



**Economic Analysis
for the
Proposed Definition of “Waters of the
United States”
– Recodification of Pre-existing Rules**

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1. Introduction

The Environmental Protection Agency (EPA) and the Department of the Army (Army), (“the agencies”) are publishing a proposed rule to initiate the first step in a comprehensive, two-step process intended to review and revise the definition of “waters of the United States,” consistent with Executive Order 13778 signed on February 28, 2017, “Restoring the Rule of Law, Federalism, and Economic Growth by Reviewing the ‘Waters of the United States’ Rule.” For this first step, the agencies propose to revise the Code of Federal Regulations to re-codify the definition of “waters of the United States,” which currently governs administration of the Clean Water Act (CWA), pursuant to a decision issued by the U.S. Court of Appeals for the Sixth Circuit staying a definition of “waters of the United States” promulgated by the agencies in 2015. See *In re US Dep’t. of Def. and US EPA Final Rule: Clean Water Rule*, No. 15-3751 (lead) (6th Cir. Oct. 9, 2015). The agencies would apply the definition of “waters of the United States” as it is currently being implemented, that is, informed by applicable agency guidance documents and consistent with Supreme Court decisions, and longstanding practice. Proposing to re-codify the regulations that existed before the 2015 Clean Water Rule (CWR) will provide continuity and certainty for regulated entities, the states, agency staff, and the public. In a second step, the agencies will pursue a notice-and-comment rulemaking in which the agencies will conduct a substantive re-evaluation of the definition of “waters of the United States.”

2. Methodology and Approach

2.1. Purpose of Economic Analysis

In accordance with Executive Order 12866, Executive Order 13563, Office of Management and Budget (OMB) Circular A-4, and the EPA's "Guidelines for Preparing Economic Analyses," the agencies prepared this economic analysis (EA) for this "significant regulatory action."

The agencies prepared an illustrative economic analysis to provide the public with information on the potential changes to the costs and benefits of various CWA programs that could result if there were a change in the number of positive jurisdictional determinations. The 2015 CWR is used as a baseline in the analysis in order to provide information to the public on the estimated differential effects of restoring the pre-2015 status quo relative to the 2015 CWR. However, as explained previously, the 2015 CWR has already been stayed by the Sixth Circuit, and the proposed rule would merely codify the legal status quo, not change current practice.

The proposed rule is a definitional rule that affects the scope of "waters of the United States." This rule does not establish any regulatory requirements or directly mandate actions on its own. However, by changing the definition of "waters of the United States," the proposed rule changes the waters where other regulatory requirements that affect regulated entities come into play, for example, the locations where regulated entities would be required to obtain certain types of permits. The consequence of a water being deemed non-jurisdictional is simply that CWA provisions no longer apply to that water. There are no avoided costs or forgone benefits if similar state regulations exist and continue to apply to that water. The agencies estimated that the 2015 CWR would result in a small overall increase in positive jurisdictional determinations compared to those made under the 1986 regulation as currently implemented (e.g., informed by the 2003/2008 guidance). When the 2015 CWR is compared exclusively to the 1986 regulation (uninformed by the 2003/2008 guidance), the agencies estimated fewer waters would be within the scope of the CWA. Because this rulemaking contemplates returning to the prior regulations as currently implemented, resulting in an overall reduction in positive jurisdictional determinations relative to the 2015 CWR, the agencies estimated the avoided costs and forgone benefits of repealing the 2015 CWR.

In evaluating the impacts of the proposed action, a number of uncertainties have been identified. For example, the quantitative analysis takes as its starting point the estimates of the costs and benefits of the 2015 CWR.¹ Rescinding that rule suggests that the costs of that rule would now be avoided costs and the benefits of that rule would now be forgone benefits. However, one key uncertainty is predicting the response of states when the scope of jurisdictional waters under the CWA is reduced. For example, if states regulate these waters and wetlands beyond the extent assumed in this EA, both the avoided costs and forgone benefits based on the 2015 CWR EA estimates would be overestimates.

2.2. Base Case and Year of Analysis

As noted in Circular A-4 (OMB, 2003), the agencies need to establish a baseline against which to analyze the economic effects of the proposed rule. Normally, the baseline for analyzing the effects of a proposed rule is a description of the world that would exist without the rule. Without this proposed rule, the Code of Federal Regulations (CFR) would continue to reflect the definition of “waters of the United States” as promulgated in the 2015 CWR. The 2015 CWR was implemented for several weeks, except in 13 states, until litigation on that rule resulted in a nationwide stay of the rule by the U.S. Court of Appeals for the Sixth Circuit, instituting the “pre-Rule regime, pending litigation.” Although the stay created a situation in which the prior regulations (the language this proposal would reinsert in the CFR) are in effect, that could be altered at any time by factors beyond the control of the agencies. If the court were to take future action to lift that stay, the 2015 CWR would again be the state of the world without this proposed rule.² Thus, the agencies are interpreting the baseline for this economic analysis to be the 2015 CWR. The policy scenario analyzed in an EA should reflect the world with the proposed rule. As the agencies propose to reinstate the regulations that existed just prior to the 2015 CWR, the

¹ “Economic Analysis of the EPA-Army Clean Water Rule,” (U.S. EPA and Dept. of Army 2015a)

² Prior to the Sixth Circuit’s stay order, the District Court for North Dakota had preliminarily enjoined the rule in 13 States (North Dakota, Alaska, Arizona, Arkansas, Colorado, Idaho, Missouri, Montana, Nebraska, Nevada, South Dakota, Wyoming and New Mexico). Therefore, if the Sixth Circuit’s nationwide stay were to expire, the 2015 rule would be enjoined under the North Dakota order in States covering a large geographic area of the country, but the rule would be in effect in the rest of the country pending further judicial decision-making or substantive rulemaking under the Executive Order.

economic analysis of the 2015 CWR (“Economic Analysis of the EPA-Army Clean Water Rule,” EPA-HQ-OW-2011-0880-20866) provides much of the information necessary for an economic analysis of this proposed rule.

The estimates reported in the 2015 CWR EA were reported in 2014 price levels.³ This economic analysis updates those estimates to 2016 price levels, using the Gross Domestic Product (GDP) Deflator, which measures changes to GDP driven by changing prices rather than changing production. It is also called the GDP Implicit Price Deflator (GDP-IPD).

EPA is aware that, under the court stay of the 2015 rule, the legal status quo is governed by the regulations that existed prior to the 2015 rule, and informed by guidance and longstanding practice. EPA considered this as a possible alternative baseline to augment the analysis with the main baseline articulated above. However, given past practice implementing Executive Order 12866 of incorporating all relevant regulations that are finalized into the baseline, this economic analysis only examines the 2015 rule in the baseline.

2.3. Methodology

This economic analysis is based on the assumption that the 2015 CWR has been fully implemented even though this rule is merely codifying the existing status quo. However, this analysis is based on many of the conditions characterized by the baseline assumed in the 2015 CWR EA (U.S. EPA and Dept. of Army 2015a). Thus, as noted in Section 2.1 above, the costs of the 2015 CWR serve as the starting point for estimates of the avoided costs of this proposed rule, while the benefits of the 2015 CWR serve as the starting point for estimates of the forgone benefits of this proposed rule. A brief description of how those costs and benefits were estimated follows; for additional detail, see U.S. EPA and Dept. of Army (2015a).

The 2015 CWR EA estimated the costs and benefits from the increased positive jurisdictional determinations of waters under the 2015 CWR relative to practices at the time [80 FR 37053, June 29, 2015]. In addition, the 2015 CWR EA noted that certain assumptions were made to be analytically conservative, leading to a likely overestimate of costs and benefits. As an

³ Note that the 2015 CWR EA describes the methodology behind its estimates as producing 2014 price levels; however, in several places, tables reporting those estimates mislabel the estimates as being in Fiscal Year (FY) 2014 price levels (“FY14”). In fact, all calculations there were done in calendar year 2014 price levels. The FY 2014 label is appropriate for some of the jurisdictional impact estimates.

example, the 2015 CWR EA made the assumption that all newly positive jurisdictional determinations under the 2015 CWR would trigger new CWA requirements, and acknowledged that it would not hold uniformly (see p. vii of U.S. EPA and Dept. of Army, 2015a: “No costs would apply if no discharge or dredge/fill activity occurs.”). The programs analyzed in the 2015 CWR EA included:

- CWA Section 311 Oil Spill Prevention (benefits were not quantified)
- CWA Section 401 Certification (benefits were not quantified)
- CWA Section 402
 - Stormwater Permitting
 - Concentrated Animal Feeding Operation Permitting
 - Pesticide General Permit (benefits were not quantified)
- CWA Section 404 Permits and Stream and Wetland Mitigation (stream mitigation benefits were not quantified)

The estimates in the 2015 CWR EA (U.S. EPA and Dept. of Army 2015a) relied primarily on public data regarding recent approved jurisdictional determinations (JDs) issued under the CWA Section 404 program. The EPA reevaluated a sample of recent negative jurisdictional determinations (*i.e.*, determinations of no jurisdiction) and estimated the extent of jurisdictional determinations for aquatic resources that would have become positive under the 2015 CWR. The percentage of the sample of negative jurisdictional findings that were determined to become positive under the 2015 CWR was taken as the lower bound on the change in jurisdiction. However, it was noted that the lower bound jurisdictional estimate may underestimate the change in jurisdiction because some landowners may have assumed their waters were non-jurisdictional and therefore never applied for an approved jurisdictional determination. To account for these types of situations, an upper bound jurisdictional change was created by counterfactually assuming a doubling of the number of requested approved jurisdictional determinations for an appropriate subset of jurisdictional determinations (see Section 4 of U.S. EPA and Dept. of Army 2015a, for a more complete description). The 2015 CWR EA (U.S. EPA and Dept. of Army 2015a) estimated a change in positive approved jurisdictional determinations of 2.84% and 4.65% under these “low end” and “high end” scenarios, respectively.

Absent data to denote how changes in jurisdiction translate into changes in permitting activity, the agencies assumed that the change in costs and benefits of the 2015 CWR would be proportional to the range of changes in positive approved jurisdictional determinations.

For the CWA 311 program on Spill Prevention, Control and Countermeasure (SPCC) plans related to oil storage facilities, the agencies estimated the number of facilities lacking SPCC plans based on the assumption that the waters they are located near were not jurisdictional waters (and became jurisdictional under the 2015 CWR), and multiplied by an average cost associated with complying.

Under CWA Section 401, the agencies estimated the costs associated with states' review of federal permits to certify if they will meet applicable CWA standards using estimates of review time and average wages of employees in occupations with the necessary expertise.

The costs and benefits of the CWA section 402 permitting program as related to Stormwater (construction permitting under the Phase II rule), Concentrated Animal Feeding Operations (CAFO), and the Pesticides General Permit were calculated by multiplying the jurisdictional changes by the total costs and benefits estimated in each programs' most recent economic analysis. The costs and benefits of each program were also adjusted up or down to account for program growth or decline since the rules were promulgated.

For permits under the CWA Section 404 Permit program for the discharge of dredged and/or fill material, permit application costs were estimated by multiplying the expected additional permits due to changes in jurisdiction by estimates of the unit cost of a permit application. Two estimates of unit permit application costs were evaluated resulting in high and low application cost estimates. Compensatory mitigation costs for streams and wetlands were calculated using estimates of state-specific costs. CWA section 404 benefits associated with wetlands mitigation were calculated by multiplying estimates of household willingness to pay for each wetland acre by the number of households and by the number of acres mitigated.

Based on the 2015 CWR EA (U.S. EPA and Dept. of Army 2015a), the current EA examines the avoided costs and forgone benefits of repealing the 2015 CWR, and does so under many similar assumptions, with exceptions described below. [See Table 3 in Section 5 for a description of the uncertainties and limitations associated with maintaining those same assumptions.] Changes to the estimates from the 2015 CWR EA, besides the aforementioned

relabeling, include converting estimates from 2014 price levels to 2016 price levels, using the GDP-IPD. The corresponding tables from the 2015 CWR EA are replicated as Tables A-1 and A-2 in the appendix, for easy reference. In addition, the agencies have also added a qualitative discussion of distributional impacts (in Section 3.3).

3. Results

3.1. Avoided Costs and Forgone Benefits

Tables A-3 and A-4 in the appendix show the annual costs and annual benefits as estimated in the 2015 CWR EA, expressed in 2016 price levels, for the two predicted changes in jurisdiction that were part of the 2015 CWR analysis. As described below, the agencies do not have enough information to estimate the extent to which states would move to regulate waters that are no longer jurisdictional under the CWA.

The agencies summarize the estimates in Tables A-3 and A-4 as a range, reporting the low estimate of the low-end scenario and the high estimate of the high-end scenarios, based on the total row. The subtotal row focuses on comparing costs and benefits for only those programs for which both costs and benefits were estimated; the total row includes all estimated costs and benefits. As the categories not estimated all fall in the benefits column, comparing the quantified totals may potentially lead to a lower estimate of net benefits, depending on any regulatory response by the states. The reported ranges capture both the low and high estimates for each program cost or benefit category (generally driven by ranges for unit costs or benefits in analyses of previous rules), and the low-end and high-end estimates of the change in jurisdiction.

A number of assumptions are embedded in the 2015 CWR EA, and these assumptions may no longer be appropriate assumptions to make in estimating the avoided costs and forgone benefits for this proposed rule. Conducting an economic analysis of a regulation requires making analytical assumptions in the face of uncertainties and/or incomplete data. Relying on previously conducted analyses can introduce additional uncertainty due to changes in information or baseline conditions since the time when the original analysis was conducted. Therefore, the agencies reviewed the previous analysis in the 2015 CWR EA to determine its appropriateness and applicability to the current context.

The largest and most uncertain estimates from the 2015 CWR EA are associated with the benefits of the CWA 404 program. The 2015 CWR wetland benefits were derived through a benefit transfer exercise using 22 estimates from 10 studies, examining households' willingness to pay for wetland preservation. The studies were published between 1986 and 2000, although the agencies attempted to find more recent studies. More recent wetland studies were not available. The age of these studies introduces uncertainty, because public attitudes toward nature

protection could have changed. The past 30 years have also seen tremendous advances in statistical and economic methods that have improved the ability to collect and analyze data on the willingness to pay for changes in environmental amenities. The wetland valuation studies available for use in the benefits transfer in the final 2015 CWR EA may not have benefited from those advances, introducing greater uncertainty as to their robustness and applicability to current conditions. In addition to the age of the studies, the limited number of studies available also restricts the application of common tests for theoretical consistency that are necessary to validate the results. For example, issues of scope are not examined or taken into account.

As previously noted, states' responses to this proposed rulemaking could have a significant impact on the avoided costs and forgone benefits. For example, some of the waters covered by newly positive jurisdictional determinations under the 2015 CWR were already protected by states through their pollutant discharge permit programs, and thus would not generate incremental costs and benefits as estimated in 2015 CWR EA. The agencies were unable to factor the magnitude of this effect into the analysis leading to increased uncertainty. This additional uncertainty applies to both the avoided costs and the forgone benefits. In the case of the forgone benefits of wetland protection the agencies believe the cumulative uncertainty in this context is too large to include quantitative estimates in the main analysis for this proposed rule. However, the agencies are confident that the forgone benefits of wetlands protection are greater than zero, and therefore present these as unquantified benefits in the tables below.

Table 1. Estimates of Avoided Costs and Forgone Benefits, Derived from the 2015 CWR Economic Analysis: Low End Scenario.

	Annual Avoided Costs (millions 2016 \$)		Annual Forgone Benefits (millions 2016 \$)	
	Low	High	Low	High
CWA 402 CAFO Administration	\$0.17	\$0.17	\$3.9	\$6.8
CWA 402 CAFO Implementation	\$6.21	\$6.21		
CWA 402 Stormwater Administration	\$0.29	\$0.29	\$29.7	\$37.7
CWA 402 Stormwater Implementation	\$29.9	\$37.3		
CWA 404 Permit Application	\$29.4	\$50.2	<i>not quantified</i>	
CWA 404 Mitigation – Wetlands	\$55.7	\$156.0		
SUBTOTAL	\$121.7	\$250.2	\$33.6 + \$B*	\$44.5 + \$B*
CWA 311 Compliance	\$13.0	\$13.0	<i>not quantified</i>	
CWA 401 Administration	\$0.8	\$0.8	<i>not quantified</i>	
CWA 402 Pesticide General Permit Implementation	\$3.4	\$3.7	<i>not quantified</i>	
CWA 404 Mitigation – Streams	\$23.3	\$46.2	<i>not quantified</i>	
TOTAL	\$162.2	\$313.9	\$33.6 + \$B*	\$44.5 + \$B*

Source: Figure ES-1 in 2015 CWR EA (U.S. EPA and Dept. of Army 2015a). Revised to be in 2016 price levels, rather than the 2014 price levels in the 2015 CWR EA, and for this repeal proposal “annual costs” in the 2015 CWR EA are reported here as “avoided annual costs”, and likewise for “benefits” and “forgone benefits”.

* It should be noted that not all benefit categories are fully quantified. \$B is a stand-in for the unquantified benefits, and would not necessarily represent the same value in the total row as the subtotal row.

Table 2. Estimates of Avoided Costs and Forgone Benefits, Derived from the 2015 CWR Economic Analysis: High End Scenario.

	Annual Avoided Costs (millions 2016 \$)		Annual Forgone Benefits (millions 2016 \$)	
	Low	High	Low	High
CWA 402 CAFO Administration	\$0.28	\$0.28	\$6.4	\$11.1
CWA 402 CAFO Implementation	\$10.17	\$10.17		
CWA 402 Stormwater Administration	\$0.48	\$0.48	\$48.6	\$61.7
CWA 402 Stormwater Implementation	\$49.0	\$61.0		
CWA 404 Permit Application	\$48.2	\$82.2	<i>not quantified</i>	
CWA 404 Mitigation – Wetlands	\$91.2	\$255.4		
SUBTOTAL	\$199.3	\$409.5	\$55.0 + \$B*	\$72.8 + \$B*
CWA 311 Compliance	\$13.0	\$13.0	<i>not quantified</i>	
CWA 401 Administration	\$1.3	\$1.3	<i>not quantified</i>	
CWA 402 Pesticide General Permit Implementation	\$5.5	\$6.1	<i>not quantified</i>	
CWA 404 Mitigation – Streams	\$23.3	\$46.2	<i>not quantified</i>	
TOTAL	\$242.4	\$476.2	\$55.0 + \$B*	\$72.8 + \$B*

Source: Figure ES-2 in 2015 CWR EA (U.S. EPA and Dept. of Army 2015a). Revised to be in 2016 price levels, rather than the 2014 price levels in the 2015 CWR EA, and for this repeal proposal “annual costs” in the 2015 CWR EA are reported here as “avoided annual costs”, and likewise for “benefits” and “foregone benefits”.

* It should be noted that not all benefit categories are fully quantified. \$B is a stand-in for the unquantified benefits, and would not necessarily represent the same value in the total row as the subtotal row.

As shown above, based on compounded uncertainty as applied to estimates from the 2015 CWR EA, the annual avoided costs of the proposed rule would range from \$162 million to \$476 million, while the annual quantified forgone benefits of the proposed rule would range from \$34 million to \$73 million, plus the forgone benefits that could not be quantified.

3.2. Benefits from Removing Uncertainty about the Future Regulatory Regime

With frequent changes in interpretation and implementation of which waters are jurisdictional under the CWA, landowners, potential manufacturing plants, and other land developers face an uncertain regulatory environment. Such uncertainty can cause firms to make strategic decisions that are efficient from a private standpoint but socially inefficient, for example, by delaying project implementation to wait for uncertainty to be resolved. Firms may

also respond by building strategic flexibility into their operations, which can increase costs (Engau and Hoffmann 2009).⁴ By proposing to repeal the 2015 CWR, the agencies intend to improve the consistency and stability of the definition of “waters of the United States.” An important goal of this action is for landowners to have increased certainty about the future regulatory environment and for their decisions to develop specific land parcels or build specific manufacturing operations to proceed with greater certainty, and with a reduced need for devoting resources to maintaining operational flexibility. The agencies note, however, that uncertainty about states’ responses to this rulemaking and the outcome of the forthcoming substantive re-evaluation of the definition of “waters of the United States” will persist. Absent a great deal more data concerning how various land developers and manufacturers make decisions about new projects and in light of remaining jurisdictional uncertainty, the agencies are unable to quantify the benefits of the reduced uncertainty.

3.3 *Distributional Impacts*

The avoided costs and forgone benefits presented earlier are not expected to be felt uniformly across the population, and may not accrue to the same individuals or communities. OMB recommends including a description of distributional effects as part of a regulatory analysis “so that decision makers can properly consider them along with the effects on economic efficiency [i.e., net benefits]. Executive Order 12866 authorizes this approach.” (U.S. Office of Management and Budget 2003). Understanding the distribution of the avoided compliance costs and forgone benefits among people and communities can aid in understanding the distributional impacts associated with this action.⁵ This section discusses the general expectations regarding how avoided costs and forgone benefits might be distributed across the population, relying on a

⁴ Engau and Hoffman (2009) found that in the case of regulatory uncertainty following the Kyoto Protocol, some firms responded by increasing their strategic flexibility but not postponing decisions, which they hypothesize might have been an effort to add credibility to lobbying activities directed at influencing future regulation.

⁵ Executive Order 12989, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, directs agencies to address impacts on minority and low-income populations, particularly those that may be considered disproportionate. EPA developed guidance, both in its *Guidelines for Preparing Economic Analyses* (U.S. EPA 2010) and *Technical Guidance for Assessing Environmental Justice in Regulatory Analyses* (U.S. EPA 2016) to provide recommendations for how to consider distributional impacts of rules on vulnerable populations.

review of recent literature. For example, Fullerton (2011) discusses six potential distributional impacts related to environmental policy, some of which could be relevant to this action. Specifically, Fullerton (2011) describes impacts on consumers (e.g., higher prices); impacts on producers (e.g., lower returns to capital); scarcity rents (e.g., value of permits); benefits associated with pollution reduction; and transition costs (i.e., due to changes in employment or capital mix). The agencies did not conduct a quantitative assessment of these distributional impacts for the proposed rescission, but the qualitative discussion in this section provides a general overview of the types of impacts that could result from this action.⁶

3.3.1 Distribution of Avoided Costs

While the 2015 CWR did not require specific control costs for any particular source category, it did define what waters (including wetlands) were jurisdictional. The estimated increase in positive jurisdictional determinations under the CWA in the 2015 CWR as compared to prior practice (and the *status quo*) would necessarily increase compliance costs by applying all the regulations that are already promulgated under the CWA to these waters covered by newly positive jurisdictional determinations. These higher costs would, in part, be expected to filter through to consumers in the form of higher prices. The estimated compliance costs for the 2015 CWR consisted of costs associated with CAFO administration and implementation, stormwater administration and implementation, CWA 404 permit applications, and wetland mitigation. Each of these categories could yield higher prices, to consumers for agricultural goods (associated with CAFOs), or to property market participants for buildings and housing (due to stormwater implementation or wetland mitigation in construction projects). Expenditures on agricultural goods (e.g., food) and housing usually are a larger share of low-income household income compared to other households, and this share falls as income increases. Therefore, policies that increase prices for these goods and services could be regressive, placing a greater burden on low income households. By proposing to rescind the 2015 CWR this action would therefore reduce the potential burden on low income households, to the extent those households would have faced

⁶ See Environmental Justice Report for the Clean Water Rule: Definition of “Waters of the United States” Under the Clean Water Act; Final Rule, May 2015” for a discussion of how environmental justice was considered in the 2015 CWR (U.S. EPA and Dept. of Army 2015b).

higher prices as a result of the 2015 CWR, as the compliance costs would no longer be imposed for waters that are no longer jurisdictional.

Compliance costs could also lower labor earnings and returns to capital in the affected sectors, including agriculture. Changes in employment associated with lower labor earnings can have distributional consequences depending on a number of factors (see Section 3.3.4 below). Capital income tends to make up a greater proportion of overall income for high income households. As a result, the costs passed through to households via lower returns to capital tend to be progressive, placing a greater share of the burden on higher income households in these instances. As such, by repealing the 2015 CWR, higher income households would avoid lower returns to capital, to the extent that 2015 CWR costs were passed through in this manner.

3.3.2 Distribution of Forgone Benefits of Improved Water Quality and Wetlands Protection

The 2015 CWR EA assumed that the costs and benefits of the Corps' permitting program and EPA's regulatory programs would increase proportionately with the increase in positive jurisdictional determinations from preexisting practice (U.S. EPA and Dept. of Army 2015a). If jurisdictional waters increased by 2.84% and 4.65% percent (estimated by the percentage increase in determinations that would have been jurisdictional) then the costs and benefits of all relevant CWA programs would increase by 2.84% and 4.65% percent as well. The 2015 CWR EA estimated that up to \$572.3 million in benefits (at 2014 price levels) would have been realized with the 2015 CWR. The regulations that would be applied to new sources on waters covered by newly positive jurisdictional determinations produced benefits associated with improved surface and ground water quality, (e.g., improved commercial and recreational fishing).

Often the baseline incidence of negative health outcomes is greater among low-income or minority populations due to a variety of factors, including a greater number of polluting sources located where low-income and minority populations live, work, and play (Bullard et al. 2007; United Church of Christ 1987); greater susceptibility to a given exposure to pollutants due to physiology or other triggers (Akinbami 2012); and pre-existing conditions (Schwartz et al. 2011). Because the manner in which the health benefits of a rulemaking are distributed is based on the correlation of housing and work locations to changes in the distribution of pollutants, or

more specifically for the current rule, changes in water quality, it is difficult to fully know the distributional impacts. Furthermore, the overall distribution of benefits will depend on whether and how any households or individuals change their choice of housing or work locations in response to water quality changes (Sieg, et al. 2004). The distribution of fishing, recreation, and other water quality benefits, including flood control, depends on the distribution of willingness to pay for these benefits, information which is typically not available.

The proposed rescission of the 2015 CWR would result in forgone benefits to affected populations, but it is difficult to know how those forgone benefits would be distributed across the population without more detailed information regarding changes in water quality and willingness to pay for those benefits. Nonuse or existence value benefits, which dominate the estimation of wetlands benefits, tend to grow with income, for example. Therefore, the forgone benefits could be progressive (i.e., greater loss in benefits for higher income households). Alternatively, low-income populations may have experienced a larger share of health benefits due to their higher baseline incidence, in which case the forgone benefits would be regressive (i.e., greater loss for low-income households).

3.3.3 Impact on Landowners

With the proposed rule, the agencies expect to avoid some impacts on landowners and land users. The value of land containing waters that would be considered newly jurisdictional under the 2015 CWR, as compared to current practice, would potentially have been lowered if anticipated uses of the land would have required compliance with regulations promulgated under the CWA. Users of that land for such activities would have had to absorb costs to comply with the CWA. The increased costs would have been capitalized into and resulted in lower land values. For example, assume there is a tract of land that would be ideal for building new homes once the wetlands on that tract of land were drained and filled. The price of that land would have been reduced if the builder had to pay to mitigate that wetland loss. The amount of the reduction would have corresponded to the magnitude of the mitigation costs⁷ which were expected to vary widely nationwide and would have been determined by such items as:

⁷ For more details see Figure 8 in the 2015 CWR RIA, “Economic Analysis of the EPA-Army Clean Water Rule” (U.S. EPA and Dept. of Army 2015a).

- Permit Application Costs (expected to vary with size of project and size of impacts to jurisdictional waters)
- Permitting Time Costs
- Impact Avoidance and Minimization Costs (costs of project redesign to avoid impacts on jurisdictional waters)
- Compensatory Mitigation Costs (costs of implementing the Corps-approved compensatory mitigation plan)

At the same time, by causing additional waters to be determined to be jurisdictional under the CWA as compared to current practice, the 2015 CWR may have increased property values that, for example, benefited from additional flood protection provided by protected wetlands or from higher quality recreational opportunities and increased tourism from protected waterways. There would also have been an increase in the social value of wetlands that may have been produced for compensatory mitigation as a result of the 2015 CWR. These increased property and social values will be forgone under the proposed rule.

3.3.4 Employment Impacts

Executive Order 13777 directs federal agencies to consider the effect of regulations on jobs, among other regulatory issues and concerns (Executive Order 13777, 2017). Employment impacts of environmental regulations are composed of a mix of potential declines and gains in different areas of the economy over time. Typically, regulation affects the distribution of employment among industries rather than the general employment level.⁸ When the U.S. economy is at full employment, the removal of an environmental regulation is unlikely to have a noticeable impact on aggregate employment.⁹ With well-functioning labor markets, workers will move from one job to another relatively quickly and may experience short-term unemployment during the transition. On the other hand, when the economy is operating at less than full employment, or if there are significant unemployment issues in concentrated geographic areas or

⁸ Arrow et al. 1996; see discussion at beginning of Part Two. In practice, distributional impacts on individual workers can be important, as discussed in this section

⁹ Full employment is a conceptual target for the economy where everyone who wants to work and is available to do so at prevailing wages is actively employed. The unemployment rate at full employment is not zero.

specific industries, displaced workers may experience longer unemployment spells and difficulties finding new employment. If a regulation's potential impact on employment appears to be significant, and there are important unemployment issues facing groups of potentially affected workers, there may be important distributional effects for further consideration. OMB recommends including a description of distributional effects, as part of a regulatory analysis (U.S. Office of Management and Budget 2003).

Localized reductions in employment may occur due to increased permitting and pollution control costs resulting from a discharge into a newly jurisdictional water. Such reductions may adversely affect individuals and communities in areas or industries with significant unemployment, just as localized increases in employment may have positive effects. For the proposed rescission of the 2015 CWR, we do not have information on where changes in the number of positive jurisdictional determinations may occur, and therefore are unable to undertake analysis of employment effects specific to this action. We describe qualitatively general issues of concern related to potential distributional impacts, without drawing specific conclusions. If potentially dislocated workers are vulnerable because they are located in communities or industries facing significant unemployment issues they may experience persistent job loss, earnings may be permanently lowered, and the wider community may be negatively affected. Discussion and consideration of the distribution of potential employment impacts can shed light on whether the rulemaking exacerbates or ameliorates preexisting inequalities in wealth and income.

In considering distributional employment impacts, there may be important differences across potentially affected workers in areas or industries affected by significant unemployment. Individuals may be relatively more affected if they work in industries, occupations, or geographic areas with weak labor markets, with significant unemployment. For example, if displaced workers face limited options for re-employment, or if re-employment has lower earnings and/or reduced returns to human capital, they may experience longer durations of unemployment than otherwise and possibly also greater reductions to future earnings, as well as a greater likelihood of additional transaction costs to migrate to other areas or obtain additional education to acquire skills. On the other hand, dislocated workers operating in tight labor markets may experience relatively brief periods of transitional unemployment. Some job seekers

may find new employment opportunities due to regulation, for example, if their skill set qualifies them for new environmental protection jobs.

With the proposed rule, workers in the construction industry could find expanded opportunities associated with new construction, new plants, or development projects if they are located in areas that would have been negatively affected by the 2015 CWR. On the other hand, there is a potential for fewer job opportunities in industries such as the recreation industry, as the proposed rule no longer increases the number of waterways protected, as compared to the 2015 CWR.

The distributional impacts of workforce disruptions may extend beyond impacts on earnings. Sociological studies examine different effects than those that are typically examined in economic studies. Workers experiencing unemployment may also experience negative health impacts. The unemployed population is observed to be less healthy than those who are employed, and the differences in health across these groups can be significant (see, for example, Roelfs et al. 2011). Several recent papers have attempted to identify a causal relationship between unemployment and health. These papers examined the health effects of involuntary job loss by focusing on displaced workers; that is, those who have lost their jobs due to layoffs or other firm-level employment reductions. For example, Sullivan and von Wachtner (2009) found increased mortality rates among displaced workers in Pennsylvania; and in a study of displaced Austrian workers, Kuhn et al. (2007) found that job loss negatively affected men's mental health.

This literature also describes difficulties in identifying the cause of poorer health for the unemployed population. Associations between unemployment and poorer health may be driven, in part, by the possibility that workers in poorer health may be more likely to become unemployed, and estimates of the magnitude of the association may be biased, in part, by factors not easily observed or addressed by researchers that contribute both to unemployment risk as well as poorer health (Jin 1995, Sullivan and von Wachtner 2009).

In general, if potential employment impacts are significant and persistent and there are important differences in potential vulnerabilities for groups of workers related to local areas with significant unemployment, distributional employment impacts may also have community-wide effects, such as effects on the local tax base, the provision and quality of local public goods, and changes in demand for local goods and services.

4. Related Acts and Executive Orders

4.1. *Small Business Regulatory Enforcement Fairness Act (SBREFA)/ Regulatory Flexibility Act (RFA)*

This proposed rule to repeal the 2015 CWR would codify the legal status quo. As such, the estimates of avoided compliance costs in Section 3.1 demonstrate that this proposed rule will not have a significant economic impact on a substantial number of small entities, and therefore no regulatory flexibility analysis is required.

4.2. *E.O. 13771: Present Value of Net Benefits to 2030*

Under E.O. 13771, the agencies calculated the present value of avoided costs – following OMB guidance, we present the present value of avoided costs in 2016 dollars. A present value analysis was not performed for the 2015 CWR EA, which presented annual benefit and cost impacts as discussed in Section 3.

The calculation of a present value requires an annual stream of avoided costs and forgone benefits for each year of the timeframe for which the 2015 CWR would have been binding. For the purpose of this proposed rule analysis, that annual stream of avoided costs and forgone benefits was estimated based on the projections of annual costs presented in the 2015 CWR EA. Assuming the economic and regulated activities in the impacted programs (e.g., CWA sections 311, 401, 402, and 404) are relatively constant from year to year and the compliance costs are also stable, then the resulting cost-savings and forgone benefits of rescinding the 2015 CWR are also relatively constant. The time horizon used in calculating present value is through 2030, for a total of thirteen years, based on a number of factors. Given that an approved jurisdictional determination is typically valid for five years, this time horizon should be at least that long. NPDES permits are for 5 years and renewable, so a time horizon of at least 10 years would cover two permit cycles. In its analysis for the Active Construction effluent guideline regulation, using 14 years of dredging permit data from the Corps, EPA estimated that dredging – an activity requiring a CWA 404 permit – occurs with a frequency that ranges from 4.7 to 10 years (noting

that the range is limited by the years of available data).¹⁰ On the other hand, development often occurs after a change in ownership of land and predicting land use change is a notoriously difficult exercise, suggesting that a time horizon as long as 20 or 30 years is likely to introduce significant uncertainty. Thus, for purposes of E.O. 13771 for this proposed rule, the agencies have used a time horizon through 2030. Using a three percent and a seven percent discount rate, the agencies calculated the present value of avoided costs and forgone benefits in 2016. The estimates of annual avoided costs and forgone benefits were adjusted to represent present values in 2016, and are expressed in terms of 2016 price levels, per E.O. 13771 implementation guidance. To do this, we applied the GDP deflator recommended in the implementation guidance.¹¹

Under the aforementioned assumptions, the proposed rulemaking is expected to have a present value of cost-savings of \$2.7 billion to \$5.2 billion under a 3% discount rate, and \$1.8 billion to \$3.5 billion under a 7% discount rate. The present value estimates are sensitive to the assumption that the economic conditions and regulated activities pertaining to these programs (e.g., the number of permits, acres of wetland mitigation, etc.) will be relatively constant. Increasing development demand associated with economic growth could lead baseline regulated activities to increase over time, in which case the current proposed rule to rescind the 2015 CWR would yield higher cost-savings and forgone benefits. But such baseline activities could also decrease over time based on the sectoral shifts in economic activity and the spatial pattern of land use, in which case the current proposed rule would yield lower cost-savings and forgone benefits.

The present value estimates are also sensitive to the assumption that the marginal compliance costs of avoided regulatory activities are stable over the time horizon. These activities could become more or less expensive over time, which could also lead to higher or lower cost-savings, respectively. One example, where baseline costs to regulated entities could

¹⁰ For more details, see U.S. EPA, 2009, “Economic Analysis of Final Effluent Limitation Guidelines and Standards for the Construction and Development Industry”.

¹¹ For GDP-IPD figures used in this analysis, see <https://www.bea.gov/iTable/print.cfm?fid=ED8379E3B870D35D721D155A07EDCC602C8B75B9F62BF3144F0AD5C40B910F675527EA67256537B0B861F837692ADA4863A36A58B7AA75B2536A5A8352E74CE6>. Accessed 5/30/17.

increase is the CWA Section 404 permit application and mitigation programs. The opportunity cost of land used for wetland mitigation will likely increase over time since land is in fixed supply. Even if the number of new development projects each year remains constant, the supply of usable land for mitigation will diminish over time, thus increasing the marginal cost of wetland mitigation in the baseline. If baseline costs are increasing over time, then the realized cost savings would be higher than those quantified in this EA.

5. Limitations and Uncertainties

The quantitative analysis takes as its starting point the estimates of the costs and benefits of the 2015 CWR, as documented in the EA for that rule (U.S. EPA and Dept. of Army 2015a). As such, the same limitations and caveats that apply to the 2015 CWR EA apply to the quantitative analysis in this EA as well (see, for example, Section 3 of U.S. EPA and Dept. of Army 2015a). The estimates of avoided costs and foregone benefits also do not reflect any changes in baseline conditions since the analysis for the 2015 CWR was conducted (e.g., developments in state regulations, changes in economic activity, or other factors affecting the cost of compliance activities).

The use of results from the 2015 CWR analysis makes implicit assumptions about how state regulators would respond to this proposed rulemaking. Specifically, the current EA assumes states would not change existing laws and regulatory programs. However, it is possible that some states may respond to a re-codification of the regulations in place prior to the 2015 CWR by continuing to regulate as waters of the state those waters that are no longer considered “waters of the United States.” The particulars of individual state laws and regulations vary greatly. States have a range of options, from relying on the proposed federal definition, to choosing to remain at the 2015 CWR jurisdiction levels, to asserting state jurisdiction to waters beyond those covered by the 2015 CWR. To the extent that states regulate waters and wetlands beyond the levels assumed in the 2015 CWR EA, realized cost savings and forgone benefits will be lower. A 2013 Environmental Law Institute report estimated that approximately two-thirds of all states place some legal constraint on the authority of state and local government officials to adopt aquatic resource protections beyond the CWA definition of “waters of the U.S.” These may be straightforward stringency limitations, property-based limitations, or combinations of the two. The provisions may be partial limitations, affecting only some applications. These states would have to change their current laws before adopting more stringent requirements; therefore, such a response is less likely among those states.

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A. Appendix

The estimates in Tables A-1 and A-2 below are taken without change from the 2015 CWR EA, and reproduced here.

Table A-1/Figure 16a. Estimated Annual Costs and Benefits, Using Original Number of ORM2 Other Waters Records.

	Annual Costs (FY14\$ millions)		Annual Benefits (FY14\$ millions)	
	Low	High	Low	High
CWA 402 CAFO Administration	\$0.2	\$0.2	\$3.8	\$6.6
CWA 402 CAFO Implementation	\$6.1	\$6.1		
CWA 402 Stormwater Administration	\$0.3	\$0.3	\$29.0	\$36.8
CWA 402 Stormwater Implementation	\$29.2	\$36.4		
CWA 404 Permit Application	\$28.7	\$49.1	\$306.1	\$306.1
CWA 404 Mitigation – Wetlands	\$54.4	\$152.3		
SUBTOTAL	\$118.8	\$244.3	\$338.9	\$349.5
CWA 311 Compliance	\$12.7	\$12.7	<i>not quantified</i>	
CWA 401 Administration	\$0.8	\$0.8	<i>not quantified</i>	
CWA 402 Pesticide General Permit Implementation	\$3.3	\$3.6	<i>not quantified</i>	
CWA 404 Mitigation – Streams	\$22.8	\$45.2	<i>not quantified</i>	
TOTAL	\$158.4	\$306.6	\$338.9	\$349.5

Table A-2/Figure 16b. Estimated Annual Costs and Benefits, Using Double the Number of ORM2 Other Waters Records.

	Annual Costs (FY14\$ millions)		Annual Benefits (FY14\$ millions)	
	Low	High	Low	High
CWA 402 CAFO Administration	\$0.3	\$0.3	\$6.2	\$10.8
CWA 402 CAFO Implementation	\$9.9	\$9.9		
CWA 402 Stormwater Administration	\$0.5	\$0.5	\$47.5	\$60.2
CWA 402 Stormwater Implementation	\$47.8	\$59.6		
CWA 404 Permit Application	\$47.0	\$80.3	\$501.2	\$501.2
CWA 404 Mitigation – Wetlands	\$89.0	\$249.4		
SUBTOTAL	\$194.6	\$383.3	\$554.9	\$572.3
CWA 311 Compliance	\$12.7	\$12.7	<i>not quantified</i>	
CWA 401 Administration	\$1.3	\$1.3	<i>not quantified</i>	
CWA 402 Pesticide General Permit Implementation	\$5.4	\$5.9	<i>not quantified</i>	
CWA 404 Mitigation – Streams	\$22.8	\$45.2	<i>not quantified</i>	
TOTAL	\$236.0	\$465.0	\$554.9	\$572.3

To calculate the numbers in Tables A-3 and A-4, the values in the above tables are multiplied by 1.024, which represents the GDP deflator for 2016 divided by the GDP deflator for 2014, in order to convert from 2014 price levels to 2016 price levels.

Table A-3. Estimates of Costs and Benefits, As Quantified in 2015 CWR Economic Analysis: Low End Scenario.

	Annual Costs (millions 2016 \$)		Annual Benefits (millions 2016 \$)	
	Low	High	Low	High
CWA 402 CAFO Administration	\$0.17	\$0.17	\$3.9	\$6.8
CWA 402 CAFO Implementation	\$6.21	\$6.21		
CWA 402 Stormwater Administration	\$0.29	\$0.29	\$29.7	\$37.7
CWA 402 Stormwater Implementation	\$29.9	\$37.3		
CWA 404 Permit Application	\$29.4	\$50.2	\$313.5	\$313.5
CWA 404 Mitigation – Wetlands	\$55.7	\$156.0		
SUBTOTAL	\$121.7	\$250.2	\$347.0	\$357.9
CWA 311 Compliance	\$13.0	\$13.0	<i>not quantified</i>	
CWA 401 Administration	\$0.8	\$0.8	<i>not quantified</i>	
CWA 402 Pesticide General Permit Implementation	\$3.4	\$3.7	<i>not quantified</i>	
CWA 404 Mitigation – Streams	\$23.3	\$46.2	<i>not quantified</i>	
TOTAL	\$162.2	\$313.9	\$347.0	\$357.9

Source: Figures ES-1 and 16a in 2015 CWR EA (U.S. EPA and Dept. of Army 2015a). Revised to be in 2016 price levels, rather than the 2014 price levels in the 2015 CWR EA, and for this repeal proposal “annual costs” in the 2015 CWR EA are reported here as “avoided annual costs”, and likewise for “benefits” and “forgone benefits”.

Table A-4. Estimates of Costs and Benefits, As Quantified in 2015 CWR Economic Analysis: High End Scenario.

	Annual Costs (millions 2016 \$)		Annual Benefits (millions 2016 \$)	
	Low	High	Low	High
CWA 402 CAFO Administration	\$0.28	\$0.28	\$6.4	\$11.1
CWA 402 CAFO Implementation	\$10.17	\$10.17		
CWA 402 Stormwater Administration	\$0.48	\$0.48	\$48.6	\$61.7
CWA 402 Stormwater Implementation	\$49.0	\$61.0		
CWA 404 Permit Application	\$48.2	\$82.2	\$513.2	\$513.2
CWA 404 Mitigation – Wetlands	\$91.2	\$255.4		
SUBTOTAL	\$199.3	\$409.5	\$568.2	\$586.0
CWA 311 Compliance	\$13.0	\$13.0	<i>not quantified</i>	
CWA 401 Administration	\$1.3	\$1.3	<i>not quantified</i>	
CWA 402 Pesticide General Permit Implementation	\$5.5	\$6.1	<i>not quantified</i>	
CWA 404 Mitigation – Streams	\$23.3	\$46.2	<i>not quantified</i>	
TOTAL	\$242.4	\$476.2	\$568.2	\$586.0

Source: Figures ES-2 and 16b in 2015 CWR EA (U.S. EPA and Dept. of Army 2015a). Revised to be in 2016 price levels, rather than the 2014 price levels in the 2015 CWR EA, and for this repeal proposal “annual costs” in the 2015 CWR EA are reported here as “avoided annual costs”, and likewise for “benefits” and “forgone benefits”.