over the period of analysis," and the agencies' failure to account for these cumulative impacts in their case studies is a "potentially fatal flaw").

[129] *See* Glenn C. Blomquist & John C. Whitehead, *Resource Quality Information and Validity of Willingness to Pay in Contingent Valuation*, 20 Res. & Energy Econ. 179, 186 n.4 (1998).

[130] At bare minimum, according to data provided by the agencies, correcting for this error would increase the estimate of wetlands degradation by another 3.4 times. *See* Moeltner Study at 8 (reporting that "hypothetical contributions collected via a single payment are, on average 340% higher (exp(1.486)−1=3.4), than for funding scenarios that stipulate recurring annual payments"); Replacement Rule RIA at 210 (adopting this finding through lumpsum mean of 1.486). But the agencies' finding that the value of cumulative benefits each year in perpetuity is only 3.4 times higher than the value of a one-time benefit of the same yearly amount implies a discount rate of approximately 30 percent—far higher than observed discount rates—and therefore vastly undervalues the difference between one-time and cumulative benefits.

[131] *See* Circular A-4 at 33 (recommending use of 3 and 7 percent discount rates for regulatory impact analysis).

[132] Mullen Supplemental Review at 3 (explaining that "the foregone benefits far exceed the avoided costs for Scenario 0 in the case studies" once this error is corrected).

[133] For this calculation, we multiplied 3.4 by 15 to determine that, through these two errors, the agencies are undervaluing wetlands benefits by at least 51 times. And since 1/51=0.019, this means that the reported valuation is less than 2% of the valuation that would have been produced with a proper application of Blomquist & Whitehead (1998).

[134] Replacement Rule RIA at 115.

[135] *Id.*

[136] Clean Water Rule RIA at 40. The agencies incorporated the 2:1 ratio into their Clean Water Rule analysis. *Id.*

[137] The agencies commit several other errors in the case studies that we do not focus on here. For instance, the agencies do not account for mitigation "required to compensate for temporary impacts," which they acknowledge accounts for up to "five percent of total impacts" in the studied areas. Replacement Rule RIA at 116. The agencies also disregard the likelihood that projects will shift toward non-covered waters to avoid federal permitting requirements, just as they do with the nationwide analysis. *See supra* note 73. Furthermore, the agencies ignore reductions in on-site prevention by restricting their analysis to compensatory mitigation. *See id.*

[138] *See Bus. Roundtable v. SCC*, 647 F.3d 1144, 1148–49 (D.C. Cir. 2011).

[139] Repeal Rule RIA at xii (Scenario 1).

[140] *Id.*

[141] Repeal Rule RIA at 194 (showing that in a scenario where states are not filling the gap, the agencies' estimate that annual avoided costs for the wetlands mitigation program are $58.9 million to $164.1 million, while annual forgone benefits are $106 million).

[142] Circular A-4 at 2.

[143] *Id.* at 42 ("If benefit or cost estimates depend heavily on certain assumptions, you should make those assumptions explicit and carry out sensitivity analysis using plausible alternative assumptions. If the value of net benefits changes from positive to negative (or vice versa) . . . you should conduct further analysis to determine which of the alternative assumptions is more appropriate.").

[144] Repeal Rule RIA at 51–52.

[145] Repeal Rule, 84 Fed. Reg. at 56,661.

[146] Repeal Rule RIA at xii.

[147] *See supra* Sec. A(2)(a).

[148] Repeal Rule RIA at 57 (explaining that wetlands valuation was "dropped to zero once outside of the state or region borders").

[149] Although the agencies do not explicitly explain their treatment of the local variable in the Repeal Rule's economic analysis, there is no reason to believe that they took a different approach from the Replacement Rule. Indeed, from the agencies' own description, it appears that they left this variable out of their analysis. As the agencies acknowledge in the Repeal Rule, the local variable is the most significant of all the variables in the Moeltner Study. Yet when the agencies list the variables that they then used to apply Moeltner's study and calculate state-level benefits, they do not include the local variable in the list variables that they used. *See* Repeal Rule RIA at 65–66.

[150] *Id.* at 65 (applying improper baseline acreage of 10,000).

[151] *Id.* at 24 (improperly speculating about state responses).

[152] Mullen Report at 20; *see also* Whitehead Report at 10 (using proper methodology for regional valuation to project $594 million in forgone benefits).

[153] Policy Integrity Comments at 14.

[154] *State Farm*, 463 U.S. at 43.

[155] Clean Water Rule RIA at 40–41.

[156] *Id.* at xi, 41. These values are in 2014$.

[157] Under Scenario 0, the agencies projected that the Repeal Rule will result in 1154.6 annual forgone mitigation acres with mitigation compliance-cost savings of $58.9–$164.1 million. Repeal Rule RIA at 69, 194. These values are in 2018$.

[158] Under Scenario 0, the agencies' estimate that the Replacement Rule will result in 1,485.62 annual forgone mitigation acres with mitigation compliance-cost savings of $217.2–485.5 million. Replacement Rule RIA at 174–75. These values are in 2018$.

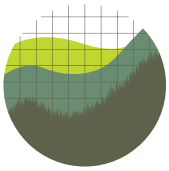
[159] *Id.* at 119.

[160] *Id.*

[161] In their Response to Comments, published with the Replacement Rule, the agencies simply explain that mitigation-cost estimates are based on "updated values, which is why the mitigation cost values are different than the ones used in the 2015 analysis." Response to Comments at 94. Citing "updated values" does nothing to explain why the numbers drastically changed.

[162] If anything, in fact, mitigation costs have likely decreased over time due to the expansion of mitigation banks and other market-driven approaches to Section 404 compliance. Policy Integrity Comments at 31–32.

[163] *Fox TV Stations*, 556 U.S. at 516.



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