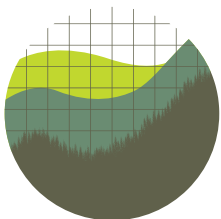




Muddying the Waters

*How the Trump administration is obscuring the
value of wetlands protection from the Clean Water Rule*



Institute for
Policy Integrity

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Executive Summary

In 2015, the Environmental Protection Agency and Army Corps of Engineers (the agencies, hereafter) revised the definition of the “waters of the United States” as part of the Clean Water Rule. This revised definition was expected to increase the wetland area subject to protection under the Clean Water Act. An economic analysis conducted by the agencies at the time showed that the benefits of the Rule were expected to substantially outweigh the costs.

Under the Trump administration, the agencies now propose to repeal the 2015 Clean Water Rule and have issued a revised economic analysis in support of that decision. In the new analysis, the agencies now claim that the majority of the benefits in the 2015 analysis cannot be quantified, making it appear that the Clean Water Rule is not cost-benefit justified. The agencies have violated many of their own requirements for conducting economic analysis to arrive at this conclusion, and a more comprehensive assessment of the evidence shows that the 2015 Clean Water Rule is still cost-benefit justified.

To arrive at the conclusion that the benefits of the Rule cannot be quantified, the agencies have selected evidence for their re-analysis based on an arbitrary cut-off based on the age of the study. Also, they have applied evidence-selection criteria inconsistently across the costs and benefits of the Rule. Currently, the agencies wrongly exclude relevant studies of the environmental benefits of wetlands based purely on their age. At the same time, the agencies continue to rely on old studies of compliance costs, which may actually be outdated or unreliable because of changing circumstances. For instance, the increasing prevalence of mitigation banks are, and will likely continue, reducing mitigation costs.

The agencies failed to take into account relevant evidence for quantifiable, forgone benefits from wetland protection, including recent estimates of positive economic value for isolated wetlands. This evidence shows that wetland value has likely increased over time, and incorporating these estimates into the 2015 analysis nearly doubles the estimated benefits of the Rule.

Evidence also shows that the 2015 Clean Water Rule would have additional value relative to state-level regulations. The agencies claim, without support, that state-level rules could render the Clean Water Rule unnecessary, but an analysis of existing state regulations shows that there are substantial additional benefits from a federal rule. The states that currently have no additional protection of wetlands relative to the Clean Water Act are also those states with the largest area of wetlands likely to be affected by the Rule. These states also have considerably lower wetland mitigation costs, raising the cost-effectiveness of the Rule relative to the 2015 analysis’ predictions.

Finally, the agencies should maintain the 2015 Clean Water Rule as the baseline for analysis. The agencies argue that repealing the Rule would “merely codify the legal status quo,” creating the misleading implication that the repeal of the Rule would have neither costs nor benefits. Shifting the baseline in this way goes against agency requirements and violates rules of rational decision-making. Repealing the 2015 Clean Water Rule would forgo substantial environmental and economic benefits.

Federal wetland protection in the United States

Wetlands provide substantial economic and ecological benefits including flood prevention, water purification, and wildlife habitat. Wetlands also function as part of an interconnected ecosystem, so improvements in wetland quantity and quality in one area of a watershed can bring benefits to other areas. This interconnectedness increases the importance of protecting wetlands throughout the landscape.¹ Despite their value, development and filling of wetlands has resulted in substantial losses over time. Estimates show that draining and development have resulted in the loss of more than half of the historical wetland area in the United States, with particularly severe losses from the 1950s to 1970s.²

The Clean Water Act plays a key role in protecting wetlands, and wetland loss has slowed substantially since its passage in 1972.³ The federal definition of the “waters of the United States” governs whether a body of water falls under the jurisdiction of the Clean Water Act. In 2015, the Environmental Protection Agency (“EPA”) and the Army Corps of Engineers (“Corps”) published the Clean Water Rule, which included a new definition of the “waters of the United States.” These agencies created the definition to clarify the extent of the Clean Water Act jurisdiction following a series of Supreme Court decisions in 2001 and 2006,⁴ and it was expected that the Rule would increase the wetland area that falls under the Act’s purview.⁵ The Clean Water Rule was finalized in 2015 but was stayed in October of that year by the U.S. Court of Appeals for the Sixth Circuit.⁶

The agencies are now proposing to rescind the Clean Water Rule and the revised definition of the “waters of the United States.” They have released an economic analysis in support of that action,⁷ and this report summarizes and responds to that analysis.⁸ In brief, the agencies’ economic analysis is biased, incomplete, and inaccurate. The agencies have failed to monetize significant, forgone environmental benefits from the proposed rule by wrongly excluding studies based solely on their age. In fact, these older studies remain relevant, and the evidence of significant environmental value in protecting wetlands is further bolstered by more recent studies that the agencies overlook. Meanwhile, the agencies have failed to consider changing circumstances that may reduce compliance costs.

The agencies must rectify these errors in their final economic analysis. If a final, more accurate economic analysis shows that the forgone environmental benefits of the proposed revision are in excess of forgone financial costs, the agencies must either articulate a non-arbitrary justification for proceeding with a net costly rule revision, select instead a net beneficial alternative, or else abandon the revision of the 2015 Clean Water Rule.

Biased evidence selection leads to biased analysis

Cost-benefit analysis relies on the judicious selection of supporting studies and evidence. When selection of evidence for an economic analysis is biased, the foundation of the analysis is eroded, leading to biases in regulatory decisions. The EPA endorses this viewpoint, writing in its “Guidelines for Preparing Economic Analysis” that cost and benefit estimates are “only as good as the study cases from which [they] are derived, and it is therefore crucial that studies be carefully selected.”⁹ Careful selection means that the information is “relevant to its intended use” and that the analysis used to create the information is “reasonable for, and consistent with, the intended application.”¹⁰

The EPA and Corps' proposed redefinition of the "waters of the United States" provides a clear example of how inappropriate evidence selection can lead to erroneous conclusions. The agencies' analysis is not based on a complete evaluation of all the best available information, it applies different criteria for the selection of cost studies than for benefit studies in a manner that biases the results, and it arbitrarily and mechanically excludes relevant studies based solely on their age. Reversing their own findings from 2015, the agencies claim that they cannot quantify the environmental benefits from protecting wetlands under the 2015 Clean Water Rule. By failing to quantify these environmental benefits, their economic analysis suggests that the Clean Water Rule would entail larger costs than it will provide in benefits. In fact, this conclusion is based on an arbitrary and inconsistent assessment of evidence. A balanced analysis shows that wetlands protected by the Rule would provide substantial economic and environmental benefits, outweighing the costs of that protection.

The agencies selected studies based on an arbitrary age test rather than a careful judgement of the evidence

Determining whether a given study should be included in a cost-benefit analysis calls for expert judgement, subject to the standards for rational rulemaking. Like the EPA Guidelines, the Office of Management and Budget's guidelines, published in *Circular A-4*, require that evidence should be weighed on its merits, stating that "there is no mechanical formula that can be used to determine whether a particular study is of sufficient quality to justify use in regulatory analysis."¹¹ That said, the *Circular* provides some key guideposts: analysis must be "based on the best reasonably obtainable scientific, technical, and economic information available"; agencies should "rely on peer-reviewed literature, where available"; studies used should be "transparent" and "reproducible"; and "analytical consistency in estimating benefits and costs" is paramount.¹² The *Circular* also requires regulatory analyses to be consistent with agency guidelines under the Information Quality Act, which generally requires information to be accurate, complete, unbiased, transparent, and reproducible.¹³

In the 2015 Clean Water Rule's economic analysis, the EPA and Corps quantified benefits of wetland protection on the basis of 10 valuation studies that estimated the public's willingness to pay for the protection of riverine, forested, emergent, and isolated wetlands. Studies of these types of wetlands were selected because they match the types of wetlands likely to be incrementally covered by the 2015 Rule.¹⁴ In selecting the studies, the agencies followed requirements from *Circular A-4* that the context of the studies should be, as far as possible, similar to the context of the policy.¹⁵

In their latest analysis, the agencies have excluded all of these wetland benefit studies, claiming that since they were published between 1986 and 2000, the "age of these studies introduces uncertainty."¹⁶ Using age to mechanically determine whether studies should be included directly contravenes the requirements laid out in *Circular A-4* and the EPA's own guidelines.

By comparison, EPA's calculation of the value of statistical life illustrates an appropriate consideration of study age. Value of statistical life estimates provide a measure of the value of reduced mortality from a policy and are routinely used in EPA economic analyses. The EPA derives its estimate from studies published between 1974 and 1991.¹⁷ EPA's Science Advisory Board evaluated these studies in 2011 and recommended that the studies should continue to be used and incorporated with newer evidence unless a future evaluation specifically determined that the older studies no longer accurately represented current conditions.¹⁸

In the context of wetland value, in contrast, the agencies did not evaluate whether the benefit studies represent current preferences for wetland protection. Instead, they claim, without justification, that the studies are out of date. As we show below, evidence does not support this claim.

Moreover, the agencies have acted arbitrarily and inconsistently when choosing which studies to include. If one accepts that age alone is a sufficient reason to exclude information—and again, it is not, barring some showing of inaccuracy or irrelevance—then the agencies should have also excluded similarly aged cost estimates. Yet, the agencies relied upon numerous dated cost estimates in their latest analysis. Three categories of costs presented in the agencies’ analysis are based on studies conducted prior to 2003, and the costs in these categories account for at least 30% of the total forgone costs of the proposed recodification. Clean Water Act 402 Concentrated Feeding Operation implementation costs are estimated based on a 2003 analysis.¹⁹ Clean Water Act 402 stormwater implementation costs are based on an economic analysis conducted in 1999.²⁰ And, Clean Water Act 404 permit application costs come from a 2002 study using underlying data from 1999, as well as a Corps analysis conducted in 2000.²¹

Regulatory costs change frequently due to improvements in technology, greater efficiency, and variation in prices. Changes due to technology and efficiency should lower costs, so these changes make older cost studies increasingly unreliable over time. Therefore, age-based evidence selection criteria should be particularly stringent for cost estimates. We reiterate, however, that *Circular A-4* requires that all studies—cost estimates and benefit estimates—be judged on their relevance and quality rather than a mechanical, age-based rule.

The increasing prevalence of mitigation banks reduces the reliability of agency cost estimates

In addition to technology improvements and efficiency gains, the agencies’ economic analysis also fails to consider expected, future cost reductions, particularly from stream and wetland mitigation banks. Wetland and stream mitigation banks are wetland areas that have been restored, established, enhanced, or protected and can be used to offset the effects of development in other areas. For instance, if development occurs and causes the draining or loss of wetlands in one area, the developer can purchase credits from a mitigation bank so that overall, wetland area is not lost. Mitigation banks provide a predictable, market-driven, and often low-cost way for developers to conduct wetland mitigation.

The 2015 Clean Water Rule economic analysis acknowledged that stream mitigation bank markets have been growing over time, though unfortunately the expected effect of this growth was not incorporated into the cost-benefit analysis.²² Continued growth in these markets, which would likely be accelerated by a more expansive definition of the “waters of the United States,” would help further reduce costs.

Growth in wetland mitigation banks has already helped lower costs in that area, and continued expansion of those markets is expected to lower costs further. As of 2015, more than 1,500 wetland banks or in-lieu instruments had been approved.²³ As of August 2017, the Army Corp’s Regulatory In-Lieu Fee and Bank Information Tracking System (RIBITS) lists 289 pending mitigation banks,²⁴ suggesting continued strong growth in the use of mitigation banks.

The state of Washington provides a clear example of the power of mitigation banks to make wetland protection more cost effective. When the state considered adopting wetland mitigation banks, it quantified millions of dollars per year in net benefits, including economies of scale in the restoration of wetlands and reduced costs of permitting and oversight.²⁵

Similarly, participants at a National Mitigation & Conservation Banking Conference reported that “Besides providing economies of scale, mitigation banking can save buyers considerable amounts of time...While it can take two years to get a permit for on-site mitigation, that time can be cut to just six months by using a mitigation bank. Saving 18 months of time translates into saving 18 months of interest.”²⁶ As mitigation banks continue to grow in number, competition will tend to drive down prices even further.²⁷

Wetlands create positive economic benefits and those benefits are increasing

As discussed above, the agencies’ new economic analysis does not quantify the forgone benefits of wetland mitigation because of the age of the underlying studies. The agencies make two claims for why older studies cannot be used to estimate benefits: first, “because public attitudes toward nature protection could have changed,” and second, because older studies “may not have benefited from [statistical and methodological] advances.”²⁸ The agencies do not assess or provide support for either of these claims, and evidence shows that these claims are false.

First, evidence does not support the claim that statistical and methodological advances render studies published between 1986 and 2000 invalid. Contingent valuation methods have been well studied and established since at least the late 1980s. The primary reference textbook on the topic was published in 1989, the National Oceanic and Atmospheric Administration’s Blue Ribbon Panel on contingent valuation (chaired by Nobel Prize winners Kenneth Arrow and Robert Solow) published its findings and recommendations in 1993, and more than 100 contingent valuation studies were published per year by the mid-1980s.²⁹ Improvements have continued to occur over time, but contingent valuation was already a mature method by the time the studies used in the 2015 Economic Analysis were published.



*Staff works to restore Halstead Meadow at Sequoia & Kings Canyon National Parks
Photo © NPS*

Evidence also does not support the claim that public attitudes toward the environment have reduced wetland value. Wetland benefit studies show that willingness to pay for wetland protection has, if anything, gone up over the last three decades. For instance, recent studies show that willingness to pay for coastal wetlands has remained stable or increased since the 1990s. Willingness to pay for wetland restoration in Louisiana was estimated to be \$0.004 per acre per household in 1986 (using inflation adjusted 2011 dollars).³⁰ A 2014 study estimated that willingness to pay in 2011 was unchanged at \$0.004 per acre.³¹ Meta-analysis of willingness to pay for coastal wetlands across multiple states shows that public value has gone up since the early 1990s.³² Table 1 summarizes recent estimates of wetland value and compares these estimates over time, showing that wetland value has remained steady or increased over recent decades.

Table 1: Wetland values over time

Study	Publication date	Wetland type	Value per household per acre
Bergstrom et al.	1990	Coastal	\$0.004
Petrolia and Kim	2011	Coastal	\$0.002
Petrolia, Interis, and Hwang	2014	Coastal	\$0.004
Earlier studies from EPA and Corps Analysis	1989-1991	Forested	\$0.007
Later studies from EPA and Corps Analysis	1993-1998	Forested	\$0.008
Newell and Swallow	2014	Forested	\$0.12
<i>Note:</i> All values are in 2014 dollars. Where applicable, the value is calculated assuming a 3% discount rate. Coastal studies value 10 years of payments, while the forested wetland study values are annual.			

More generally, the increasing scarcity of wetlands relative to market goods means that their relative value has likely risen over time. While overall wetland area in the United States has remained stable over the last two decades, the area of wetland types most likely to be vulnerable under the proposed rule's reduced protections has been shrinking. Nationwide, freshwater forested wetlands experienced a significant 1.2% decline over the period of the U.S. Department of Interior's most recent wetland assessment.³³ Prairie wetlands experienced a similar loss of area between 1997 and 2009, the date of the most recent assessment.³⁴ Greater wetland scarcity should cause an increase in the value of remaining wetlands, similar to the way that scarce goods like vintage antiques increase in value relative to easily produced modern furniture.³⁵ The increase in public value of wetlands is also consistent with a growing scientific understanding of the ecological and economic importance of wetlands, including those that are isolated from other bodies of water.³⁶

The agencies failed to include recent and relevant studies of wetland benefits

Recent studies show that willingness to pay for relevant wetlands is positive, quantifiable, and rising over time. The agencies' new economic analysis states that "although the agencies attempted to find more recent studies" of willingness to pay for wetland preservation, "[m]ore recent wetland studies were not available."³⁷ In fact, a large body of recent evidence shows that wetlands have a positive, quantifiable economic value.³⁸

A 2014 study provides high-quality estimates of willingness to pay for wetlands very similar to those that are likely to be protected under the 2015 Clean Water Rule. The authors use a method known as a real-money choice experiment to estimate the value of isolated, forested wetlands in Rhode Island.³⁹ The real-money choice experiment is a hybrid valuation approach that provides individuals with information on various environmental amenities (in this case, different

types and sizes of wetlands) and asks for donations to protect those amenities. Based on the payment for amenities with different characteristics, the researchers can learn about the value that individuals place on those characteristics.

The 2014 study finds that the annual value for isolated, forested wetlands is \$0.12 to \$0.15 per household, per acre at a 3% and 7% discount rate, respectively.⁴⁰ These values (which, as we discuss below, should be considered as a lower bound) are substantially higher than the average annual value for forested wetlands of \$0.04 to \$0.06 per household per acre estimated in the 2015 Clean Water Rule analysis.⁴¹ Including the willingness to pay estimate from this study substantially increase the benefits of wetland protection relative to the estimates from the 2015 Analysis. The overall willingness to pay for forested wetlands nearly doubles, becoming \$0.08 to \$0.11 per household per acre.⁴² This increase in the willingness to pay translates into a near doubling of the benefit of protecting these wetlands. In the 2015 Analysis, the value of wetland mitigation was estimated to be between \$313 and \$513 million. Using the revised willingness to pay, this value rises to between \$612 million and \$1 billion.⁴³

Real money choice experiments possess many of the benefits both of stated preference approaches like contingent valuation and of revealed preference approaches. When studying wetlands, stated preference valuations should capture the full range of benefits—from tangible things like water quality improvement to harder-to-value aspects like existence value, or the benefit that an individual gets from knowing that more acreage of wetlands are protected—better than revealed preference or hedonic methods. In general, any value from an environmental amenity that does not vary over space, like existence value, will not be captured by property price-based hedonic valuations.⁴⁴ Choice experiment (and stated preference methods), by experimentally soliciting willingness to pay, more readily capture the full value of an environmental amenity.⁴⁵ By using real-money payments for actual wetlands, the method used by the 2014 study also avoids a potential problem with stated preference methods; namely, inflated willingness to pay due to hypothetical response bias.

One weakness of the real-money method is that individuals might free ride in their contributions, lowering estimated willingness to pay. Therefore, the willingness to pay estimates using real-money choice experiments provide a lower bound on the true willingness to pay for public goods.

Multiple recent publications use hedonic methods (a type of revealed preference approach) to estimate wetland value. These studies show that nearby urban wetlands have a positive effect on house prices. In North Carolina, homes within a mile of a wetland are worth \$3,100 more than homes that are not close to a wetland.⁴⁶ In Oregon, a property 1000 feet closer to a wetland is worth roughly \$600 more than a comparable property that is 1000 feet further from a wetland.⁴⁷ In Arizona decreasing the distance from a house to a wetland by 1% is associated with a price increase of 2%, even if the wetland is intermittently dry and isolated from other water amenities.⁴⁸ *Circular A-4* requires that “[i]f both revealed-preference and stated-preference studies that are directly applicable to regulatory analysis are available, you should consider both kinds of evidence and compare the findings.”⁴⁹

Estimates from hedonic studies should be used with caution and attention to the estimation context. For wetlands, hedonic studies are likely to understate the true value for two reasons. First, as noted above, hedonic methods do not capture existence value and other environmental amenity values that do not vary geographically. Second, revealed preference studies can conflate the costs of wetland mitigation with the benefits from wetland preservation. Analysis of the house and land price effects of wetlands on a given property will capture not only the benefits of the wetland to the property owner but also the opportunity costs and direct costs associated with wetlands, such as potential limitations on land development. For this reason, studies of wetland value on a given land parcel will not provide accurate estimates of

the public benefit of wetlands.⁵⁰ Meta-analysis shows that hedonic methods routinely understate willingness to pay for wetlands.⁵¹

Also, the revealed preference estimates given above must be transformed before they can be compared with the benefit estimates used in the 2015 Clean Water Rule analysis. These additional studies focus on estimating the effect of wetland proximity on house or property price. The agencies' economic analysis, however, reports estimates of the value per household of an acre of wetland. To translate the hedonic estimates to a comparable value, agencies would need to gather additional information on the size of the wetlands considered in the hedonic studies in order to calculate the effect of wetland size, as well as additional factors like population distribution and location-independent effects. Nevertheless, these additional studies further support the proposition that the forgone benefits of wetland mitigation are not zero, but rather are significant and quantifiable.

In addition to studies that analyze the value of wetlands likely to be incrementally covered by the 2015 Clean Water Rule, a broader set of wetland valuation studies should also be used. More general wetland valuation studies can provide useful evidence on trends in willingness to pay for wetlands, as discussed above. Willingness to pay for other wetlands also provides a reasonable estimate of the value of wetlands likely to be affected by this proposed rule. The meta-analysis of *Brander, Florax, and Vermaat* (2006) shows that the median willingness to pay for woodland, fresh water marsh, salt marsh, and unvegetated sediment wetlands are all similar, with values ranging from roughly \$50/acre/year for freshwater marshes to \$160/acre/year for unvegetated sediment. Accounting for wetland and study characteristics, the authors find that forested wetlands have the highest value of all wetlands types.⁵² General wetland values are also directly relevant to the value of incremental wetlands. Wetlands function as a system, so loss of freshwater wetlands under the proposed rule will have a negative effect on wetlands that are already protected.⁵³ Therefore part of the value of protecting marginal wetlands stems from their role in supporting healthy ecosystems beyond the direct area of the wetlands themselves.

Additional wetland studies can also provide estimates of willingness to pay for individual amenities that are common across several types of wetlands. Using such estimates, agencies could produce enumerative estimates of the value of incremental wetlands.⁵⁴ A series of recent meta-analyses of wetland value provide a convenient starting point for incorporating this information.⁵⁵

Finally, by not quantifying the benefits of wetland mitigation, the agencies have not followed regulatory analysis requirements. *Circular A-4* states that if there is uncertainty about costs or benefits, agencies "should describe benefits or costs under plausible scenarios and characterize the evidence and assumptions underlying each alternative scenario."⁵⁶ Following this guidance, the 2015 Clean Water Rule economic analysis addressed uncertainty by estimating costs and benefits under numerous scenarios.⁵⁷ The current economic analysis should perform similar analysis to address uncertainty. Failing to quantify a readily quantifiable and significant factor in the regulatory decision is not an appropriate treatment of uncertainty.

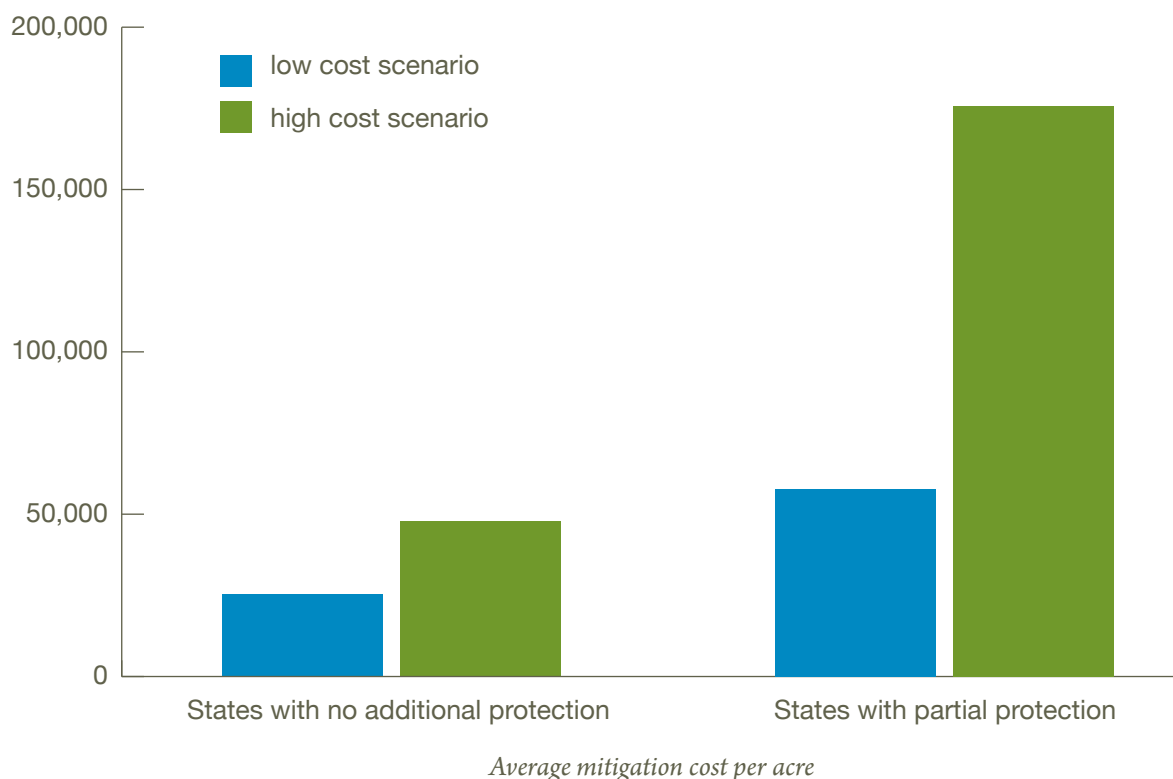
State-level policies make the 2015 Clean Water Rule even more cost effective

The agencies also claim that “states’ responses to this proposed rulemaking could have a significant impact on the avoided costs and forgone benefits”⁵⁸ Two recent studies conducted by the Environmental Law Institute and funded by EPA directly refute this claim. The studies quantify the effect of state policies on federal wetland mitigation costs and benefits, showing that under the 2015 Clean Water Rule, federal permitting would provide additional protection for wetlands in at least 50% of states.

Twenty-four states do not have any wetland protections beyond those provided by the Clean Water Act 401 certifications, and Illinois only provides protection for non-Clean Water Act waters if development occurs as part of a state project.⁵⁹ Importantly, the states that have no additional protections beyond those provided by the Clean Water Act are also those states most likely to contain wetlands left unprotected by the proposed rule. For instance, the agencies estimate that North Dakota has the largest number of acres of wetland that would be incrementally protected under the 2015 Clean Water Rule.⁶⁰ North Dakota also offers no wetland protection beyond what is provided by the Clean Water Act.⁶¹

Moreover, the case of North Dakota is not an isolated one. In general, the states that provide the fewest additional wetland protections are also the states that possess the largest areas of wetlands likely to be affected by the proposed rule. According to the agencies’ analysis, the states with no additional protections possess two-thirds of the wetland acreage expected to be left unprotected by the proposed rule (1,252 acres out of 1,890 total acres),⁶² so they would suffer substantial forgone benefits if the Clean Water Rule were to be repealed.

Figure 1: Wetland mitigation costs are lower in states with no additional wetland protection



At the same time, these states have substantially cheaper wetland mitigation costs, as shown in Figure 1. In the low-cost scenario examined by the agencies, this group of states had an average per-unit cost of protection less than half of that in states that do offer additional wetland protections. In the high-cost scenario, the cost-effectiveness gap was estimated to be even larger, with mitigation costs in the states without additional protections estimated to be only 27% of the costs in other states.⁶³ The relatively low mitigation costs and relatively high benefits in these states mean that predicted wetland preservation will be even more cost effective than the agencies' economic analysis indicates.

Shifting the baseline makes the agencies' analysis misleading

The agencies state that they are using the 2015 Clean Water Rule as a baseline for analysis only in order “to provide information to the public on the estimated differential effects.” However, the agencies immediately gainsay the legitimacy of that baseline, arguing that because the 2015 Clean Water Rule “has already been stayed by the Sixth Circuit...this proposal would merely codify the legal status quo.” The misleading implication is that the proposed rule has no real costs or benefits when, in fact, the environmental costs could be quite significant.

To the extent the agency proposes to rely on a baseline that does not include the 2015 Clean Water Rule, that would be a mistake. The 2015 Clean Water Rule is appropriate as a baseline not just because it is essential to contextualize the proposal's costs and benefits for the public, but because that choice of baseline is consistent with best analytical practices.

The stay issued by the U.S. Court of Appeals for the Sixth Circuit is not permanent.⁶⁴ There is considerable uncertainty about whether the courts will uphold or remand the 2015 Clean Water Rule. Given that uncertainty, best practices dictate that the 2015 Clean Water Rule must be considered as a baseline. As *Circular A-4* explains:

When more than one baseline is reasonable and the choice of baseline will significantly affect estimated benefits and costs, you should consider measuring benefits and costs against alternative baselines. In doing so you can analyze the effects on benefits and costs of making different assumptions about other agencies' regulations, or the degree of compliance with your own existing rules.⁶⁵

The uncertainty about the court rulings is akin to uncertainty about other agencies' regulations or compliance with an existing rule. Because the choice of baselines will “significantly affect estimated benefits and costs,” the 2015 Clean Water Rule must be used as a baseline for analysis.

Even though the agencies correctly use the 2015 Clean Water Rule in the baseline, the analysis is still problematic for a separate reason: in this proposed repeal, the agencies have announced that the repeal of the 2015 Clean Water Rule is only the “first step in a comprehensive, two-step process intended to review and revise the definition of ‘waters of the United States.’”⁶⁶ The agencies make clear that they will replace the rule with a new rule and that they intend to consider replacing the definition of “waters” with one that adheres to Justice Scalia's opinion in *Rapanos*,⁶⁷ which would provide a more stringent standard for determining Clean Water Act jurisdiction over wetlands than either the *status quo* or the 2015 Clean Water Rule.⁶⁸ In other words, in a second step as contemplated by the agencies, even more wetlands could lose protection, above and beyond the wetlands that would lose protection under the proposed first-step repeal, resulting in even greater cumulative lost benefits.

The rationality and transparency problems created by the failure to monetize forgone benefits of the proposed repeal are compounded by this two-step process. The forgone benefits at each individual step will of course only be part of the total forgone benefits of the two-step process. Splitting the forgone benefits into two smaller portions makes it easier for decisionmakers and the public to discount the significance of those benefits. This is all the more true for unmonetized effects. The tendency to ignore non-monetized effects is the result of common but irrational mental heuristics like probability neglect. For example, the phenomenon of probability neglect causes people to reduce small probabilities entirely down to zero, resulting in these probabilities playing no role in the decision-making process.⁶⁹ The same is true when unmonetized effects are split into smaller portions: each individual small portion is irrationally treated as being worth near zero, when in fact the aggregate could be quite significant.

To remedy this problem, the agencies need to present the costs and benefits of their entire proposed two-step repeal-and-replace process as compared to the status quo of the 2015 Clean Water Rule. This could be accomplished in a few different ways. First, the agencies could proceed by proposing a single, unified rulemaking using the 2015 Clean Water Rule as a baseline. Second, the agencies could consider the 2015 Clean Water Rule as a baseline at each step of its rulemaking process. Third, in the event that the agencies finalize their proposed repeal and then subsequently treat the repeal as the baseline for a further revision of the rule, the agencies should compare their preferred revision against an alternative that would reinstate the 2015 Clean Water Rule. *Circular A-4* requires agencies to consider a full range of regulatory alternatives in their cost-benefit analyses, reflecting a full range of options under the agencies' statutory discretion and including alternatives that are both more stringent and less stringent than the agencies' preferred alternative.⁷⁰ This is consistent with the agencies' legal requirements to justify a departure from a previous rule, such as the need to provide reasons for disregarding the "facts and circumstances that underlay" the original rule, when choosing a new path.⁷¹ Ultimately, the agencies must explain, relative to the 2015 Clean Water Rule, why they have chosen a different level of wetlands protection and why that new level of protection is justified.

Using the 2015 Clean Water Rule as a baseline, any of the shifts now contemplated by the agencies—including the proposed repeal as well as further reductions in the level of protections for wetlands—almost certainly have forgone benefits that vastly outweigh the anticipated cost savings. Unless the agencies can explain why, relative to the 2015 Clean Water Rule, the cost savings from either the proposed repeal or future revisions justify the forgone benefits, the agencies should not move forward with the proposed recodification.

Bottom line: cost-benefit analysis does not support repeal of the Clean Water Rule

In their 2015 analysis of the Clean Water Rule, the agencies found that the benefits of the Rule outweigh the costs across a range of different scenarios. As this report details, in their latest analysis the agencies have not provided substantive reasons for overturning that original conclusion. Instead, the agencies have relied on an arbitrary and mechanical evidence selection method that biases the results against finding benefits.

In fact, the evidence shows that the Clean Water Rule is likely even more cost effective than the 2015 analysis suggests. The benefits of wetland protection are quantifiable, positive, and growing over time while the costs of wetland mitigation will likely fall in the future. Incorporating recent evidence on willingness to pay for isolated, forested wetlands nearly

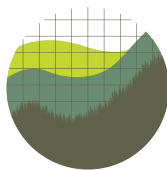
doubles the estimate of the benefits from the Rule, raising them by \$300 to \$500 million depending on the scenario. To the extent that individual willingness to pay overlooks the benefit of interconnected ecosystem services provided by wetlands, this value will be a lower bound on the true environmental benefits of the Rule. Existing state policies potentially reduce both the costs and benefits, but because the states that stand to gain most from the policy are also those that have the lowest mitigation costs, these existing policies would improve the cost-effectiveness of the Rule. Agency guidelines and rational rulemaking require that the agencies address the oversights and shortcomings of their current economic analysis.

Endnotes

- ¹ E.g., U.S. Environmental Protection Agency, *Functions and Values of Wetlands*, WETLANDS FACTSHEET SERIES (2002).
- ² E.g., U.S. Environmental Protection Agency, *Threats to Wetlands*, WETLANDS FACTSHEET SERIES (2001).
- ³ See National Research Council, *Compensating for Wetland Losses Under the Clean Water Act* (2001) at 18.
- ⁴ *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*, 531 U.S. 159 (2001) (SWANCC), and *Rapanos v. United States*, 547 U.S. 715 (2006).
- ⁵ U.S. Environmental Protection Agency and U.S. Department of the Army, *ECONOMIC ANALYSIS OF THE EPA-ARMY CLEAN WATER RULE* at 45 (2015) [hereinafter “2015 Analysis”] at 7-14.
- ⁶ *Ohio v. Army Corps of Eng’rs*, Nos. 15-3799/3822/3853/3887 (6th Cir. 2015).
- ⁷ Available at <https://www.regulations.gov/document?D=EPA-HQ-OW-2017-0203-0002>
- ⁸ This report is based on the public comments to the proposed rule that The Institute for Policy Integrity is issuing to the agencies. Those comments are available at http://policyintegrity.org/documents/IPI_WOTUS_comments.pdf
- ⁹ EPA, *Guidelines for Preparing Economic Analysis*, at 7-45 (2010) (hereinafter “Guidelines”).
- ¹⁰ *Id.* at 8-13.
- ¹¹ OMB, CIRCULAR NO. A-4 at 23 (2003).
- ¹² *Id.* at passim.
- ¹³ E.g., OMB, *Guidelines for Ensuring Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies* (2001).
- ¹⁴ 2015 Analysis, *supra* note 5, at 44-45.
- ¹⁵ CIRCULAR NO. A-4, *supra* note 10, at 25 states that the “study context and policy context should have similar populations” and that the “relevant characteristics of the study and the policy contexts should be similar.”
- ¹⁶ U.S. Environmental Protection Agency & U.S. Department of the Army, *Economic Analysis for the Proposed Definition of “Waters of the United States”—Recodification of Pre-Existing Rules 8* (2017) [hereinafter “2017 Analysis”].
- ¹⁷ U.S. Environmental Protection Agency, *GUIDELINES FOR PREPARING ECONOMIC ANALYSES*, (2010) at B-2.
- ¹⁸ U.S. EPA Science Advisory Board, *Review of Valuing Mortality Risk Reductions for Environmental Policy: A White Paper 15* (2011) (“Older studies will eventually fail to adequately represent the current population so the age of the study should be evaluated to determine whether it is reasonable to consider it representative of current preferences.”) (emphasis added); *id.* at 3 (recommending updating to reflect newer literature, but never implying the existing value of statistical life should not be used in the meantime).
- ¹⁹ National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitation Guidelines and Standards for Concentrated Animal Feeding Operations (CAFOs), Final Rule. *FEDERAL REGISTER* 68 (2003): 7176-7274; and 2015 Analysis, *supra* note 5, at 28.
- ²⁰ U.S. Environmental Protection Agency, *ECONOMIC ANALYSIS OF FINAL PHASE II STORMWATER RULE*, (1999); and 2015 Analysis, *supra* note 5, at 25.
- ²¹ See David Sunding & David Zilberman, *The Economics of Environmental Regulation by Licensing: An Assessment of Recent Changes to the Wetland Permitting Process*, NAT. RESOUR. J. 59-90 (2002); see also 2015 Analysis, *supra* note 5, at 37.
- ²² 2015 Analysis, *supra* note 5, at 39.
- ²³ Corps, Institute for Water Resources, *The Mitigation Rule Retrospective* (2015).
- ²⁴ https://ribits.usace.army.mil/ribits_apex/f?p=107:158:5746720326223::NO::
- ²⁵ See Washington Department of Ecology, *Preliminary Cost Benefit and Least Burden Analyses: Chapter 173-700 WAC—Compensatory Wetland Mitigation Banks* (2009), <https://fortress.wa.gov/ecy/publications/documents/0906002.pdf>.

- ²⁶ Robin Meadows, *Wetland Mitigation Banking*, Ecosystem Marketplace (2005) (paraphrasing Ken Bailey, Tetra Tech EC Inc., a seller and buyer of wetland credits), <http://www.ecosystemmarketplace.com/articles/wetland-mitigation-banking/>
- ²⁷ *Id.* (paraphrasing David John, an early proponent of mitigation banking and CEO of Miller Legg & Assoc.).
- ²⁸ 2017 Analysis *supra* note 15, at 8.
- ²⁹ Robert Cameron Mitchell & Richard T. Carson, USING SURVEYS TO VALUE PUBLIC GOODS: THE CONTINGENT VALUATION METHOD (1989); Kenneth Arrow et al., *Report of the NOAA panel on contingent valuation*, 58 FED. REGIST. 4601–4614 (1993); and Richard T. Carson & W. Michael Hanemann, *Contingent Valuation*, in HANDBOOK OF ENVIRONMENTAL ECONOMICS VOLUME 2 821–936 (K.-G. Maler & J.R. Vincent eds., 2005) at 842.
- ³⁰ John C. Bergstrom et al., *Economic value of wetlands-based recreation*, 2 ECOL. ECON. 129–147 (1990).
- ³¹ Daniel R. Petrolia, Matthew G. Interis & Joonghyun Hwang, *America's Wetland? A National Survey of Willingness to Pay for Restoration of Louisiana's Coastal Wetlands*, 29 MAR. RESOUR. ECON. 17–37 (2014).
- ³² *Id.* at 32.
- ³³ TE Dahl, *Status and trends of wetlands in the coastal watersheds of the Conterminous United States 2004 to 2009* (2013).
- ³⁴ TE Dahl, *Status and Trends of Prairie Wetlands in the United States 1997 to 2009* (2014).
- ³⁵ See e.g., Krutilla, J.V., and A.C. Fisher, *THE ECONOMICS OF NATURAL ENVIRONMENTS*. Resources for the Future, Washington, DC (1975).
- ³⁶ See Ralph W. Tiner, *Geographically isolated wetlands of the United States*, 23 WETLANDS 494–516 (2003).
- ³⁷ 2017 Analysis, *supra* note 15, at 8.
- ³⁸ 2015 Analysis, *supra* note 5, at 44–45 considered relevant wetlands to be “similar to those expected to be incrementally protected under the final [Clean Water] rule.” Based on this criterion, the analysis included studies of willingness to pay for “riverine or floodplain, forested, emergent, and depression or isolated wetlands”.
- ³⁹ Laurie W. Newell & Stephen K. Swallow, *Real-payment choice experiments: Valuing forested wetlands and spatial attributes within a landscape context*, 92 ECOL. ECON. 37–47 (2013).
- ⁴⁰ The authors conclude that the “full Hicksian willingness to pay equals or exceeds \$0.75 per acre per household for a 10 year wetland conservation contract.” Prices are in 2014 dollars to match the values from the agencies’ 2015 economic analysis. *Id.* at 46.
- ⁴¹ 2015 Analysis, *supra* note 5 at 49.
- ⁴² The agencies calculated the willingness to pay in the 2015 Analysis by calculating a geometric weighted average of the individual study estimates separately for forested and emergent wetlands. The weights were equal to the area-specific number of observations in each study. Newell and Swallow (2013), *supra* note 38, included 518 subjects in their study, making it the largest forested wetland study among those considered by the agencies.
- ⁴³ The benefit is calculated by averaging two values. First, one multiplies the willingness to pay by the number of households in each state and the acres of wetland expected to be incrementally protected by the Rule. Summing these values across states gives the state-level benefit. Second, one uses the same procedure but multiplies by the number of households in each wetland region rather than each state. A simple average of these two benefit numbers provides the final, total benefit. For the underlying data, see EPA, *Analysis of Jurisdictional Determinations for Economic Analysis and Rule*, EPA-HQ-OW-2011-0880-20877 (2015).
- ⁴⁴ Timothy J. Bartik, *Measuring the Benefits of Amenity Improvements in Hedonic Price Models*, 64 LAND ECON. 172–183 (1988).
- ⁴⁵ Mitchell & Carson (1989), *supra* note 28, at 62–67.
- ⁴⁶ Nikhil Kaza & Todd K. BenDor, *The land value impacts of wetland restoration*, 127 J. ENVIRON. MANAGE. 289–299 (2013).
- ⁴⁷ Noelwah R. Netusil, *Urban environmental amenities and property values: Does ownership matter?*, 31 LAND USE POLICY 371–377 (2013).
- ⁴⁸ R.H. Bark et al., *Habitat preservation and restoration: Do homebuyers have preferences for quality habitat?*, 68 ECOL. ECON. 1465–1475 (2009).
- ⁴⁹ CIRCULAR No. A-4, *supra* note 10 at 24.

- ⁵⁰ JE Reynolds & A Regalado, The effects of wetlands and other factors on rural land values, LXX APPRAISAL J. 182–190 (2002).
- ⁵¹ Luke M. Brander, Raymond J. G. M. Florax & Jan E. Vermaat, The Empirics of Wetland Valuation: A Comprehensive Summary and a Meta-Analysis of the Literature, 33 ENVIRON. RESOUR. ECON. 223–250 (2006) at 235.
- ⁵² *Id.* at 235 and 239–240. The analysis reports total value per hectare of wetland rather than a per-capita or per-household value, resulting in apparently large values compared to the per household willingness to pay used in the agencies’ economic analyses. The values are in 2014 dollars.
- ⁵³ Tiner (2003), *supra* note 18.
- ⁵⁴ See e.g., Jason Kinnell et al., Perceptions and Values for Preventing Ecosystem Change: Pennsylvania Duck Hunters and the Prairie Pothole Region, 78 LAND ECON. 228–244 (2002).
- ⁵⁵ See Tracy Boyer & Stephen Polasky, Valuing urban wetlands: A review of non-market valuation studies, 24 WETLANDS 744–755 (2004); Brander, Florax, and Vermaat, *supra* note 48; and Klaus Moeltner & Richard Woodward, Meta-Functional Benefit Transfer for Wetland Valuation: Making the Most of Small Samples, 42 ENVIRON. RESOUR. ECON. 89–108 (2009).
- ⁵⁶ CIRCULAR NO. A-4, *supra* note 10, at 18.
- ⁵⁷ 2015 Analysis, *supra* note 5, at 6.
- ⁵⁸ 2017 Analysis, *supra* note 15, at 9.
- ⁵⁹ See Environmental Law Institute, America’s Vulnerable Waters: Assessing the Nation’s Portfolio of Vulnerable Aquatic Resources since Rapanos v. United States (2011) at iii; see also Environmental Law Institute, State Constraints: State-Imposed Limitations on the Authority of Agencies to Regulate Waters Beyond the Scope of the Federal Clean Water Act (2013).
- ⁶⁰ EPA, Analysis of Jurisdictional Determinations (2015), *supra* note 42.
- ⁶¹ See Environmental Law Institute (2013), *supra* note 48 at 9.
- ⁶² EPA, Analysis of Jurisdictional Determinations (2015), *supra* note 42.
- ⁶³ *Id.*
- ⁶⁴ Ohio v. Army Corps of Eng’rs, Nos. 15-3799/3822/3853/3887 (6th Cir. 2015).
- ⁶⁵ CIRCULAR A-4, *supra* note 10, at 15. See also EPA, Guidelines for Preparing Economic Analysis, *supra* note 8 at 5-2 (2010) (“Multiple baseline scenarios are needed, for example, when it is impossible to make a reasonable unique description of the world in the absence of the proposed regulation. For instance, if the current level of compliance with existing regulations is not known, then it may be necessary to compare the policy scenario to both a full compliance baseline and a partial compliance baseline. Further, if the impact of other rules currently under consideration fundamentally affects the economic analysis of the rule being analyzed, then multiple scenarios, with and without these rules in the baseline, may be necessary.”).
- ⁶⁶ Definition of “Waters of the United States”—Recodification of Pre-Existing Rules, 82 Fed. Reg. 143 (27 July 2017).
- ⁶⁷ *Rapanos v. United States*, 547 U.S. 715 (2006).
- ⁶⁸ Intention to Review and Rescind or Revise the Clean Water Rule, 82 Fed. Reg. 12,532 (6 March 2017) states that “the agencies will consider interpreting the term ‘navigable waters,’ as defined in the [Clean Water Act] in a manner consistent with the opinion of Justice Scalia in *Rapanos*.” For the potential effect of Justice Scalia’s definition on jurisdictional determinations, see e.g. Jonathan H. Adler, *Reckoning with Rapanos: Revisiting Waters of the United States and the Limits of Federal Wetland Regulation*, 14 MO. ENVTL. L. & POL’Y REV. 1, 28 (2006) at 11.
- ⁶⁹ Cass R. Sunstein, *Probability Neglect: Emotions, Worst Cases, and Law* (John M. Olin Law & Economics, Working Paper No. 138, 2001), available at <http://ssrn.com/abstract=292149>.
- ⁷⁰ *Circular A-4* at 7–8.
- ⁷¹ *F.C.C. v. Fox Television Stations, Inc.*, 556 U.S. 502, 515 (2009). See also generally *Motor Vehicle Mfrs. Ass’n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983).



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