Economic Analysis of the EPA-Army Clean Water Rule

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U.S. Environmental Protection Agency

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Executive Summary

Key Background

The Environmental Protection Agency (EPA) and the U.S. Department of the Army (Army) (hereinafter collectively referred to as "the agencies") have prepared a final rule revising the definition of the regulatory term "waters of the United States." This term identifies waters which are, and are not, subject to the Clean Water Act (CWA). The agencies have worked to develop this rule in light of the Act, science, Supreme Court decisions, public comments, and the agencies' experience and technical expertise.

The final rule includes eight categories of jurisdictional waters, maintains existing exemptions for certain categories of activities and waters, and adds additional exclusions for categories of waters that are never covered under the Act. The final rule does not establish regulatory requirements and, therefore, does not impose direct costs on any entity. Instead, it is a definitional rule that clarifies the scope of "waters of the United States."

The agencies prepared this illustrative economic analysis to show how the scope of this new regulation compares to the historic practices under the existing regulation and to the agencies' recent field practices in making jurisdictional determinations after the Supreme Court decisions of 2001 and 2006. The latter serves as our baseline for calculating how this rule may affect the costs and benefits of specific CWA programs. This required a number of extrapolations from past regulatory analyses to reflect the potential change in scope of the each CWA regulatory program. This summary describes the overall approach and presents the key results from the economic analysis.

Key Elements of the Analysis

Baseline for Comparison

This final rule updates and clarifies regulations that were promulgated in 1986. Since that time, the agencies have had several decades of experience implementing the regulations and making jurisdictional determinations. That experience can be thought of as comprising two distinct time periods. The first, from 1986 to around the year 2000, represents the historic practice of implementing the regulations. The second, from approximately 2008 to the present, represents the recent practice of implementing the regulations and is based on the 2008 EPA and Army jurisdiction guidance. These two time periods differ because of key Supreme Court cases in 2001 and 2006 that unsettled prior clarity regarding the allowable extent of jurisdiction in the CWA. Due to this uncertainty, recent practice in implementing the act has at times been overly cautious, even though the regulations have not changed.

This change in practice creates two distinct baselines from which one could analyze the impacts of the final Clean Water Rule. Compared to a baseline of existing regulations and historic practice, this rule results in a decrease in CWA jurisdiction because the scope of regulatory jurisdiction in this rule is narrower than that under the existing regulations. However, compared to recent practice, this rule is projected to result in a slight increase in CWA jurisdiction by providing clarity about which waters are covered by the Clean Water Act and resolving the uncertainty caused by the key Supreme Court cases that had led to caution in asserting jurisdiction.

Both baselines are reasonable starting points to analyze the impacts of the rule. The analysis compared to historic practice is conceptually straightforward because the narrowed jurisdictional scope results in negative or zero impact. Unfortunately, detailed data regarding individual jurisdictional determinations from before the year 2000 are not available, and therefore the agencies were unable to develop quantitative estimates of the impact of the rule relative to historic practice. However, because jurisdiction under the CWR will be less inclusive than under historic practice, it is helpful to underscore that costs and benefits will be no greater than they would have been under historic practice. To estimate impacts compared to recent practice, the agencies used data from the U.S. Army Corps of Engineers (Corps) regarding recent jurisdictional determinations both for the proposal and the final rule. The remainder of this document outlines the methods and assumptions that went into developing the resulting quantitative estimates of the costs and benefits of CWA programs relative to the recent practice baseline.

It should be noted that the quantified estimates of indirect costs and benefits relative to recent practice have a number of important limitations and caveats, and are presented here as illustrative examples of the potential impacts on various CWA programs.

With the limited amount of data and modeling capability, there remains uncertainty surrounding our estimates. Following OMB circular A-4, the agencies decided to undertake scenario analysis that describes how determinations might be affected.[1] In one scenario, the agencies combined a series of "high end" assumptions, including that twice as many jurisdictional determinations will be made for "other waters" as indicated in recent Corps data. In a second scenario, we assume the number of "other waters" determinations will be the same as indicated in the recent Corps data – "low end" scenario. Finally, in a third scenario, we followed an approach similar to that used in the economic analysis accompanying the proposal. Compared to the recent practice baseline, the analysis suggests the new rule will result in an increase in the number of positive jurisdictional determinations and an associated increase in both costs and

[1] Circular A-4 provides that: "In some cases the level of scientific uncertainty may be so large that the [agency] can only present discrete alternative scenarios without assessing the relative likelihood of each scenario quantitatively." Office of Mgmt. & Budget, Exec. Office of the President, Circular A-4, Regulatory Analysis (2003), available at http://www.whitehouse.gov/sites/default/files/omb/assets/omb/circulars/a004/a-4.pdf.

benefits that derive from the subsequent implementation of CWA programs. However, a more definitive assessment would only be possible if additional data across a wide range of programs becomes available. The assumptions that were made are discussed in this report.

Evaluation of Jurisdictional Determinations

To estimate how the costs and benefits of CWA programs may change as a result of a change in the number of positive jurisdictional determinations[2] under this rule, the EPA reviewed a sample of negative jurisdictional determinations (JDs)[3] (i.e., determinations of no jurisdiction) completed by the Corps in fiscal years 2013 and 2014 to assess how the JD would change if the final rule had been in place.[4] The EPA looked at a random sample of 188 jurisdictional determination files, which represents 782 individual waters in 32 states. It is important to emphasize that the economic analysis focuses exclusively on the costs and benefits from CWA programs that would result from the associated change in negative JDs, rather than an analysis of how the scope of jurisdiction changes - nationwide data do not exist on the extent of all waters covered by the CWA. The agencies generally only make jurisdictional determinations on a case-specific basis at the request of landowners.

The agencies updated the economic analysis of the proposed rule, which relied upon data from FY09 and FY10, by reviewing more recent data from FY13 and FY14. This not only ensures that the most current data are used, but also responds to concerns raised in public comments that the FY09 and FY10 dataset used in the economic analysis for the proposed rule represented a period of decreased economic activity. JDs covering three categories of waters were reviewed – streams, wetlands, and other waters.

The agencies relied on certain conservative assumptions in their economic analysis that have the effect of consistently increasing the number of positive JDs that results from the new rule as analyzed against a baseline of recent practice. Key assumptions and JD estimates include the following:

[2] A "positive jurisdictional determination" is a decision to assert CWA jurisdiction over a particular water. The alternative is a "negative jurisdictional determination" which is a decision not to assert CWA jurisdiction over a particular water. It is important to note that the purpose of the economic analysis is not to estimate the change in the numbers of waters subject to jurisdiction.

[3] A "positive jurisdictional determination" is a decision to assert CWA jurisdiction over a particular water. The alternative is a "negative jurisdictional determination" which is a decision not to assert CWA jurisdiction over a particular water. It is important to note that the purpose of the economic analysis is not to estimate the change in the numbers of waters subject to jurisdiction.

[4] The information available in the Corps ORM2 database does not allow the agencies to evaluate the percent of waters currently found to be jurisdictional that will not be under the final rule.

- For purposes of this analysis, the agencies assume that all waters in the stream and wetlands categories of the Corps JD data would be determined to be jurisdictional under the new rule, notwithstanding the limits on jurisdiction in the new rule.
- The agencies estimate that 17.1 percent of negative jurisdictional determinations for "other waters" will become positive under the new rule because they meet the definition of "adjacent." Prior to the new rule, non-wetland adjacent waters were subject to a case-specific analysis because the definition of "adjacent" applied only to wetlands, not all waters.
- The agencies estimate that a total of 15.7 percent of the "other waters" JD category will change from negative to positive under the (a)(7) provision of the new rule.
- The agencies estimate that 1.7 percent of the "other waters" JD category will change from negative to positive under the (a)(8) provision of the new rule.
- Combining the information reported in the three bullets above, the agencies estimate that 34.5 percent of "other waters" overall will change from a negative to a positive JD under the provisions of the new rule.
- For the "high end" estimate, before estimating the overall change from negative to positive JDs, the agencies doubled the number of JDs in the "other waters" category, raising their representation in the total JD data from 6 percent to 11 percent to account for instances where landowners might not currently seek a jurisdictional determination and therefore are not represented in the data system.
- For the "low end" estimate, the agencies assume, as indicated by the Corps data, that the number of JDs in the "other waters" category is 6 percent of the total number of JDs

Combining these assumptions and the estimates derived for all of the categories of JDs in the FY13 and FY14 data produces an estimated increase of between 2.84 and 4.65 percent in positive jurisdictional determinations annually compared to recent field practice. Note that both of these scenarios contain conservative assumptions made necessary by the lack of data and modeling capability.

The Potential Benefits and Costs to Clean Water Act Programs

This rule does not result in any direct costs or benefits under the historic practice or recent practice baselines. A finding of jurisdiction regarding a particular water does not incur any direct costs. The consequence of a positive jurisdictional determination is simply that Clean Water Act provisions apply to that water – in particular, a permit would be required for a pollutant discharge that would pollute, degrade, or destroy the water. No costs would apply if no discharge or dredge/fill activity occurs. Costs would be incurred only indirectly: for example, by triggering CWA provisions by discharging pollutants into the waterway. A positive jurisdictional determination that a water is subject to the CWA is not equivalent to a new permit.

However, absent data to correlate positive jurisdiction to a new permit under Sections 402 or 404 for example, for purposes of estimating how the costs and benefits of CWA programs

may change with an increase in the number of positive JDs, our analysis employs the conservative assumption that the final rule could affect entities regulated under the CWA programs in direct proportion to this percentage change in positive jurisdictional determinations. To estimate how costs and benefits of CWA programs change under these scenarios, the agencies uniformly applied the percent increment in jurisdiction to the total costs and benefits for the Sections 311, 401, 402 (stormwater, pesticide general permit, Confined Animal Feeding Operation permits) and 404 programs to account for an estimated increase in permitting and activities that would result. Note that this is a very conservative assumption. There is no reason to believe, for example, that Confined Animal Feeding Operations would expand by this percentage – at least without similar contractions (and costs and benefit reductions) elsewhere in the economy. Also, the agencies relied on existing annual administrative and compliance cost information, and updated cost figures to 2014 dollars.

This analysis generally uses conservative assumptions about the impact a change in the scope of jurisdiction would have on various CWA programs. For example, when a water is found jurisdictional under the CWA, a permit is required for a pollutant discharge that would pollute, degrade, or destroy the water. However, after it is known that a particular water is jurisdictional, the actor that requested the determination may decide not to pollute, degrade, or destroy the water. In that case, no permit is required and no permitting costs are incurred. This analysis assumes, however, that all positive jurisdictional determinations are followed by the permit application process and permit requirements and accordingly incur related costs.

The agencies expect that some waters previously found to be jurisdictional under recent practice would occasionally be found non-jurisdictional under this rule. However, using the available data it is not possible to determine how frequently this would occur. To the extent that any previously jurisdictional waters are found non-jurisdictional under this rule, both costs and benefits would be overestimated in this analysis.

A significant focus of the benefits analysis is on an anticipated increase in CWA 404 permits that would result in ecological benefits from those permitted losses being offset through compensatory mitigation. The agencies estimate the potential benefits from CWA 404 compensatory mitigation based upon a benefits transfer analysis using studies measuring willingness to pay for preservation of wetlands similar to the type likely to be protected by this rule. For this final rule economic analysis, the agencies made improvements by refining the approach to calculating benefits from Section 404 compensatory mitigation and differentiating between emergent and forested wetlands.

An important aspect of the Clean Water Rule is the increased clarity and certainty it brings to the process of making jurisdictional determinations under the CWA. Since 2008, approximately 100,000 case-specific jurisdictional determinations have been made – a time- and resource-intensive process. The final rule is designed to reduce the need for case-specific determinations, both by clarifying categories of waters that are jurisdictional or not jurisdictional

by rule and by simplifying the process for the remaining determinations. This aspect of the final rule reduces burden and brings additional certainty to the process, but the associated benefits could not be quantified in this analysis.

Key Findings

Figure ES-1 presents a summary of how the estimated CWA program costs and benefits change under the "low end" scenario, and Figures ES-2 presents the summary of costs and benefits under the "high end" scenario. The benefit estimates presented in Figure ES-1 are calculated based on a 3 percent discount rate, as the agencies feel this is the appropriate rate in this context. Benefit estimates calculated at both 3 and 7 percent discount rates are reported in the remainder of the document. There are several costs and benefits that the agencies were unable to monetize, including permitting time and project redesign costs under Section 404, as well as the benefits of Section 404 stream mitigation, benefits of the Section 402 pesticide general permit, and benefits of the Section 401 certification program.

Key Conclusions

- Compared to the current regulations and historic practice of making jurisdictional determinations, the scope of jurisdictional waters will decrease, as would the costs and benefits of CWA programs
- Compared to a baseline of recent practice, the agencies assessed two scenarios. Those scenarios result in an estimated annual increase of between 2.84 and 4.65 percent in positive jurisdictional determinations.
- The agencies' analysis indicates that for both scenarios, the change in benefits of CWA programs exceed the costs by a ratio of greater than 1:1.
- The "other waters" category represents the greatest potential for changes in jurisdictional determinations.
- Estimated impacts on CWA programs may be over-estimated because each newly jurisdictional water will not be affected by all CWA programs simultaneously, and a particular activity affecting a water may be exempt from permitting under the Clean Water Act. It is also unlikely that new CAFOs and stormwater-relevant construction would be built on newly jurisdictional waters without decreases in construction or CAFO activities elsewhere.

Figure ES-1. Estimated Annual Indirect 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	*not quantified*	
CWA 401 Administration	$0.8	$0.8	*not quantified*	
CWA 402 Pesticide General Permit Implementation	$3.3	$3.6	*not quantified*	
CWA 404 Mitigation – Streams	$22.8	$45.2	*not quantified*	
TOTAL	**$158.4**	**$306.6**	**$338.9**	**$349.5**

* Calculations reflect rounding.

Figure ES- 2. Estimated Annual Indirect 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**	**$399.9**	**$554.9**	**$572.3**
CWA 311 Compliance	$12.7	$12.7	*not quantified*	
CWA 401 Administration	$1.3	$1.3	*not quantified*	
CWA 402 Pesticide General Permit Implementation	$5.4	$5.9	*not quantified*	
CWA 404 Mitigation – Streams	$22.8	$45.2	*not quantified*	
TOTAL	**$236.7**	**$465.0**	**$554.9**	**$572.3**

* Calculations reflect rounding.

Section 1: Introduction and Overview of the Clean Water Rule

The agencies conducted this illustrative economic analysis to show how the scope of the Final Clean Water Rule: Definition of "Waters of the United States" (hereafter referred to as the rule) compares to the historic practices under the existing regulation and to the agencies' recent field practices in making jurisdictional determinations. The latter serves as our baseline for calculating how this rule may affect the costs and benefits of specific CWA programs. This rule, revising the definition of "waters of the U.S.," by itself imposes no direct costs. The potential changes to costs and benefits from CWA programs as a result of the changes made by this rule are considered indirect, because the rule is a definitional change to a term that is used in the implementation of CWA programs (i.e., sections 303, 305, 311, 401, 402, and 404). Entities currently are, and will continue to be, subject to the provisions of these programs. Each of these programs may subsequently impose direct or indirect costs as a result of implementation of their specific provisions. While all of the costs and benefits associated with this rule are indirect, for readability throughout the rest of this document these indirect costs and indirect benefits are identified simply as costs and benefits.

Members of Congress, developers, farmers, state and local governments, energy companies, and many others requested new regulations to make the process of identifying waters protected under the CWA clearer, simpler, and faster. In this final rule, the agencies are responding to those requests from across the country to make the process of identifying waters protected under the CWA easier to understand, more predictable, and more consistent with the law and peer-reviewed science.

On April 21, 2014, the agencies published a proposed rule to reduce uncertainty about the scope of "waters of the United States" covered by Clean Water Act programs, that arose from interpretation of Supreme Court decisions in 2001 and 2006, and the subsequent guidance issued by the agencies in 2008. During the public comment period, which ran until November 14, 2014, over one million comments were received. Stakeholder input received during public outreach events in combination with the written comments received during the public comment period have reshaped each of the definitions included in the final rule, ultimately with the goal of providing increased clarity for regulators, stakeholders, and the regulated public to assist them in identifying waters as "waters of the United States." The rule reflects the judgment of the agencies when balancing the science, the statute, the Supreme Court opinions, the agencies' expertise, and the regulatory goals of providing clarity to the public while protecting the environment and public health.

The agencies made the following key changes from the proposed rule:

- Tributaries – The final rule removes wetlands and other waters lacking bed/bank and ordinary high water mark from definition – moves to adjacency;
- Adjacent waters – The final rule revises the definition for "neighboring" by establishing distance limits;
- The final rule eliminates the "other waters" category by clarifying jurisdiction over isolated waters, but not asserting jurisdiction by rule. It also identifies 5 specific subregions which are assumed to be similarly situated for purposes of conducting a case-specific significant nexus analysis;
- The final rule allows for case-specific analysis for all waters within 4,000 feet of an ordinary high water mark or high tide line of a covered tributary, impoundment, traditional navigable water, interstate water, or territorial sea and all waters within the 100-year floodplain of a traditional navigable water, interstate water, or territorial sea, whichever is broader;
- The final rule refines proposed exclusions and adds features that were not previously excluded (e.g., water distributary systems);
- The final rule redefines excluded ditches.

In preparing this document (the *Economic Analysis* or EA), the agencies updated and revised the analyses completed for the proposal. The following sections describe Clean Water Act regulatory programs that will be affected by this rule, the approach used by the agencies to estimate a potential change in jurisdictional determinations based on the final rule, potential changes to costs and benefits of several CWA programs affected by the final rule, and updates and enhancements to the analyses for the final EA.

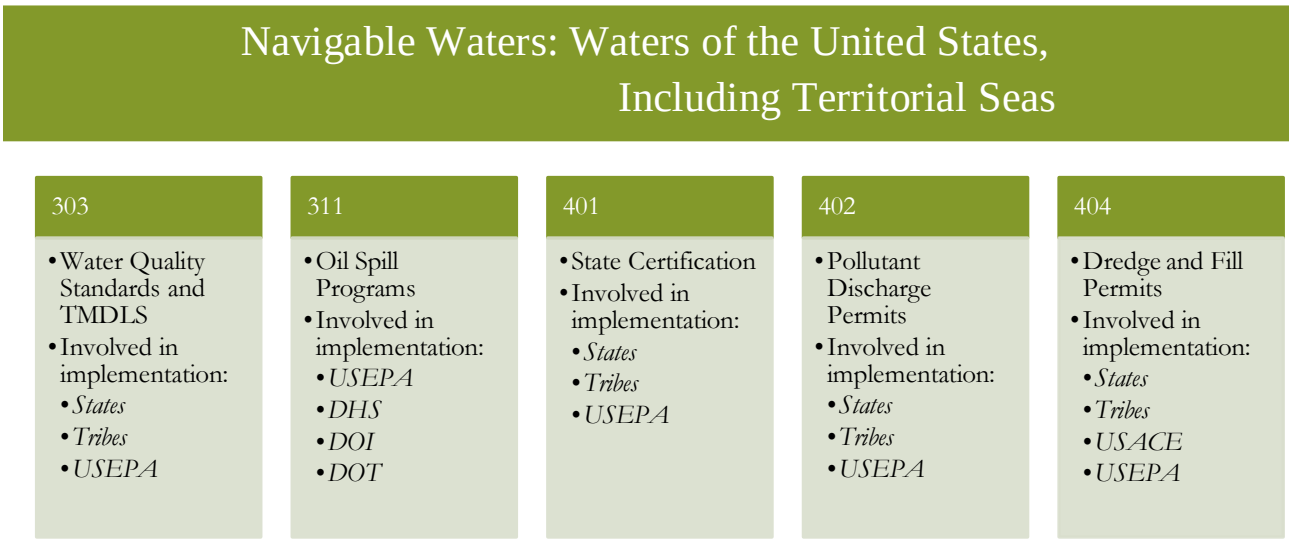
Section 2: Clean Water Act Regulatory Programs

The goal of the Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. To achieve that goal, the CWA establishes a number of regulatory and non-regulatory programs that are designed to control pollution at its source and improve water quality. As a pollution prevention statute, the CWA extends beyond waters that are navigable in fact to include the headwater streams, lakes, and wetlands and other waters that contribute significantly to protect the integrity of navigable waters. The scope of waters that are specifically covered by CWA programs is all waters meeting the definition of "waters of the United States." Any water that does not meet the definition of "waters of the U.S." is not subject to the CWA. This rule does not change the agencies' longstanding practices or regulations governing the implementation of this rule.

Figure 1 depicts the various CWA programs that are affected by the definition of "waters of the U.S.," along with the government entities that may be responsible for administering the programs. Among its many provisions, the CWA calls for states and tribes to set standards for meeting water quality goals and developing plans to restore polluted waters (section 303); establishes oil spill prevention and clean-up programs (section 311); establishes state and tribal roles in certifying that federal permits will not violate water quality standards and other CWA requirements, as well as relevant state or tribal laws (section 401); requires permits for pollutant discharges (section 402); requires permits for the placement of dredged or fill material, (section 404); and allows the federal government, states, tribes, and communities to enforce the law.

The potential effects of this rule on each of these programs is discussed in greater detail in the sections that follow.

Figure 1 - Affected Clean Water Act Programs



As shown in Figure 1, states and tribes have a significant role in administering many CWA programs. This economic analysis does not account for the possibility that some states, as a matter of state law, may be considering a broader set of waters to be subject to a state's implementation of certain CWA programs. Although the extent of a state's CWA jurisdiction may not be smaller than the definition of waters of the U.S., states and tribes may elect to implement their water quality protection programs more broadly, according to a definition of "waters of the state" or "waters of the tribe." Where individual states have elected to regulate waters more broadly, the estimated costs and benefits of this rule would be smaller than presented here (because states may already be asserting jurisdiction over waters for which this analysis presumed jurisdiction was not generally asserted in practice).

The particulars of individual state laws and regulations vary greatly. 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. The ELI report estimates that approximately half the states have some provisions that extend protections beyond "waters of the U.S." Some of these provisions pre-date new stringency limitations and may not be retroactive.[5]

[5] Environmental Law Institute. 2013. *State Constraints: State-Imposed Limitation on the Authority of Agencies to Regulate Waters Beyond the Scope of the Federal Clean Water Act.* Environmental Law Institute, Washington, DC.

Section 3: Approach for the Economic Analysis

For this economic analysis, there are two potential baselines. The first potential baseline is the existing EPA and Corps regulations the final rule replaces and the historic practice of implementing those regulations. The final rule reduces the scope of waters historically protected under the CWA. Following the Supreme Court decisions in *SWANCC* (2001) and *Rapanos* (2006), the agencies no longer asserted CWA jurisdiction over isolated waters. Because the final rule is narrower in jurisdictional scope than the existing regulations, there would be negative costs and benefits in comparison to this baseline. Unfortunately, detailed data regarding individual historic jurisdictional determinations are not available, and therefore the agencies were unable to develop quantitative estimates of the impact of the rule relative to historic practice. However, there is a second possible baseline based on recent field practice following the 2008 Guidance (see EPA and Army guidance Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in *Rapanos v. United States* & *Carabell v. United States*, issued December 2, 2008). To estimate impacts compared to recent practice, the agencies used data from the Corps regarding recent jurisdictional determinations. The remainder of this document outlines the methods and assumptions that went into developing the resulting quantitative estimates of the costs and benefits of CWA programs relative to the recent practice baseline. The agencies analyzed against this second baseline for purposes of providing illustrative estimates of the impact a change in jurisdictional determinations may have on the costs and benefits of CWA programs.

To estimate potential costs and benefits to CWA programs, the economic analysis utilizes available program data and documentation to estimate the extent to which assertion of jurisdiction might change under the final rule. The proposed rule analysis, which also estimated potential costs and benefits relative to recent field practice, utilized CWA Section 404 jurisdictional determination and permit data from fiscal years 2009-2010, which reflects Corps implementation following issuance of program guidance in 2008 by the EPA and the Corps (post *SWANCC* and *Rapanos*). The analysis for the final rule has been updated using data from 188 jurisdictional determination files from fiscal years 2013-2014. This change provided the agencies with more recent data and responded to public comments expressing concern that the fiscal year 2009-2010 data represented a period of economic downturn when fewer landowners would likely seek a jurisdictional determination for a permitted project. The available data only can inform the agencies how many currently negative determinations may become positive based on the final rule. The agencies note that there will be some waters that will no longer meet the definition of "waters of the U.S." and therefore, this analysis may over-estimate the increase in positive determinations.

Using the jurisdictional determination data from fiscal years 2013 and 2014, an estimate of how assertion of jurisdiction may increase as a result of this rule is applied to cost and benefit

information for affected CWA programs. Additional updates to the economic analysis include updated assumptions about the amount of compensatory mitigation occurring under CWA 404 general permits; a refined approach to calculating benefits from Section 404 compensatory mitigation, differentiating between emergent and forested wetlands; and updated Section 404 wetland mitigation costs. The agencies' analysis indicates that estimated incremental benefits to these programs exceed incremental costs.

Uncertainties and Limitations

The economic analysis is necessarily based on available information and the resulting cost and benefit estimates correspondingly reflect available information. In estimating costs and benefits from CWA programs under Section 311 and 401, regulator experience necessarily plays an important role, given a lack of complete information. The approach to estimating costs and benefits for each of these programs is presented in Sections 6 and 7, respectively. Additionally, costs and benefits estimated from potential increases in permitting in the CWA Section 402 program, presented in Section 8, utilize data from economic analyses from the Section 402 final rule or the final permit that established the program. As a result, cost and benefit figures presented here are subject to the same limitations as those underlying analyses. Estimates of costs and benefits from Section 404 of the CWA are presented in Section 9. Since completion of the economic analysis at proposal the Corps of Engineers undertook significant efforts to complete quality assurance on 404 program data. This resulted in improvements in data availability and data quality, which in some instances revised previously-reported values. The estimate of benefits for newly-mitigated wetland impacts utilizes benefits transfer from stated preference willingness-to-pay (WTP) studies. Literature on WTP for wetlands similar to those likely to be protected by this rule is very limited, and was predominately published in the 1990s. Since that time, significant changes have been made in standard practices for this type of study, and thus the results presented here must be viewed accordingly.

Recognizing these considerations, this analysis utilizes the best available information to assess the effects of the final rule on a variety of CWA programs and provide quantitative estimates for many potential impacts. The agencies took care throughout this document to describe the strengths and limitations of this analysis and encourage readers to treat the results with an appreciation of their limitations.

Section 4: Estimated Changes in Positive Jurisdictional Determinations

To evaluate the extent to which assertion of CWA jurisdiction by the agencies may change as a result of this rule, EPA examined data records in the Corps' ORM2 (Operation and Maintenance Business Information Link, Regulatory Module) database that documents Corps jurisdictional status decisions (jurisdictional determinations) associated with various aquatic resource types. The aquatic resource data records include the following categories: traditional navigable waters, relatively permanent waters, non-relatively permanent waters, wetlands associated with these categories; as well as uplands, impoundments, and isolated waters. The isolated waters category is used in the Corps' ORM2 database to represent intrastate, non-navigable waters; including wetlands, lakes, ponds, streams, and ditches, that lack a direct surface connection to other waterways. These waters are hereafter referred to as "ORM2 other waters."

It is important to emphasize that the ORM2 other waters group represents a more inclusive set of waters than would be determined to be subject to a case-specific analysis in the final rule. For example, the ORM2 other waters group includes many wetlands and some non-wetlands waters that could meet the new definition of "adjacent" under the final rule as well as waters that are actually traditional navigable waters but that inconsistent practices following *Rapanos* may have incorrectly classified as other waters under current practice.

To examine how assertion of jurisdiction may change, the agencies reviewed negative jurisdictional determinations (JDs) for ORM2 other waters completed by the Corps in fiscal years 2013 and 2014 (i.e., determinations of no jurisdiction). As the agency that manages day-to-day implementation of the CWA section 404 program, the Corps conducts tens of thousands of JDs each year.[6] For other federal CWA programs, EPA or the state (in the case of state-assumed programs) typically do not conduct JDs, with the exception of enforcement. Thus, most of the nation's JDs for CWA purposes originate from the Corps.

Under current practice, JDs for waters determined to be "other waters" are required to be coordinated with EPA and Corps Headquarters, creating an organized set of JD files for review. JD files for positive JDs (i.e., determinations that waters are jurisdictional) are maintained by Corps District offices, and are not organized according to the regulatory provision under which a water is jurisdictional. As a result, reviewing how current positive JDs may become negative as a result of the final rule was determined to be outside the scope of this analysis. Analyzing only negative JDs allows for an estimation of only the potential increase in assertion of CWA

[6] Only New Jersey and Michigan have assumed the CWA 404 program, although the Corps retains permitting authority over certain waters.

jurisdiction, as viewed through the lens of CWA 404 activity during the baseline period of these fiscal years. The agencies recognize that the rule may result in some currently-jurisdictional waters being found to be non-jurisdictional.

ORM2 aquatic resource records from FY13 and FY14 were placed into three groups: streams (ORM2 categories of traditionally navigable waters, relatively permanent waters, and non-relatively permanent waters), wetlands (associated with the various categories above of streams), and ORM2 other waters. These categories represent categories used in the agencies' 2008 guidance. Of the 160,000 records streams represented 65 percent of the total number of FY13 to FY14 records, wetlands represent 29 percent of the records, and other waters represent 6 percent of the records.[7] In the FY13 to FY14 baseline period, 93.2 percent of aquatic resource records were found jurisdictional where applicants sought a determination.

From this baseline level of jurisdictional determinations, the agencies estimate an overall percent change in positive jurisdictional determinations. The agencies begin by assuming that 100 percent of the records classified as streams will meet the definition of tributary in the final rule, and 100 percent of the records classified as adjacent wetlands will meet the definition of adjacent in the final rule. In assuming 100 percent jurisdiction of streams and adjacent wetlands the agencies are likely overestimating the number of positive jurisdictional determinations over these waters, because some of these streams and wetlands considered jurisdictional under current practice would not be under the final rule. Wetlands currently considered "adjacent" may be outside the applicable distance thresholds and non-jurisdictional. Similarly, all waters presently classified as streams may not meet the required physical characteristics under the final rule to be considered "tributary." Note that waters that are currently found to be jurisdictional may also be subject to the expanded set of exclusions included in the final rule. For these and similar reasons, the agencies believe that positive jurisdictional determinations under the final rule will be less than assumed for the purposes of this economic analysis.

The greatest change in current practice of CWA jurisdictional determinations is expected for waters currently known as "other waters," and captured in the ORM2 other waters category. The final rule changes the existing regulation to now capture eight categories of waters that are "waters of the U.S." The basis of asserting jurisdiction for such waters is based on a significant nexus to a traditional navigable water, interstate water, or the territorial seas instead of based on a water's ability to affect interstate or foreign commerce. As a result, this analysis assesses the ways that these waters currently found non-jurisdictional as "other waters" could be determined to be jurisdictional:

(1) a revised definition of adjacent waters, that includes physically proximate wetland and non-wetland waters, that under the existing regulations were evaluated as "isolated;"

[7] This other waters figure is consistent with the general estimate of the total proportion of "other waters" compared to the overall extent of wetlands and lakes (see e.g. Tiner (2003) and EPA (2014)).

(2) specific classes of waters determined to be similarly situated by (a)(7) in the final rule that require a significant nexus analysis to determine jurisdiction and which today are subject to a case-specific significant nexus evaluation; and

(3) waters that are subject to a case-specific significant nexus analysis under (a)(8) lie within 4,000 feet from the high tide line or ordinary high water mark of a covered tributary, impoundment, traditional navigable water, interstate water, or territorial sea, and waters that lie within the 100-year floodplain of a traditional navigable water, interstate water, or territorial sea, whichever is broader.

To determine how negative jurisdictional determinations may change for ORM2 other waters under the final rule, a team of EPA experts from across the country independently examined a random sample of 188 jurisdictional determination files previously generated with Corps headquarters during FY13 and FY14. A file may include more than one water. In total, these files represented over 782 individual waters in 32 states and all were previously determined non-jurisdictional based on current practice. Of the existing negative determinations for ORM2 other waters the EPA team made the following assessments, recognizing that without conducting further field work certain assumptions would have to be made.

<u>Waters meeting the definition of "adjacent"</u>

- 17.1 percent of negative jurisdictional determinations for ORM2 other waters are assumed to become positive jurisdictional determinations under the final rule because they meet the new definition of adjacent waters and are not excluded under paragraph (b) of the rule. These waters fall within the 100-year floodplain and are within 1,500 feet of a stream mapped on the USGS's National Hydrology Dataset (NHD). All waters within 300 feet of a stream mapped on the NHD are assumed to become adjacent waters. In the final rule, only waters that are within 100 feet of the ordinary high watermark of a non-tidally influenced traditional navigable water, interstate water, or a jurisdictional tributary are adjacent, so this result overestimates waters that could become jurisdictional within this category.
    - All of these waters are assumed to result in a positive jurisdictional determination for the purposes of the economic analysis.

<u>Waters meeting the definition of (a)(7)</u>

- A total of 21.8 percent of the ORM2 other waters were assumed to fall within section (a)(7) of the final rule and not be excluded under paragraph (b) of the rule. These waters, where they do not meet the provisions of other paragraphs of the rule, are not jurisdictional by rule, but are determined to be similarly situated by rule Their jurisdiction would still need to be determined on a case-specific basis using a significant nexus evaluation.

- To estimate the likelihood that these waters could be found jurisdictional, EPA evaluated several factors in the areas where the five categories of waters are commonly found based on Dahl (2014), Moulton (2000), and Tiner (2003).[8] Density of waters (i.e., their co-location with each other) and their proximity to the tributary system were key factors, with greater density and closer proximity generally capturing certain watersheds. In addition, chemical, physical, and biological features of each of the categories were factors, as were practical considerations such as the overall size and continuity of the area in which the category waters were located. EPA used data from the U.S. Fish and Wildlife Service's National Wetland Inventory to evaluate the density of wetlands in the areas of interest. Given the high density of wetlands in certain watersheds where the category waters are commonly located, for the purposes of this analysis it is assumed that all of the waters of the selected categories that fall into these high density watersheds will result in a positive determination. This is because a significant nexus analysis that considers the aggregation of many similarly situated waters generally is anticipated to be more likely to have a significant nexus than that which considers fewer waters. Of these special type waters in the ORM2 other waters, 9.5 percent are located in these high density watersheds, and are assumed to have a significant nexus and therefore be determined to be jurisdictional for the purposes of this analysis.

- The remaining 12.4 percent of ORM2 other waters that were identified as a special type are located in watersheds with less dense estimated wetland coverage. Given this lower density and lower likelihood of having a significant nexus, for the purposes of the economic analysis, it is assumed that half of these waters will be found to be jurisdictional under the rule, a total of 6.2 percent [=12.4%*0.5].

In the context of all ORM2 other waters, it is assumed that a total of 15.7 percent of the ORM2 other waters will become jurisdictional under (a)(7) of the final rule [=9.5%+6.2%].

Waters meeting the definition of (a)(8)

- A total of 33.1 percent of ORM2 other waters could be determined to be jurisdictional under paragraph (a)(8) of the final rule as they do not meet the new definition of adjacency, do not fall under paragraph (a)(7), and are not excluded under paragraph (b) of the final rule. Paragraph (a)(8) of the final rule allows for a case-specific significant nexus analysis for waters within 4,000 feet from the high tide line or ordinary high water mark of a covered tributary, impoundment, traditional navigable water, interstate water, or territorial sea, as

[8] Dahl, T.E. 2014. Status and trends of prairie wetlands in the United States 1997 to 2009. U.S. Department of the Interior; Fish and Wildlife Service, Ecological Services, Washington, D.C. (67 pages).
Moulton, D. W. and J. S. Jacob. 2000. Texas Coastal Wetlands Guidebook. Texas Sea Grant **(**66 pp).
Tiner, R.W. 2003. "Geographically Isolated Wetlands of the United States." *Wetlands* **23**(3): 494-516.

well as waters that fall within the 100-year floodplain of a traditional navigable water, interstate water, or territorial sea, whichever is broader. Paragraph (a)(8) also allows waters to be aggregated with waters of the same type that are similarly situated for the purposes of a significant nexus analysis. Some of the waters that will be determined to be jurisdictional under this category are presently found to be jurisdictional as adjacent waters under current practice, based on their connections to currently jurisdictional waters. Additionally, some waters that are presently determined to be jurisdictional but fall outside either the 100-year floodplain or the 4,000 foot limit under (a)(8) or that are determined to be jurisdictional as adjacent waters based on connections via confined surface flow or shallow subsurface flows will no longer be found jurisdictional under the final rule. These potential reductions in positive jurisdictional determinations are not quantified as part of this analysis due to a lack of available data.

- The agencies have assessed the potential effect of adding the 100-year floodplain within the analysis required under paragraph (a)(8) of the final rule and have concluded that it will result in only an insignificant change in the scope of CWA jurisdiction and correspondingly, a minimal effect on the costs and benefits identified in the agencies' economic analysis. The agencies are, however, unable to quantify the effect. The agencies have determined that the vast majority of the nation's water features are located within 4,000 feet of a covered tributary, traditional navigable water, interstate water, or territorial sea. We believe, therefore, that very few waters will be located outside 4,000 feet and within a 100-year floodplain. And even where these waters do exist, they would have to be found to have a significant nexus on a case-specific basis to be covered under the CWA. The agencies conclude, therefore, that this provision will not affect the indirect costs and benefits associated with the final rule in a material way.

- For the purposes of this economic analysis, the agencies assumed that 100 percent of wetlands currently considered adjacent will be determined to be jurisdictional; some of these currently adjacent waters may be outside the distance limits of adjacency in the final rule and as a result under the final rule will be determined to be jurisdictional under (a)(8), if found in a case-specific analysis to have a significant nexus. To calculate the percentage of ORM2 other waters that could found to be jurisdictional under paragraph (a)(8), the agencies used the procedure described in Section 11 of the economic analysis that accompanied the proposal, examining information on the extent of isolated wetlands in a watershed and the likelihood of aggregation and a positive significant nexus analysis.
    - This approach estimated that 5 percent of waters may be located in watersheds where a positive significant nexus evaluation with aggregation is likely (and the agencies believe that estimates beyond 10 percent of waters being found to have a significant nexus after aggregation do not represent realistic assumptions.) For the purposes of this analysis, the agencies assume that 5 percent of the remaining ORM2 other waters not meeting an exclusion under paragraph (b) of the final rule will be found to be jurisdictional under (a)(8).
    - This represents 1.7 percent of the total number of the remaining ORM2 other waters [33.1%*.05].

In total, the agencies estimate that 34.5 percent of the ORM2 other waters will be found to now be jurisdictional under this final rule. This estimate is the sum of the 17.1 percent (adjacent waters), 15.7 percent ((a)(7)), and 1.7 percent ((a)(8)) subsets of the ORM2 other waters category. The remaining 28 percent of the negative determinations for ORM2 other waters would remain negative under the final rule.

To estimate an overall potential change in positive jurisdictional determinations from recent practice, an increase in assertion of jurisdiction in any category of waters (streams, wetlands, and ORM2 other waters) is then applied proportionally based on the size of that category relative to the total number of waters in ORM2. Figure 2 presents the results of applying the assumptions above to the baseline set of ORM2 other waters.

There is some uncertainty regarding how to treat instances in which landowners may have assumed their waters to be non-jurisdictional in the FY13-14 baseline period, and thus did not request jurisdictional determinations. Therefore, this would not be included in the ORM2 data, but these waters would be most likely be similar to ORM2 other waters. The agencies consider three possibilities. The first is simply assume that landowners did, in fact, request jurisdictional determinations, and so the figure of 9,715 records for other waters in the ORM2 database is accurate. As recorded in Figure 2, this would imply that an additional 2.84 percent of jurisdictional determinations would have been positive in FY 13–14 had the final rule been in place.

There is little evidence from which to infer how many landowners did not request jurisdictional determinations under recent practices, but whose holdings would be found to be jurisdictional under the rule. To illustrate the possibilities, the agencies considered what would happen if the number of requested jurisdictional determinations were doubled for ORM2 other waters. Figure 3 presents the results under this assumption: an additional 4.65 percent of jurisdictional determinations would have been positive in FY 13–14 had the final rule been in place.

Figure 2. Projected Change in Positive Jurisdictional Determinations, Using Original Number of ORM2 Other Waters Records.[9]

	Number of ORM2 Records (FY13-14)	Percent of Total ORM2 Records	Positive Jurisdictional Records (FY13-14)	Percent Positive Jurisdiction (FY13-14)	Projected Percent Positive Jurisdiction	Relative Contribution to Overall Change in Jurisdictional Waters
Streams	103,591	65%	102,894	99.3%	100.0%	0.44%
Wetlands	46,781	29%	46,273	98.9%	100.0%	0.32%
ORM2 Other Waters	9,715	6%	0	0.0%	34.5%	2.09%
Total	160,087	100%	149,166	93.2%	96.0%	2.84%
Label	A	B	C	D	E	F
Formula		A/Total(A)		C/A		(E-D)*B

Figure 3 - Projected Change in Jurisdictional Determinations, Using Double the Number of ORM2 Other Waters Records[10]

	Number of ORM2 Records (FY13-14)	Percent of Total ORM2 Records	Positive Jurisdictional Records (FY13-14)	Percent Positive Jurisdiction (FY13-14)	Projected Percent Positive Jurisdiction	Relative Contribution to Overall Change in Jurisdictional Waters
Streams	103,591	61%	102,894	99.3%	100.0%	0.41%
Wetlands	46,781	28%	46,273	98.9%	100.0%	0.30%
ORM2 Other Waters	19,430	11%	0	0.0%	34.5%	3.94%
Total	169,802	100%	149,166	87.8%	91.4%	4.65%
Label	A	B	C	D	E	F
Formula		A/Total(A)		C/A		(E-D)*B

[9] Calculations reflect rounding.
[10] Calculations reflect rounding.

Based on these assumptions, the agencies illustrate three scenarios, with increases in jurisdictional determinations ranging from a 2.84 percent to a 4.65 percent relative to recent practice, utilizing the FY13 and FY14 jurisdictional determination dataset. The agencies use these higher and lower percent changes in jurisdictional determinations to calculate potential incremental costs and benefits when applied to Clean Water Act programs. The table in Appendix C presents costs and benefits to CWA programs when using an increase in positive jurisdictional determinations of 3.67 percent.

It is important to note that by using these estimated increases in positive jurisdictional determinations as a proxies for increases in permitting across the various Clean Water Act programs the agencies are assuming that permits (or water quality certifications) will be requested for every water that is determined to be jurisdictional. This assumption is conservative because CWA permits are not likely to be issued for every water projected to be determined jurisdictional. In addition, landowners may seek determinations, only to not move forward with a project. However, because the agencies do not know which entities will require CWA permits each year and for which newly-jurisdictional waters, the agencies apply both 2.84 percent and 4.65 percent to the CWA programs assessed.

Changes in JD Analysis from Proposed Rule EA to Final Rule EA

In addition to using more recent data from the ORM2 database, the agencies made several updates and enhancements to the EA supporting the final rule:

- When reviewing the ORM2 other waters files, the agencies applied the exemptions to exclude those that would not be subject to permitting under CWA sections 402 and 404.
- The EA supporting the proposal assumed the doubled records are only non-adjacent waters, whereas in the EA for the final rule, the agencies doubled it for all of the other waters.
- Another update is how non-adjacent waters are categorized and treated. For the final rule, the agencies analyzed them for (a)(7), (a)(8) and non-(a)(8) categories. The EA for the proposal assumed that all non-adjacent waters are equivalent to the way the agencies applied assumptions regarding (a)(8) waters which reflects a lower assertion of jurisdiction.
- As part of the analysis, the agencies also applied the exemptions in the final rule to the ORM2 other waters.

Section 5: Clean Water Act Sections 303 and 305

CWA Section 303 includes development of state water quality standards, monitoring and assessment of water quality, and development of total maximum daily loads (TMDLs) for waters that are determined by the state to not meet applicable water quality standards.

States typically develop water quality standards for general categories of waters, including wetlands; in addition to creating site-specific standards and more generic standards that can apply broadly. State water quality standards have been in effect prior to and continuing after the *SWANCC* and *Rapanos* decisions. Therefore, requirements for state water quality standards to be consistent with the CWA (designated uses, criteria to protect those uses, antidegradation policies) will likely not require any changes as a result of this rule. What could change is whether or not those standards apply to a specific water. To the extent a state believes there are needs for water quality standards development for specific types of waters, those needs would exist with or without this rule. For example, several states have distinct designated use categories for different types of streams, such as New Mexico which has categories for ephemeral waters, intermittent waters, and perennial waters. Other states have expressed interest in, or are in the process of, further refining the designated use categories in their water quality standards, or making other modifications. These are ongoing practices for water quality standards development and revision that have occurred and will continue to regardless of changes to the Federal definition of waters of the U.S. The agencies do not project any additional costs relating to development or revision of water quality standards as a consequence of this rule.

CWA 305(b) requires a report from states that includes (among other items) a description of the water quality of all navigable waters in the state and an analysis of the extent to which they meet the 101(a)(2) goals of the Act. In practice, states typically have a set budget for these activities and make plans accordingly. Many states strive to be as comprehensive as possible and balance the needs to identify all impaired waters with probabilistic surveys designed to track general status and trends. To the extent that this rule may increase the coverage where a state would wish to apply its monitoring resources, states are likely to adjust sampling locations or sampling frequency without a net cost increase. If a state chooses to monitor a water whose jurisdictional status has been affected as a result of this rule in lieu of a monitoring site currently in use, there may be opportunity costs associated with this change as there would no longer be monitoring data from the old site.

States conduct assessments based on all existing and readily-available monitoring data. States are required to list waters that are impaired, but have discretion to prioritize this list for TMDL development, which may proceed over a period of several years under EPA policy. Monitoring, assessment, and TMDL development tend to occur in water segments where the

agencies assertion of jurisdiction is unlikely to change. Therefore, additional cost burdens for TMDL development are not anticipated from this action.[11]

[11] It is also worth noting that the development and application of a TMDL in a watershed setting is likely to reduce the need for additional controls in downstream waters. In watersheds where this rule clarifies jurisdiction it may reduce the cost of returning an impaired water to a condition of meeting water quality standards by allowing more efficient control of upstream and other watershed sources of pollution.

Section 6: Estimate of Potential Clean Water Act Section 311 Oil Spill Prevention Program Costs and Benefits

CWA Section 311 addresses oil spill prevention and preparedness, reporting obligations, and response planning. These requirements apply to facilities that produce or store oil products based on total volume. In particular, inland non-transportation oil facilities of a certain size that have potential to discharge to navigable waters must prepare and implement Spill Prevention, Control, and Countermeasure (SPCC) plans. Potential costs of this rule associated with CWA Section 311 include SPCC plan development and implementation for oil storage and production facilities. In its 2009 *Regulatory Impact Analysis for the Final Amendments to the Oil Pollution Prevention Regulations*, EPA developed compliance unit costs for SPCC-regulated facilities, including plan preparation and maintenance, secondary containment, integrity testing, drainage, monthly inspections, security, and training. There are four categories of production and storage facilities, with the great majority (more than 80 percent) comprising the lowest two categories in terms of capacity, and the lowest unit costs for compliance. The weighted average annual facility cost is $9,910 for production facilities (about 35 percent of total facilities) and $14,155 for storage facilities (values adjusted to 2014$ using CPI-U).

Information from EPA Regional Office program managers and enforcement specialists reveal that some potentially-regulated facilities believe that they are not covered by the applicable SPCC regulations because they do not have the potential to discharge to a water of the U.S. Although there is not corresponding jurisdictional determination information as available for the CWA 404 permit program, it is reasonable to assume that a broader assertion of CWA jurisdiction may affect some of these facilities.

Each EPA Region has historically inspected approximately 100 facilities per year for compliance, totaling about 1,000 inspections nationwide per year, although in the past 5 years, the number of inspections has averaged about 700 per year. Upon closer inspection, some of these facilities that asserted non-jurisdiction conclude they do need to comply. Generally, less arid EPA Regions report that their facilities do not question CWA jurisdiction, whereas EPA Regions that include more arid (western) areas more frequently encounter this claim. Some EPA Regions report that one to five facilities claim non-jurisdiction and that some of these facilities report there are a dozen others like them. One EPA Region reports that at least 20 entities have asserted non-jurisdiction. Assuming that 100 inspected facilities per year could correctly claim non-jurisdiction, it is estimated that there could be ten times more facilities nationwide that could successfully make this claim, resulting in a total of 1,000 facilities each year. Assuming that none of these 1,000 facilities have incurred compliance costs (either for the SPCC rule or to meet self-imposed industry standards) and would now have to come into compliance given their proximity to a water determined to be jurisdictional under the final rule, these facilities are assumed to incur weighted average compliance costs described above. The estimated 1,000

affected facilities are divided into 350 production facilities and 650 storage facilities, consisted with the breakdown of the regulated facilities from the 2009 SPCC rule. Applying weighted average unit costs of $9,910 for production facilities and $14,155 for storage facilities results in approximately $12.7 million per year in incremental compliance costs.

Benefits associated with a reduction in spills associated with compliance with the SPCC rule include avoided costs to regulated entities to respond to the event, fines and penalties and market loss. The public will benefit from avoided environmental impacts that can be measured through willingness to pay to prevent environmental damages from oil spills. Other benefits can include avoided impacts to commercial fishing, avoided closures of recreational sites, and shutting down of drinking water intakes. EPA assumes that the risk of a spill declines through compliance with the SPCC by these facilities that will now be subject to CWA jurisdiction, but is unable to quantify the reduced risk in order to monetize this benefit for this analysis.

Section 7: Estimate of Potential Clean Water Act Section 401 Costs and Benefits

Under Section 401 of the CWA, states, tribes, and interstate agencies have the authority to review federal permits or licenses that may result in a discharge to waters of the United States, and certify if they will meet applicable water quality standards, certain other provisions of CWA requirements, and appropriate state or tribal laws. States, tribes, and interstate agencies may also condition federal permits or licenses to ensure they will not violate those laws and requirements. Section 401 certification is commonly used to review CWA section 404 permits issued by the U.S. Army Corps of Engineers, CWA section 402 permits in the four states where EPA issues National Pollution Discharge Elimination System permits, Rivers and Harbors Act section 10 permits, and Federal Energy Regulatory Commission licenses for non-federal hydroelectric dams. Because there is not a consistent level of effort across states to implement the 401 certification program, based on program experience EPA estimates that a representative distribution of effort would be 25 states dedicating 0.5 FTE (full time employees) equivalent, 20 states dedicating 10 FTE, and 5 states dedicating 20 FTE for CWA 401 implementation. This tallies to 312.5 FTE nationally.

Section 401 certification program implementation involves prioritizing and reviewing permits and generally requires expertise in science, engineering, and economics along with the associated support staff, legal support, and management. To estimate potential costs to states, Bureau of Labor Statistics occupational employment and wage estimates from May 2013 were used, adjusted to reflect fully-loaded labor costs, and updated to 2014 values using the Employment Cost for Employee Compensation Index (See Figure 18 , Appendix A). Using this data, and assuming an even mix of scientists, engineers, economists, and managers employed by state government, the average fully-loaded hourly wage is $43.21 per hour. Assuming an eight-hour work day, 5 days a week, and 52 weeks a year, this corresponds to an annual cost of $89,868 per employee. Multiplying this by a total of 312.5 FTE, this yields an annual estimate of current expenditures of approximately $28.1 million to implement this program for all federal permits.

In order to estimate the incremental costs for Section 401 programs, a 2.84 percent increase in Clean Water Act Section 404 permits is estimated to result in projected incremental costs to states of approximately $798,000 annually. In order to estimate the incremental costs including a doubling of the ORM2 other waters, a 4.65 percent increase in Clean Water Act Section 404 permits is estimated to result in projected incremental costs to states of approximately $1.3 million annually.

Figure 4 summarizes Section 401 additional administrative cost information. As the vast majority of states have assumed implementation of Section 402 of the Clean Water Act,

additional costs associated with potential growth in those programs is discussed in the following sections. States that have not assumed the Section 402 program have the opportunity to complete Section 401 certifications on these permits. However, the Section 402 programs most likely to be affected by this rule and thus examined in this analysis are typically implemented via existing statewide general permits, where a Section 401 certification already exists and permittees simply submit a Notice of Intent. Therefore, while these permits may see increased usage, there will not be any additional Section 401 review burden for states that have not assumed the NPDES program, as these general permits already exist, with state Section 401 certification.

Figure 4 - Estimated Additional CWA Section 401 Administrative Costs to States

FTE Amount for 401	Number of States	Total FTE	Total Costs (2014$)
0.5	25	12.5	$1,123,351
10	20	200	$17,973,613
20	5	100	$8,986,807
Total:		312.5	$28,083,771
Using Original Number of ORM2 Other Waters Records (2.84%)		8.9	$797,579
Using Double the Number of ORM2 Other Waters Records (4.65%)		14.5	$1,305,895

States may place additional restrictions on permits through their Section 401 authority, adding costs to permittees and environmental benefits. States can require permit conditions to protect water quality regardless of the scope of Clean Water Act jurisdiction. The costs and benefits associated with the conditions a state may place on a permit via Section 401 certification do not need to be added to the costs and benefits of this rule. States impose conditions on permits in watersheds where there are water quality concerns, which exist independently of this rule. Even in the absence of this rule, in watersheds where a state has water quality concerns it may impose additional permit conditions on permits issued within that watershed.

Section 8: Estimate of Potential Clean Water Act Section 402 Costs and Benefits

Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES) program to provide for permits to point sources, with applicable requirements and conditions, to discharge pollutants to waters of the U.S. NPDES permits address the discharge of a pollutant, yet may reflect different statutory and regulatory requirements depending on the type of point source and volume of discharge, and state water quality standards.

When evaluating potential impacts to NPDES permit costs, EPA assumes that the decrease in waters that are jurisdictional associated with implementation of the 2008 Guidance has not greatly affected the number of entities requiring individual CWA Section 402 permits, such as those issued for municipal wastewater treatment plants or industrial facilities. The EPA has not witnessed a large number of permit holders asserting they no longer required such a permit because of the non-jurisdictional status of a receiving water. While EPA is aware of occasional inquiries on this matter, no such inquiries have resulted in a permitting authority determining that a discharger no longer needed a permit. There are several potential explanations for this. First, the nature of a traditional discharge permit where a facility is seeking to have wastewater dispersed and carried away is different than a Section 404 permit where an entity is, for example, seeking to fill a portion of a natural waterway for development. As such, it is possible that a CWA 402-permitted discharger may have the effect of creating a permanent water where there once was an intermittent or ephemeral water because of continuous discharge (i.e., an "effluent-dependent" or "effluent-dominated" water). In these cases, jurisdiction may not come under question. Second, EPA has authorized most (46) states to operate the CWA Section 402 permitting program, and states assert jurisdiction over "waters of the state" which must be as inclusive as "waters of the U.S" but may be more expansive. In contrast, only two states (Michigan and New Jersey) have assumed the Section 404 program (to the extent it can be assumed for "non-navigable" waters). Additionally, facilities may have invested the capital in treatment and simply be willing to continue operating under their permit and see no need to challenge jurisdictional status.

Permitting for construction and development stormwater, concentrated animal feeding operations (CAFOs), and pesticide application are three areas of CWA Section 402 implementation where it is assumed there may be potential new costs associated with a change in the definition of "waters of the U.S." This is because these activities relate to collection of stormwater runoff rather than disposal of domestic or industrial wastewater, and EPA and states typically regulate them through CWA Section 402 general permits rather than individual permits.

Entities engaged in actions requiring general permit coverage can submit a Notice of Intent (NOI) to the permitting authority to obtain coverage. Under the existing implementation of the scope of "waters of the U.S.", many of these entities may not believe their discharge affects a protected water and may not have applied for permit coverage. Under the rule, a portion of these entities may be subject to an assertion of jurisdiction to a similar extent as those seeking Section 404 permits. Construction-related stormwater discharges, CAFO discharges, and application of pesticides are more likely occur in similar locations as CWA Section 404 dredge and fill discharge with respect to proximity to "isolated waters," small streams, and their adjacent wetlands. Thus there may be costs from this rule under these programs include implementing best management practices (BMPs) for regulated entities and administering permitting programs for government. The analysis here is derived from the estimates of direct costs for those rules.

The stormwater, CAFO, and pesticide general permit were finalized over a time period from 2003 to 2011. As such, these rules incorporated differing baselines of Clean Water Act jurisdiction in their analysis depending on if they were completed before or after the 2008 *Rapanos* decision and corresponding 2008 Guidance. These differences are discussed in the sections that follow. All analyses going forward will include the new definition of "waters of the U. S." established in this final rule as part of the baseline.

Section 402 Stormwater Permitting

Stormwater runoff is generated when precipitation from rain and snowmelt events flows over land or impervious surfaces and does not percolate into the ground. As the runoff flows over impervious surfaces (paved streets, parking lots, and building rooftops), it accumulates debris, chemicals, sediment or other pollutants that could adversely affect water quality if the runoff is discharged untreated. The primary method to control stormwater discharges is the use of best management practices (BMPs). In addition, most stormwater discharges have been designated as point sources by statute, regulations, or on a case-by-case basis and require coverage under a NPDES permit. The Stormwater program was implemented in two phases, with Phase I rule issued in 1990 and Phase II issued in 1999. The Stormwater program regulates construction sites, specific industrial sectors specified in the Phase I rule, and discharges from Municipal Separate Storm Sewer Systems (MS4s).

Stormwater runoff in cities and towns is commonly transported through MS4s, from which it is often discharged, untreated, into local waters. To prevent harmful pollutants from being washed or dumped into an MS4, operators must obtain a NPDES permit and develop a stormwater management program. The Stormwater Phase I rule, issued in 1990, requires medium and large cities or certain counties with populations of 100,000 or more to obtain NPDES permit coverage for their stormwater discharges. The Stormwater Phase II rule, issued in 1999, requires regulated small MS4s in urbanized areas, as well as small MS4s outside the urbanized areas that are designated by the permitting authority, to obtain NPDES permit coverage for their stormwater discharges. Generally, Phase I MS4s are covered by individual permits and Phase II MS4s are covered by a general permit. Each regulated MS4 is required to develop and implement a stormwater management program (SWMP) to reduce pollutant discharge from stormwater to the "maximum extent practicable" (MEP) and eliminate non-stormwater discharges.

A MS4 may have several different outflows within its service area, and some may be to waters where CWA jurisdiction may not apply. However, in implementing a SWMP, operators likely implement BMPs uniformly across their area without regard to the specific location of a specific outfall, and thus the jurisdictional status of a portion of the receiving water would not matter in terms of costs. In addition, MS4 outfalls tend not to be in wetlands, which represent a large portion of the CWA Section 404 program aquatic resource records, and the waters where the greatest changes in assertion of CWA jurisdiction is expected under this rule. Thus, the true cost of the project impact is likely to be low. Any potential costs to MS4s resulting from 404 permit requirements are captured in Section 9. With regard to 404 permits for MS4s, the agencies' longstanding practice is to view stormwater control measures that are not built in "waters of the United States" as non-jurisdictional. Conversely, the agencies view some waters, such as channelized or piped streams, as jurisdictional currently even where used as part of a stormwater management system. The proposed rule brought to light confusion about which

stormwater control features are jurisdictional waters and which are not, and this confusion is addressed in the final rule via a specific exclusion for stormwater control features that are created in dry land.

Economic impacts to industrial facilities regulated under the EPA Phase I stormwater rule are also expected to be minimal. Most industrial sectors regulated under the Phase I stormwater rule are located in urbanized areas where newly-designated jurisdictional waters are not expected to exist. If any entities are currently discharging to a non-jurisdictional water, they are currently required to have a NPDES permit if their discharge later reaches a jurisdictional water. Regulated industrial sectors that could occur in areas where newly-designated jurisdictional waters may occur (i.e., timber product facilities in SIC code 24; mining and oil and gas extraction and refining facilities in SIC codes 10-14; landfills; and air transportation facilities in SIC code 45) represent a minority of the regulated industrial stormwater universe (less than 30 percent of facilities authorized to discharge under the EPA-issued Multi-Sector General Permit (MSGP) are in one of these sectors). Additionally, these types of facilities are generally large (the average acreage of facilities authorized to discharge under the EPA MSGP in these sectors is 262 acres), and due to their scale it is expected that industrial facilities affected by the Phase I rule likely already discharge to, or their discharge reaches, a water of the U.S. Consequently, the majority of facilities in these sectors are presently covered under an existing NPDES permit and would not be newly-regulated under this rulemaking. Furthermore, nearly all oil and gas facilities qualify for an exemption from NPDES permitting and would not be affected by the rule. Section 402(l)(2) of the Clean Water Act (CWA) exempts from NPDES permitting "discharges of stormwater runoff from, oil and gas exploration, production, processing, or treatment operations or transmission facilities, composed entirely of flows which are from conveyances or systems of conveyances… which are not contaminated by contact with, or do not come into contact with, any… raw material, intermediate products, finished product, byproduct, or waste products located on the site of such operations."

Stormwater runoff from construction activities can have a significant impact on water quality. As stormwater flows over a construction site, it can pick up pollutants like sediment, debris, and chemicals and transport these to a nearby storm sewer system or directly to a river, lake, or coastal water. Polluted stormwater runoff can harm or kill fish and other wildlife. Sedimentation can destroy aquatic habitat, and high volumes of runoff can cause stream bank erosion. Debris can clog waterways and potentially reach the ocean where it can kill marine wildlife and impact habitat.

The NPDES stormwater program requires certain construction site operators to obtain coverage under a NPDES permit for their stormwater discharges. The construction site operators subject to NPDES requirements are those engaged in clearing, grading, and excavating activities that disturb one acre or more; including smaller sites in a larger common plan of development or sale.

To estimate potential incremental costs and benefits from the construction stormwater permitting program EPA used information from the *Economic Analysis of Final Phase II Storm Water Rule.*[12] The Stormwater Phase II rule was promulgated prior to the two Supreme Court cases addressing CWA jurisdiction and nearly all waters that may have a change in their jurisdictional status as a result of implementation of the final Clean Water Rule were jurisdictional at that time. All costs associated with the Phase II Stormwater Rule were fully accounted for in the economic analysis that accompanied the Phase II rule and it would not be wrong to not explicitly include them here. However, this analysis identifies the component of the original stormwater costs and benefits that may be attributed to changing jurisdictional assertions. This is done by taking both a 2.84 and 4.65 percent of the total costs and benefits calculated in the 1999 Stormwater economic analysis.

Since the issuance of the stormwater Phase II rule there has also been growth in the industry either through changes in the construction industry or changes in permitting levels resulting from the *SWANCC* and *Rapanos* decisions affecting CWA jurisdictional assertion. The 1999 Economic analysis cites to 130,000 construction starts in 1994. EPA tracks NPDES permit numbers for reporting program performance under EPA's Strategic Plan pursuant to the Government Performance and Results Act (GPRA).[13] EPA's 2011 reporting cites 169,000 construction sites with permit coverage; in 2014 164,000 covered construction sites were reported. For the purposes of this analysis growth is calculated from the higher level of permitting in 2011, which corresponds to 30 percent growth in the program.

Figure 5 summarizes costs and benefits for construction and development stormwater permitting, with costs and benefits figures updated from 1998 to 2014 dollars using the CPI-U. Increases in administrative costs are estimated to total $360,000 annually. EPA has authorized most states to implement the NPDES stormwater permitting program, so these administrative costs accrue to states implementing the program.

Costs to new permit-holders are estimated to range from $29.2 to $36.4 million annually. Using double the number of ORM2 other waters, costs to new permit-holders are estimated to range from $47.8 to $59.6 million annually. These cost estimates includes the costs of implementation of erosion and sediment controls and post-construction controls. Benefits are estimated to range from $29.0 to $36.8 million, which reflect public willingness-to-pay for water quality improvements achieved by the stormwater rule. Similarly, using double the number of ORM2 other waters, benefits are estimated to range from $47.5 to $60.2 million.

[12] U.S. Environmental Protection Agency. 1999. *Economic Analysis of Final Phase II Stormwater Rule.* U.S. Environmental Protection Agency, Washington, D.C.
[13] http://water.epa.gov/resource_performance/planning/index.cfm.

Figure 5 - Estimated Annual CWA 402 Stormwater Permitting Impacts ($ millions)

	Administrative Costs	Compliance Costs (low estimate)	Compliance Costs (high estimate)	Monetized Benefits (low estimate)	Monetized Benefits (high estimate)
	Using Original Number of ORM2 Other Waters Records				
Original Rule Analysis (1998$)	$5.3	$545.0	$678.7	$540.5	$686.0
2.84% Component of Stormwater Program affected by CWR	$0.2	$15.5	$19.3	$15.4	$19.5
30% Program Growth	$0.2	$20.1	$25.1	$20.0	$25.3
Total Incremental Change (2014$)	$0.3	$29.2	$36.4	$29.0	$36.8
	Using Double the Number of ORM2 Other Waters Records				
Original Rule Analysis (1998$)	$5.3	$545.0	$678.7	$540.5	$686.0
4.65% Component of Stormwater Program affected by CWR	$0.2	$25.3	$31.6	$25.1	$31.9
30% Program Growth	$0.3	$32.9	$41.0	$32.7	$41.5
Total Incremental Change (2014$)	$0.5	$47.8	$59.6	$47.5	$60.2

Section 402 Concentrated Animal Feeding Operation Permitting

Facilities that meet the definition of Concentrated Animal Feeding Operations (CAFOs) under CWA regulations are point sources under the CWA and are regulated under the NPDES permitting program. Most current permit holders are covered under state-issued general permits, and thus administrative costs for implementing the program fall to states and CAFO operators. EPA promulgated regulations for Concentrated Animal Feeding Operations (CAFOs) in 2003 that expanded the number of operations covered by CAFO regulations and included requirements for nutrient management plans for land application of manure from CAFOs. EPA revised this regulation in 2008 to reflect changes based on a Second Circuit Court decision. However, the basic cost and benefit information from the original economic analysis is useful for estimating potential impacts in a similar manner as above for stormwater.[14]

In the Economic Analysis to support the 2003 CAFO rule EPA estimated a potential universe of 15,000 affected entities. The CAFO rule was finalized in February 2003, after issuance of the *SWANCC* Supreme Court decision in 2001. Therefore, estimates of the affected universe of CAFOs would reflect changes in jurisdictional assertion as a result of *SWANCC*. More recent permit data indicate that in 2011 7,318 entities held CAFO permits, and in 2014 6,946 entities were permitted. These changes in permitting numbers may be the result of changes in size of the CAFO industry, or changes in jurisdictional assertion following the implementation of the agencies' 2008 Guidance interpreting the *Rapanos* decision. These recent permit numbers remain significantly below the 15,000 entities projected to be affected in the 2003 analysis, and so for this analysis the CAFO program size is decreased by 49 percent, to more accurately reflect the current universe. From this current program size, either a 2.84 or a 4.65 percent increment of the total costs and benefits is taken to account for an estimated increase in permitting resulting from changes in positive jurisdictional assertion from this rule. It should be noted that these assumptions concerning increased jurisdiction over CAFOs likely overestimate costs. It is not clear that increases in jurisdiction would result in more CAFOs being permitted and, as a result, incurring costs. Lastly, costs presented in the 2003 analysis are updated from 2001 dollars to 2014 using the CPI-U, which accounts for inflation over this time period.

Figure 6 summarizes the estimated costs and benefits associated with increased permit activity in the CAFO program due to an increase in Clean Water Act jurisdiction. Incremental costs to CAFO operators are estimated to total $6.1 million annually, or $9.9 million under a doubling of ORM2 other waters. Administrative costs, which accrue to states that have assumed the NPDES program, are estimated to total $167,000 annually, or $270,000 annually under a

[14] National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitation Guidelines and Standards for Concentrated Animal Feeding Operations (CAFOs), Final Rule. *Federal Register* 68 (12 February 2003): 7176-7274.

doubling of ORM2 other waters. Using the benefits figures monetized in the original analysis provides estimated benefits ranging from $3.8 to $6.6 million annually, or $6.2 to $10.8 million under a doubling of ORM2 other waters. Benefits for smaller CAFO operations were not calculated in the 2003 analysis. Monetized benefits are primarily from improved surface water quality (measured in terms of enhanced recreational value), reduced nitrates in private wells, reduced shellfish bed closures from pathogen contamination, and reduced fish kills from episodic events. EPA was not able to monetize a number of benefits categories, including human health and ecological benefits of reduced exposure to pollutants associated with CAFO manure; reduced eutrophication of coastal and estuarine waters due to both nutrients and runoff and deposition of ammonia volatized from CAFOs; reduced human illness due to pathogen exposure during recreational activities in estuaries and coastal waters; improvements in soil properties due to reduced over-application of manure, together with an increased acreage receiving manure applications at agronomic rates; reduced pathogen contamination in private drinking water wells, and reduced cost of commercial fertilizers for non-CAFO operations.

The agencies note that there is uncertainty that there will be additional CAFO permits that will be required by operators as a result of the final rule. Therefore, these estimated costs and benefits are merely illustrative.

Figure 6 - Estimated Annual CWA 402 CAFO Permitting Impacts ($ millions)

	Administrative Costs	**Compliance Costs**	**Monetized Benefits (low estimate)**	**Monetized Benefits (high estimate)**
	Using Original Number of ORM2 Other Waters Records			
2003 Rule Analysis (2001$)	$9.0	$326.0	$204.0	$355.0
49% Program Size Decrease	$4.4	$159.7	$100.0	$174.0
2.84% Increment	$0.1	$4.5	$2.8	$4.9
Total Incremental Change (2014$)	$0.2	$6.1	$3.8	$6.6
	Using Double the Number of ORM2 Other Waters Records			
2003 Rule Analysis (2001$)	$9.0	$326.0	$204.0	$355.0
49% Program Size Decrease	$4.4	$159.7	$100.0	$174.0
4.65% Increment	$0.2	$7.4	$4.6	$8.1
Total Incremental Change (2014$)	$0.3	$9.9	$6.2	$10.8

Section 402 Pesticide General Permitting

On October 31, 2011, EPA issued the final NPDES general permit for point source discharges to waters of the United States from the application of (1) biological pesticides, or (2) chemical pesticides that leave a residue. This permit, also known as the Pesticide General Permit (PGP), was developed in response to a decision by the Sixth Circuit Court of Appeals (*National Cotton Council, et al. v. EPA*). The Agency's final PGP covers operators that apply pesticides that result in discharges from the following use patterns: (1) mosquito and other flying insect pest control; (2) weed and algae control; (3) animal pest control; and (4) forest canopy pest control. The permit requires the minimization of pesticide discharges through the use of pest management measures and monitoring for and reporting of any adverse incidents. The general permit provides coverage for discharges in the areas where EPA is the NPDES permitting authority. In the remaining areas (44 states and the U.S. Virgin Islands), which are not included in the PGP analysis, states are authorized to develop and issue the NPDES pesticide permits.

To estimate potential increment costs from pesticide general permits, EPA utilized the economic analysis completed to support the pesticide general permit.[15] This analysis was completed in 2011, and so the baseline for the analysis incorporated any effects on jurisdiction resulting from *SWANCC* and *Rapanos*. The economic analysis focused on the 35,376 entities where EPA is the permitting authority. In other documentation EPA estimated approximately 365,000 entities could be affected nationwide once states developed and issued their own general permits for these discharges. The cost figures estimated in the original PGP analysis are scaled up to reflect this larger, nationwide universe, which inherently assumes that the costs of compliance will be similar in areas where EPA is not the permitting authority. States use the EPA PGP as a model, but they may deviate from the EPA permit and in those circumstances the cost estimates presented here may not be representative. There also may be additional costs to applicators that are not captured in these estimates. The estimated 2.84 or 4.65 percent increase in jurisdiction is applied to the cost figures from the original PGP analysis and then the number is scaled up to the entire potential universe size to estimate potential new costs and benefits resulting from this rule. After adjusting for inflation, costs range from $3.3 to $3.6 million annually; under a doubling of ORM2 other waters, costs range from $5.4 to $5.9 million. Figure 7 summarizes the process and estimated costs. The original PGP economic analysis did not estimate administrative costs to government entities nor did it quantify benefits, and these values are not estimated here.

[15] U.S. Environmental Protection Agency. 2011. *Economic Analysis of the Pesticide General Permit (PGP) for Point Source Discharges from the Application of Pesticides.* U.S. Environmental Protection Agency, Washington, D.C.

Figure 7 - Estimated Annual CWA 402 PGP Impacts ($ millions)

	Compliance Costs (low estimate)	**Compliance Costs (high estimate)**
Using Original Number of ORM2 Other Waters Records		
Original PGP Estimates (2009$)	$10.2	$11.2
2.84% Increment	$0.3	$0.3
Scale Up to Total Potential Universe	$3.0	$3.3
Total Incremental Change (2014$)	$3.3	$3.6
Using Double the Number of ORM2 Other Waters Records		
Original PGP Estimates (2009$)	$10.2	$11.2
4.65% Increment	$0.5	$0.5
Scale Up to Total Potential Universe	$4.9	$5.4
Total Incremental Change (2014$)	$5.4	$5.9

Section 9: Estimate of Potential Clean Water Act Section 404 Costs and Benefits

Section 404 of the CWA establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Activities in waters of the United States regulated under this program include fill for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports), and mining projects. Section 404 requires a permit before dredged or fill material may be discharged into waters of the United States, unless the activity is exempt from Section 404 regulation. Proposed activities are regulated through a permit review process. An *individual permit* is required where impacts are more than minimal.

Individual permit applications are reviewed by the U.S. Army Corps of Engineers, which evaluates applications under a public interest review, as well as the environmental criteria set forth in the CWA Section 404(b)(1) Guidelines. However, for most discharges that will have only minimal adverse effects, a *general permit* may be suitable. General permits are issued on a nationwide, regional, or State basis for particular categories of activities. The general permit process eliminates individual review and allows certain activities to proceed with little or no delay, provided that the general or specific conditions for the general permit are met. The great majority of discharges are authorized under a general permit.

An increase in assertion of CWA jurisdiction could produce subsequent costs of implementation of the Section 404 program as well as increased benefits. Regulated entities may face costs resulting through permit application costs, and associated compliance costs such as wetlands mitigation, stream mitigation, and project re-design and relocation expenses. There may also be program management costs and efficiencies associated with administering the Section 404 program. These costs are described in Section 11.

Through clarifying jurisdiction, this rule may result in an increase in Section 404 permits with associated costs. Ecological benefits will accrue from those permitted losses being offset through compensatory mitigation. These benefits are also presented in this section, based upon a benefits transfer analysis using studies measuring willingness to pay for preservation of wetlands similar to the type likely to be protected by this rule.

CWA Section 404 Compliance Costs

An increase in assertion of CWA jurisdiction could result in subsequent costs of implementation of the CWA 404 program: a greater number of development projects would

impact jurisdictional waters, thus requiring the sponsors of those additional projects to obtain and comply with CWA Section 404 permits. Figure 8 provides a descriptive overview of four types of CWA Section 404 permitting costs the regulated community could face – permit application costs, permitting time costs, impact avoidance and minimization costs, and compensatory mitigation costs.

Figure 8 - Conceptual Overview of CWA Section 404 Permit Compliance Costs

Cost Category	**Description (costs vary considerably by permit type and by geographic region)**
Permit Application Costs	Financial costs to finalize a permit application to a point that the Corps deems the application complete. Includes costs for delineation and survey of jurisdictional waters; preparing project area and impact drawings and maps; alternatives analysis that investigates opportunities to avoid and minimize project impacts (on-site alternatives in the case of general permits, both on- and off-site alternatives in the case of individual permits); developing a Corps-approved compensatory mitigation plan; submitting a completed application that includes all notification and other requirements. In general, permit application costs increase with the size of the project area, size of impacts to jurisdictional waters, the number of separate impact locations, and any actions needed to comply with other Federal laws before a permit can be issued (e.g., Endangered Species Act, National Historic Preservation Act). The cost of the alternatives analysis often dominates application costs for individual permits in the case of projects involving relatively large impacts to jurisdictional waters.
Permitting Time Costs	Potential financial and opportunity costs associated with any delay in project implementation resulting from the time it takes to secure a permit. In the case of private sector, for-profit development projects, time costs could include financial or opportunity costs of carrying development capital for longer periods of time. In the case of public sector projects, time costs could include opportunity costs of forgone public services and benefits from not proceeding with the project sooner rather than later.
Impact Avoidance and Minimization Costs	Potential financial and opportunity costs associated with project redesign that may be required in order to avoid and minimize impacts on jurisdictional waters. Opportunity costs could include foregone net returns to development in the case of private sector, for-profit development projects, or lower levels of public service provision and benefits in the case of public sector projects (e.g., road construction and maintenance, repair of flood control infrastructure, etc.).
Compensatory Mitigation Costs	Financial and opportunity costs to implement the Corps-approved compensatory mitigation plan that is written into the permit as a special condition. In the case of a mitigation plan that involves third-party mitigation providers (commercial mitigation banks or in-lieu fee programs), cost is driven by credit prices and the number of credits

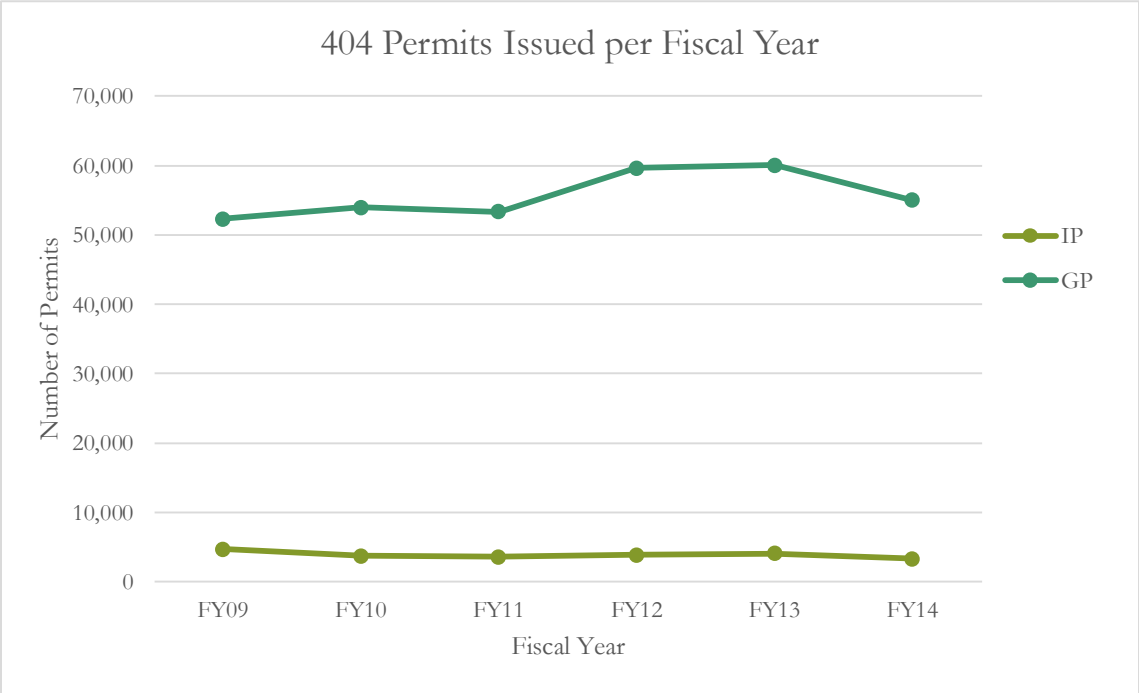
	required. In the case of a permittee-responsible mitigation plan, this may include opportunity costs of reserving a portion of development project lands for mitigation, and the financial costs of mitigation project implementation as well as mitigation monitoring, maintenance, and reporting until success criteria have been achieved. This could also include financial and opportunity costs of posting any required financial assurances for mitigation project success and/or providing any required endowment for long-term site management after mitigation success has been achieved.

The sponsors of projects subject to CWA Section 404 regulation incur costs to finalize a permit application (or a pre-construction notification in the case of general permits) that the Corps deems to be complete. Similarly, the sponsors of permitted projects also incur costs to implement compensatory mitigation actions required by permits to offset permitted impacts to jurisdictional waters. The analysis of incremental costs to the regulated community focused on the estimation of these two categories of compliance costs. Depending on circumstances, the sponsors of many private sector as well as public sector projects that are subject to Section 404 permitting can also incur permitting time costs and/or impact avoidance and minimization costs. Permitting time costs include potential financial and opportunity costs associated with delays in project implementation resulting from the time it takes to secure a permit. Impact avoidance and minimization costs include potential financial and opportunity costs associated with permit requirements to redesign projects so as to avoid and minimize project impacts on jurisdictional waters to the extent practicable. The permit costs presented here include estimation of the costs of preparing a complete CWA Section 404 permit package, which includes an analysis of alternative to avoid and minimize impacts. However, the agencies recognize that there may be circumstances where specific individual permit applicants may be asked to do additional analyses or project redesign. The agencies recognize that these costs can be significant for affected permit applicants; however, these are very case-specific costs and lacking data to support a credible approach to estimating these costs, they are excluded from this analysis.

The agencies utilize estimates of the number of additional permits and the average impact per permit to produce an estimate of additional acres of permitted impacts and associated costs. In order to estimate the number of additional permits, a baseline level of activity must be established. The agencies examined data from ORM2 on the number of individual permits and general permit authorizations issued each fiscal year, from FY2009 to FY2014. For the purposes of this analysis individual permits include standard permits and letters of permission while general permits include nationwide permits, programmatic general permits, and regional general permits. Permitting data records considered include permits issued under Clean Water Act Section 404. Data associated with permits issued under Sections 9 and 10 of the Rivers and Harbors Act of 1899; and Marine Protection, Research, and Sanctuaries Act Section 103 authority were excluded. Figure 9 shows a graph of the number of individual and general permits issued each year. Individual permit levels fluctuate between a low of 3,292 permits

issued in fiscal year 2014 and a high of 4,672 permits issued in fiscal year 2009. General permit levels peak in fiscal year 2014 with 60,020 permits issued, while the minimum number of 52,287 general permits were issued in fiscal year 2009.

Figure 9 – Individual 404 Permits (IP) and General 404 Permits (GP) Issued per Fiscal Year



In the proposed rule analysis, the agencies used a level of permitting based on permit numbers from FY2010. Commenters expressed concern that this level of permitting activity was from a time of depressed economic activity. To be responsive to these comments, in this analysis the agencies formed the baseline level of permitting activity by independently selecting the maximum number of individual permits issued in a year (4,672 from fiscal year 2009) and the maximum number of general permits issued in a year (60,020 from fiscal year 2013). Figure 10 provides a summary of this baseline level of activity. Separately selecting maximum numbers of issued general and individual permits creates a baseline level of permitting that actually has larger total permit numbers than ever actually occurred in an individual fiscal year from FY2009 to FY2014. This results in a potential over-estimate of impacts associated with an increase in positive jurisdictional determinations.

In order to estimate the potential additional impacted acreage of jurisdictional waters it is necessary to develop an estimate of the average impact per permit type. To develop this

estimate, permanent impacts from FY2013 were considered, while excluding temporary impacts[16] as well as restoration and conversion activities. Records with non-zero values in the authorized area field were included (entries that contained just a linear feet impact value or null values were excluded). By dividing the total number of non-restoration permanent impacts by the total number of FY2013 permits of this type, we are able to calculate an average impact per permit, presented in Figure 10. This average impact per permit is then multiplied by the estimated increase in permits to produce an estimate of the total additional impacted acreage.

Since issuance of the proposed rule, a data quality assurance effort was undertaken by the Corps. As a result, the average impact per permit reported here has been more thoroughly vetted than the value previously reported in the proposal analysis.

Figure 30 – Estimated Additional CWA Section 404 Permits and Impacts to Jurisdictional Waters

Permit Type	Maximum Number Permits Issues (FY09-14)	Estimated Additional Permits w/ Rule (with increase in jurisdiction)	FY13 Average Impact Per Permit (Acres)	Total Additional Impacts (Acres)
	Using Original Number of ORM2 Other Waters Records			
Individual	4,672	133	5.94	788
General	60,020	1,705	0.43	733
Total	64,692	1,837		1,521
	Using Double the Number of ORM2 Other Waters Records			
Individual	4,672	217	5.94	1,290
General	60,020	2,791	0.43	1,200
Total	64,692	3,008		2,491

Permit Application Costs

The agencies use two sets of estimates for permit application costs to calculate a range of incremental permit application costs associated with the estimated increase in permitting resulting from the final rule. These estimates of permitting costs were developed to calculate incremental permit application costs associated with the replacement of Nationwide Permit 26 (NWP 26) with a suite of new and modified nationwide permits in the year 2000 (hereafter referred to as the "NWP replacement package").

[16] For example, the Corps' 2012 Nationwide Permit 33 provides that temporary structures, work, and discharges, including cofferdams; necessary for construction activities or access fills or dewatering of construction sites can be authorized if the fill is removed in its entirety and will have no more than minimal adverse effects on aquatic resources.

The Corps developed an estimate of permit costs as part of its analysis of the incremental costs of the NWP replacement package. This estimate relied on data and information obtained through informal phone interviews with Corps District staff and consulting firms from around the country that assist the regulated community in navigating the permitting process. The Corps asked interviewees to identify major components and component and total costs for finalizing a NWP 26 pre-construction notification and an individual permit application associated with a "typical" project involving up to three acres of impacts to jurisdictional waters.

The Corps analysis of unit permit application for the NWP replacement package explicitly notes that the cost estimates were developed for a "typical" project, and that individual permit (IP) application costs for some projects could be much higher than the estimates produced for the NWP replacement package (e.g., it noted that in the case of large projects, the costs for the alternatives analysis alone could be several times the Corps estimates of IP application costs for a typical project). Further, permit application costs can vary considerably by region, so the cost for a typical project in one region can be considerably different than the cost for a typical project in another region. Also, the Corps analysis of individual permit application costs for the NWP replacement package was limited to projects affecting up to three acres of jurisdictional waters, whereas this final rule could involve new permit application costs for projects involving significantly greater impacts to waters now determined to be jurisdictional (which is relevant since permit application costs generally increase as the impact size increases). For these reasons, in this analysis the agencies use the highest Corps estimates of unit permit application costs as a lower bound of estimated permit application costs.

The NWP replacement analysis from the Corps estimated permit application costs for a pre-construction notification under NWP 26 could range from $3,000 - $10,000 and permit application costs for a standard or individual permit could range from $10,000 to $24,000. As discussed above, the high range of each of these costs was selected as a lower-bound permit application cost. The dollar figures were also adjusted for inflation from 1999$ to 2014$ using the CPI-U.

An estimate of NWP replacement costs was also commissioned by the National Association of Counties and the Foundation for Environmental and Economic Progress, whose members include large real estate development companies. This study, completed by David Sunding and David Zilberman, is hereafter referred to as the SZ study. The SZ study relied on a survey of 103 NWP and IP applications for which the project sponsors were asked to report the costs they incurred in preparing and finalizing the applications. Two-thirds of the applications in the survey sample involved projects in western states and the remainder involved applications in eastern or midwestern states. The sample involved a roughly equal mix of public sector and private sector development projects, including school construction, quarry expansion, sediment

containment, home building, road improvements, and flood control.[17] The analysis of the survey data found a statistically-significant positive relationship between the amount of permitted impacts on jurisdictional waters and the cost of preparing a NWP or an IP. The authors used the survey data to develop a relationship between impacts to jurisdictional waters (measured in acres) and the cost of preparing a NWP and an IP. For each permit type, the SZ study produced an estimate of a fixed cost component plus another cost component that varied based on the amount of impact acres.[18]

Figure 11 shows the unit application costs obtained from the two sources discussed above, and the estimated range of additional permit applications costs for individual and general permits based on the estimated increase in permits data from Figure 10. All cost figures are adjusted from 1999$ to 2014$ using the CPI-U.

[17] These details on the projects included in the survey sample are reported in: D. Sunding and D. Zilberman. 2002. "The economics of environmental regulation by licensing: An assessment of recent changes in the wetland permitting process." *Natural Resources Journal*. V. 42, Winter.

[18] The range of NWP application costs in the survey was between $2,000 and $140,076; the median cost was $11,800, and the mean cost was $28,915. The range of IP application costs in the survey was between $7,000 and $1,530,000; the median cost was $155,000 and the mean cost was $271,596. (All estimates are presumed to reflect 1999$)

Figure 11 - Estimated Annual Additional CWA Section 404 Permit Application Costs

Permit Type	Add'l Permits with Rule	FY13 Avg. Impact per Permit (acres)	Unit Costs from Corps NWP Analysis (2014$)	Unit Costs from SZ Study (2014$)	Estimated Add'l Annual Permitting Cost (2014$ millions) Low	Estimated Add'l Annual Permitting Cost (2014$ millions) High
	Using Original Number of ORM2 Other Waters Records					
Individual	133	5.94	$34,100	$62,000 plus $16,800 per acre of impact	$4.5	$8.3
General	1,705	0.43	$14,200	$23,900 plus $13,200 per acre of impact	$24.2	$40.7
Total	1,837				$28.7	$49.1
	Using Double the Number of ORM2 Other Waters Records					
Individual	217	5.94	$34,100	$62,000 plus $16,800 per acre of impact	$7.4	$13.6
General	2,791	0.43	$14,200	$23,900 plus $13,200 per acre of impact	$39.6	$66.7
Total	3,008				$47.0	$80.3

Compensatory Mitigation Costs

A portion of costs to applicants may result from compensatory mitigation of wetlands and streams. The assumption that costs *will* arise in the form of compensatory mitigation is conservative; it leads to an overestimate of costs. A landowner whose holdings are deemed to be jurisdictional might consider several options, including modifying or relocating the project, or conducting mitigation on-site, as well as purchasing compensatory mitigation credits. As a different option might be less expensive in a particular circumstance, assuming that all applicants purchase compensatory mitigation overstates costs. To estimate state-specific per-acre costs of wetland mitigation and per linear foot estimates of stream mitigation, the Corps examined published studies and survey results, made phone inquiries to Corps Districts and mitigation banks, and researched web sites. A team of Corps experts developed a range of values for each state. These costs have been updated by the Corps since the proposal, where new data have become available. Costs for mitigation in estuarine environments, whose jurisdictional status likely will not be affected by this rule, are not included where explicitly identified by mitigation bank and in-lieu fee program fee schedules. Mitigation banks and in-lieu-fee programs almost always offer wetland mitigation credits for sale; however, stream mitigation markets are less

robust. In reviewing in-lieu-fee program fee schedules, stream mitigation costs could be identified for ten in-lieu fee programs across the country. Stream mitigation continues to be a growing area of practice in the mitigation community, and an area where Corps Districts are also continuing to develop familiarity. Where new data were available, these were utilized. Where no new data were available, steam mitigation cost estimates from the proposed rule analysis were updated to 2014 dollars.

Mitigation costs vary widely, with nationwide average unit costs ranging from $41,572 to $111,985 per acre of wetlands mitigated and from $95 to $1,000 per linear foot of stream mitigation. There is more variation in unit costs per state, see Figure 20, Appendix A. Costs vary based on land acquisition costs, the nature of the work being done, demand for mitigation in the state, as well as other factors. The unit costs identified here, based on mitigation bank and in-lieu-fee program fee schedules represent fully-loaded unit costs and include the costs of land acquisition, construction work completed on site, monitoring for mitigation success, and long-term stewardship. In some cases, permittees may not purchase credits from a mitigation bank but rather complete a permittee-responsible mitigation project. The costs of this permittee-responsible mitigation project may be lower than the purchase of credits, particularly in circumstances where a mitigation project is constructed on the same tract of land as the permitted impacts. In this circumstance new land would not have to be acquired, lowering the costs of the project. Therefore, the mitigation costs estimated here may be an overestimate.

Wetland Mitigation Costs

To estimate wetlands mitigation costs the agencies assumed that all of the estimated additional acreage of impacts authorized under individual permits would require mitigation at a 2:1 ratio, with two acres of mitigation required for every acre of impact. This ratio represents the reported average amount of mitigation required per acre of authorized impact from FY09 to FY13. In the analysis prepared for the proposed rule, the percentage of ORM2 other waters determined to be jurisdictional was embedded in the calculation for the amount of mitigation required, resulting in a ratio of 1.5 acres of mitigation per acre of impact. Directly applying the 2:1 ratio uses a clearer approach utilizing existing permitting data.

For the additional acreage of impacts authorized under general permits, the agencies first assume that only half of these permits would require mitigation. As part of the analysis to support the most recent set of nationwide permits issued in 2012, the Corps estimated that only 30,000 nationwide permit authorizations would require a pre-construction notification (PCN)[19],

[19] Reissuance of Nationwide Permits, 77 Federal Register 34 (February 21, 2012), pp 10184-10290.

as compared to 60,000 authorizations actually issued in 2012. A PCN is not required for activities that, in general, do not result in more than minimal adverse effects on the aquatic environment and mitigation is not required for these authorizations. As it was estimated in the last nationwide permit package that only half of all permits would require a PCN, the agencies assume this half of the general permits would also require mitigation, assuming 2 acres of mitigation is required per acre of additional impact.

Using the estimated increase in jurisdiction assuming a doubling of the ORM2 other waters, as an example, results in an estimated increase in permitted losses of 1,290 acres authorized under individual permits, and 1,200 acres authorized under general permits from Figure 13. These assumptions can be used to calculate the total acreage of mitigation required, corresponding to 3,781 new acres of mitigation. Similar calculations were based on the ORM2 data without doubling, but separate equations are not shown.

$$New\ Mitigation_{Total}$$
$$= (2 * 1{,}290\ acres\ authorized\ under\ IPs)$$
$$+(0.5 * 2 * 1{,}200\ acres\ authorized\ under\ GPs)$$

This new level of required mitigation will compensate for newly-permitted wetland losses, resulting from an increase in assertion of CWA jurisdiction. This increased acreage of mitigation is assigned by state based on the percentage of negative FY13-14 jurisdictional determinations for wetlands and "other waters" in that state:

$$New\ Mitigation_{State} = 3{,}781\ acres * \frac{State\ \#\ Negative\ Wetland\ and\ Other\ Water\ JDs}{Nationwide\ \#\ Negative\ Wetland\ and\ Other\ Water\ JDs}$$

This approach results in more mitigation acres being assigned to states with many negative wetland or ORM2 other waters JDs, and thus likely to experience positive changes in jurisdictional assertion. Over the baseline period of FY13-14 Connecticut, Delaware, Maine, Michigan, New Hampshire, and Rhode Island had no negative JDs for wetlands or ORM2 other waters. However, the agencies did not want to presume that the actual number of negative jurisdictional determinations in these states, and therefore requirements for mitigation acres, would be zero. As a result, these states were assumed to have one negative JD.

The estimated new mitigation on a state-by-state basis was then applied to state-specific low and high wetland mitigation costs to calculate an estimated increase in mitigation costs by state. Wetland mitigation costs have been updated from the proposal where additional data were available and all costs reflect 2014 dollars. Mitigation unit cost estimates are reported in Appendix B. Estimated increases in mitigation costs by state are added to form a nationwide estimated increase in wetland mitigation costs of $54.4 to $152.3 million; using a doubling of

ORM2 other waters results in wetland mitigation costs of $89.0 to $249.4 million. State-specific values appear in Appendix B.

$$Total\ Wetland\ Mitigation\ Costs = \sum Mitigation\ Acres_{State} * Cost\ per\ Acre_{State}$$

Stream Mitigation Costs

To calculate the costs of stream mitigation, the Corps provided data on jurisdictional determinations for streams by state over FY13-14. The Corps also provided an estimate of 590 miles of stream mitigation from fiscal year 2013 to represent mitigation activity in the baseline period. The agencies believe it is a close approximation of required mitigation for FY13, and that it is consistent with the level of mitigation the Corps has estimated for the past 10 to 15 years.

From this data on baseline levels of mitigation and positive and negative jurisdictional determinations over FY13-14 the agencies are first able to calculate, in the baseline period, linear feet of mitigation per positive stream jurisdictional determination. Then, using the data from Corps on the negative stream jurisdictional determinations, the agencies can calculate the state-specific increase in mitigation if all negative stream jurisdictional determinations became positive:

$$Increase\ in\ Stream\ Mitigation_{State} = Mitigation\ per\ JD_{State} * Negative\ Stream\ JD_{State}$$

This gives an increase in linear feet of stream mitigation by state, which is multiplied by state-specific data on mitigation costs per linear foot. The nationwide increase in stream mitigation is estimated to total 111,916 linear feet. Where data are available, state-specific unit cost estimates have been updated from the proposal. Unit cost estimates appear in Appendix A; all costs reflect 2014 dollars. Summing state-specific increases in stream mitigation costs across all states gives an overall estimated increase in stream mitigation costs of $22.8 to $45.2 million. This stream mitigation estimate is not sensitive to the scenario assumptions about ORM2 other waters.

$$Total\ Stream\ Mitigation\ Costs$$
$$= \sum Linear\ Feet\ of\ Mitigation_{State} * Cost\ per\ Linear\ Foot_{State}$$

CWA Section 404 Benefits

In the absence of this rule and under recent practices, these waters were found non-jurisdictional and impacts to these waters were not required to undergo the Section 404 permitting process. A potential increase in Section 404 permits represents impacts that will now be required to undergo the Section 404 mitigation sequence of avoiding and minimizing impacts to jurisdictional waters, and finally offsetting unavoidable impacts through compensatory mitigation. The permitting process may result in a lower acreage of wetlands being impacted through avoidance of the wetlands in the project design. Remaining unavoidable losses will be offset via compensatory mitigation, and ecological benefits will accrue from the replacement of lost functions and services through compensatory mitigation.

Benefits are calculated from the estimated new impacted acreage from all individual permits and half of general permits, shown in the rightmost column of Figure 13, as mitigation is only assumed for half of general permits. In total, benefits are calculated from both 1,154 and 1,890 acres of newly-permitted losses, depending on the scenarios using original or doubled number of ORM2 other waters, now offset via mitigation.

Mitigation is typically required to be "in-kind" (i.e., of the same wetland type) as the impact site. Benefits from stream mitigation are not quantified due to a lack of available data to allow for quantification or monetization of the ecosystem services performed by the small streams that may be affected by this rule. As only wetland benefits are monetized, the benefits figures reported here are likely to be an underestimate.

Wetland Mitigation Benefits

The agencies estimate the potential benefits from CWA Section 404 compensatory mitigation using a benefits transfer approach. Benefits transfer involves selecting study cases relevant to the policy case under consideration, and transferring values using a unit value or function-based approach. While collection of original revealed or stated preference data to evaluate a policy change is ideal, it was not feasible for this rule. The major challenge with benefits transfer is that economic values for ecosystem services are context-specific (resource/region/user) and influenced as well by sample size, response rates and other quality metrics. Thus, it is best suited for transferring estimates between comparable contexts. For example, there is uncertainty involved in completing a benefits transfer where waters vary greatly in their functionality and relative value based on the relative scarcity, location within a watershed, and the degree of human impacts in their vicinity, as do the waters under consideration in this analysis. Inherent in this benefits transfer analysis is also the assumption that the wetlands whose functions are to be replaced by compensatory mitigation are of the same

quality of functionality as the wetlands valued in the willingness-to-pay (WTP) studies. Also, the users of the services in the original valuation studies may not be comparable to users in other areas; that is, the WTP among service users in different areas could differ significantly. However, without knowing specifically where impacts will occur in the future, benefits transfer remains the only feasible option for quantifying potential benefits. Given these challenges, and the uncertainty as to specific sites that may be affected by this proposed regulatory action, the benefits values presented in this analysis are most relevant for a national-level analysis. To produce a site-specific analysis there is ample opportunity for the methodology to be tailored to account for site-specific information. The type of analysis here would not be directly applicable to a site-specific evaluation.

The specific benefits transfer approach used in this analysis also relies on stated preference and aggregation of household level estimates of WTP. Stated preference studies elicit "stated preferences" rather than revealed (or actual) preferences from observed behavior. Stated preference methods rely on surveys that assess respondents stated WTP for goods or services, such as ecosystem services provided by a natural landscape feature. In using the household-level WTP information, there are not always clear rules for aggregation (i.e., determining which households pay). For this analysis, the agencies attempt to make reasonable and credible choices, but it is important to recognize that there is uncertainty and limitations associated with the results.

Valuation of Wetland Benefits

For this economic analysis and the analysis supporting the proposed rule, the agencies sought out studies from the literature that provide value estimates for a suite of ecosystem services provided by a particular wetland or wetland complex as a whole (i.e., total resource values, including both use and nonuse values). Wetlands under consideration for their value may provide varying degrees of particular services, or may not provide a particular service at all. A strength of this approach is the values elicited implicitly account for the varying degree and interrelationships among of services provided,[20] assuming respondents are sufficiently informed.

In conducting the literature search, the agencies focused on studies that assess wetlands similar to those expected to be incrementally protected under the final rule. The economic valuation literature includes a large volume of studies that estimate the value of preserving, protecting, restoring, replacing (mitigation), and increasing the size of wetlands, including

[20] The value of a bundle of services is generally not the same as the sum of values for individual services that comprise the bundle estimated separately. The independent valuation and then aggregation of multiple service values can introduce systemic bias in total value estimates because independent valuation does not account for the potential interdependence (e.g., complementarily) among services. Use of stated preference studies to estimate total values for all services collectively avoids this problem by estimating values for resource changes while considering the potential interdependence among individual resource services.

several meta-analysis studies (e.g., Moeltner and Woodward 2009).[21] Many of these studies provide values for overseas, tidal, or coastal wetlands that do not well represent waters likely be incrementally protected by this rule. For example, tidal wetlands are valued highly for fishery habitat, which is typically not provided to the same degree by wetlands adjacent to small tributaries or more isolated wetlands. Jurisdiction of tidal wetlands is not likely to change due to this rule.

Seeking only studies that value resources likely to be incrementally protected by this rule, the agencies identified 10 studies that provide 22 estimates of WTP to preserve wetlands that provide a suite of services expected to be similar to those provided by waters incrementally protected under the final rule. Given the limited scope of studies of interest, and the limited universe of wetlands valuation work generally, the relevant studies identified by the agencies are predominately from the late 1980s and early 1990s. Since this time there have been methodological advances for studies of this kind, but as there are not more recent studies available, the effect of those advances are not reflected in these numbers. Some of these methodological improvements, such as techniques to remove hypothetical biases, have lowered WTP values. However, since the early 1990s there may also have also been other changes such as awareness of wetland services and changes in income that could increase WTP. More recent studies have adopted better statistical methods and other improvements in survey methodology as well. Therefore, there is uncertainty as to whether the overall effect of these methodological improvements and other changes would result in an underestimate or overestimate of WTP. Clearly, it would be preferable to include more recent studies reflecting the current state of the art in stated preference analysis, but this was not possible as there are not relevant, more recent studies in the published literature.

These studies represent riverine or floodplain, forested, emergent, and depression or isolated wetlands in 12 states across the country. These studies are summarized in Appendix B of this report. In preparing the benefits analysis for the final rule, the agencies reviewed the benefits studies and the WTP estimates utilized from those studies and have made a number of changes in application of the study results. These changes are described below.

Loomis et al. (1991) calculated willingness to pay for preservation of vernal pools in the San Joaquin Valley of California, presenting WTP figures for residents of CA within the San Joaquin Valley and outside the San Joaquin Valley, as well as an estimated statewide WTP. The study also presents WTP values for several different management scenarios (maintenance of current wetland levels, expansion of current levels, different management for contamination, and management to improve salmon populations). In the proposal, separate WTPs for the San

[21] Moeltner, K. and R. Woodward. 2009. Meta-Functional Benefit Transfer for Wetland Valuation: Making Most of Small Samples. *Environmental and Resource Economics,* Volume 42, Issue 1, pp 89-108.

Joaquin valley and outside the San Joaquin valley were used; in addition the WTP represented a program broader than just wetlands. For this analysis the agencies have chosen WTP values from this study that more closely match the policy context, utilizing only the statewide WTP value for maintenance of current wetland levels and the statewide WTP for expansion of wetland acreage. This ensures that benefits only for wetlands programs are captured, and also utilizes the lower, statewide WTP, capturing changes in WTP based on distance from the resource.

Azevedo et al. (2000) calculated household (HH) WTP for two projects in Iowa, one of which is a prairie pothole preservation program that would seek so acquire and preserve a total of 40,000 acres of prairie potholes, acquired at a rate of 2,500 acres per year for 15 years. The proposal benefits analysis attributed the WTP value for this program to a wetland size of 2,500 acres, resulting in an erroneously high WTP per acre. For the final, we have taken the total size of the program (40,000 acres) and discounted those acres to the present at a 3% discount rate, assuming they are acquired over 15 years at a rate of 2,500 acres per year, thus describing the 40,000 acres preserved over a 15 year period in terms of the amount of acres preserved at once that would result in a socially discounted equivalent level of services. This results in a present value project size of 32,345 acres.

Poor (1999) conducted a study of WTP for preservation of Nebraska's flyway wetlands. The survey generating the WTP figures was completed in 1996. This was erroneously attributed to 1995$ in the proposal and has been corrected.

Whitehead and Blomquist (1991) presented six different figures of WTP for preservation of wetlands in Kentucky. Respondents were asked about three different wetland features, and asked their WTP given two different sets of information. The proposal used only three of these values, the final will incorporate all six values into the benefits analysis, capturing how different information affects WTP.

Mullarky and Bishop (1999) asked respondents their WTP to preserve 110 acres of wetlands in Wisconsin via re-routing of a highway. Respondents were offered a polychotomous-choice format and indicated if they would "definitely yes", "probably yes", "not sure", "probably no", or "definitely no" be willing to pay the amount offered. In the proposal, only the mean of the "definitely yes" responses was utilized as a WTP figure. In the final, the mean of the "definitely yes" and "probably yes" responses will be used. When utilizing only the "definitely yes" responses, the inherent assumption is that all other respondents had zero WTP. By including the probably yes respondents, we are ascribing greater than zero WTP to respondents where we are relatively certain their WTP is not zero, because respondents had the option to indicate they were not willing to pay the proffered amount, and did not select this option. We are unable to adjust WTP based on the degree of certainty, so it is possible the WTP value associated with the "probably yes" responses is an over-estimate, but it is certainly not zero.

Lant and Tobin (1989) asked respondents their WTP for water quality improvements for rivers in Illinois and Iowa, and estimated the increase in wetland acreage in the floodplain

necessary to achieve a higher level of water quality. In the final analysis, the WTP per acre will utilize the estimated necessary increased acreage of wetlands and the proportion of WTP for the water quality improvement being contemplated (i.e. an increase of 2,100 acres of wetlands would improve river quality by 0.55 points to "fair" (based on how respondents rated river quality). This represents 55 percent of the respondents' WTP for water quality improvements from "poor" to "fair". This study also reported WTP on a per person basis, but also provided statewide average household size at the time the study was completed. The individual WTP was adjusted to reflect household WTP based on these average household sizes.

For this analysis, it is necessary to express WTP values on a "per acre" basis rather than a "per acre per year" basis to be comparable to the mitigation cost figures presented in this section. The cost figures for compensatory mitigation reflect the total one-time cost per acre to protect and maintain the services provided by a mitigation site into perpetuity. Thus benefits should be calculated as the total per acre value, not just the one-year per acre value.

The agencies standardized WTP estimates across all studies in three ways: 1) household basis, 2) per acre basis, and 3) annual basis. For estimates reported as annual WTP for wetland preservation, the agencies derived the total present value over a period of 50 years using 3 percent and 7 percent discount rates. The agencies calculated WTP on a per household per acre basis by dividing the per household WTP value by the size of valued wetlands reported in a particular study. Additional detail on the standardization process is available in Appendix B.

National Wetlands Inventory Approach to Benefits Transfer

Different types of wetlands perform different functions and may not be valued the same. In an effort to account for these differing values, a benefits transfer exercise was completing utilizing data from the National Wetlands Inventory (NWI).[22] NWI is the leading source for geospatial information on the potential and approximate extent of wetlands across the United States. Using data from the NWI, a GIS analysis was completed examining the acreage of digitally mapped wetland habitats on a county and state basis (NWI current as of February 4, 2011). This analysis resulted in an estimate of the acreage of different categories of wetlands mapped in the NWI on a state level throughout the United States, where digital data are available. Note that this is likely an underestimate of actual wetland acreage, as at the time of the analysis digital NWI data were not available for portions of the United States and the NWI was not complete for other portions of the country. Additionally, at the time of the analysis, limited data were available in Alaska, Arkansas, Colorado, Kansas, Texas, and Utah, as approximately 75 percent or more of the wetlands in these states were not digitally mapped in the NWI. Digitization of the NWI is now complete for the conterminous United States, but parts of

[22] U. S. Fish and Wildlife Service. Data current as of February 4, 2011. National Wetlands Inventory. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. http://www.fws.gov/wetlands/.

Alaska continue to have no NWI data. Further, the NWI does not capture all wetlands, as the data are derived from aerial photo-interpretation with varying limitations due to scale (NWI is at the 1:24,000 scale), photo quality, inventory techniques, vintage of the aerial photographs, and other factors. Consequently, the maps tend to show wetlands that are readily photo-interpreted given consideration of photo and map scale, while missing certain forested wetlands that are not as easy to detect. Wetland features may also have changed since the date of the imagery and/or field work. There may be occasional differences in wetland boundaries or classifications between the information depicted on the map and the actual conditions on site. Note that the definition of wetland the NWI uses is broader than the Clean Water Act regulatory definition.

The NWI classifies wetland and deepwater habitats by types, utilizing the U.S. Fish and Wildlife Cowardin Classification System as defined by Cowardin et al.,[23] as well as categorizing wetlands in groups of similar classifications: Freshwater Forested and Shrub wetland, Freshwater Emergent wetland, Freshwater pond, Estuarine and Marine wetland, Riverine, Lakes, Estuarine and Marine Deepwater, and Other Freshwater wetland. In reviewing the projected jurisdictional changes associated with the policies in the final rule, EPA determined that the vast majority of wetlands that would become jurisdictional would fall into the NWI categories of Freshwater Forested/Shrub and Freshwater Emergent. Remaining incremental wetlands would be negligible. As described by the NWI section of the U.S. Fish and Wildlife Service website, a Freshwater Forested/Shrub wetland is a forested swamp wetland or shrub bog wetland. A Freshwater Emergent wetland is an herbaceous marsh, fen, swale, or wet meadow.[24]

The state-level wetland acreage by NWI category from the GIS analysis was used to estimate the proportion of acres in each state that fall under Forested or Emergent wetlands. This proportion was then multiplied by the projected increase in impacted acreage of Forested and Emergent wetlands, now to be off-set via mitigation (see equation below). State-specific estimates of newly-impacted acres in each state was calculated using the same approach described above to estimate the state-specific increase in mitigation acreage.

$$New\ Acres\ Forested_{State} = Total\ New\ Acres_{State} * \left(\frac{Acres\ Forested_{State}}{Acres\ Forested_{State} + Emergent_{State}}\right)$$

$$New\ Acres\ Emergent_{State} = Total\ New\ Acres_{State} * \left(\frac{Acres\ Emergent_{State}}{Acres\ Forested_{State} + Emergent_{State}}\right)$$

[23] Cowardin, L.M., V. Carter V., F.C. Golet, E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service Report No. FWS/OBS/-79/31.Washington, D.C.
[24] U. S. Fish and Wildlife Service. May 22, 2013. Wetlands Mapper Legend Categories. National Wetlands Inventory. U.S. Department of the Interior, Fish and Wildlife Service. Retrieved August 5, 2013, from http://www.fws.gov/wetlands/Data/Mapper-Wetlands-Legend.html.

The benefits studies can also be divided into the NWI categories of Freshwater Forested or Freshwater Emergent. After examining the wetlands described or specified in each case study from the original literature search, it was determined that four studies, generating thirteen WTP values assess Freshwater Forested wetlands and six studies, generating nine WTP values assess Freshwater Emergent Wetlands. WTP was calculated separately for each category by taking a geometric mean of the per-acre WTP values, weighted by the number of respondents in each study. As shown in Figure 12, WTP for Freshwater Forested/Shrub wetlands is approximately $0.04 per household per acre at a 7 percent discount rate and $0.06 per household per acre at 3 percent. WTP for Freshwater Emergent wetlands is $0.004 per household per acre at 7 percent and $0.005 per household per acre at 3 percent.

Figure 42. WTP per Household per acre ($/HH/acre) (2014$)

	Freshwater Forested/Shrub	**Freshwater Emergent**
7% Discount Rate	$0.04	$0.004
3% Discount Rate	$0.06	$0.005

Aggregation of Benefits

The next step in a benefits analysis is to determine to whom benefits accrue. In the proposed rule analysis, benefits were determined to accrue across eight wetland regions in the contiguous United States identified by the USDA Economic Research service: Central Plains, Delta and Gulf, Mountain, Midwest, Northeast, Pacific, Prairie Potholes, and Southeast.[25] Alaska is not part of a wetland region and is treated separately. Accruing benefits on a regional scale assumes that all residents within that wetland region benefit from wetland losses within that region now being offset via compensatory mitigation. Three of the WTP studies used here surveyed respondents in multiple states. Thus, it may be appropriate to consider benefits at a regional level as wetlands provide services that affect downstream water quality and uses, including beyond state borders. However, aggregating benefits using the wetland regions requires ascribing benefits over a large geographic area and there are not data available to allow for examination of the effect distance from the resource being valued has on HH WTP for wetlands.

Benefits from wetland losses now being compensated for via compensatory mitigation may also be assumed to accrue at the state level. This approach assumes that only residents within a state's boundaries receive benefits from wetland losses offset within that state. This

[25] Heimlich, R.E., R. Claassen, K.D. Wiebe, D. Gadsby, and R.M. House. 1998. *Wetlands and Agriculture: Private Interests and Public Benefits*. AER-765, U.S. Department of Agriculture Economic Research Service, Washington, D.C.

calculation for benefits may be overly conservative as wetlands can provide services and benefits to downstream waters beyond a state's boundaries, but it serves as a useful point of comparison. Additionally, six of the WTP studies utilized in this analysis completed WTP surveys with a statewide geographic scope. For these studies, ascribing benefits only within state boundaries may represent the most appropriate benefits transfer exercise

There are no clear boundaries determining to whom benefits should accrue. Though both approaches are described above as appropriate, estimating mitigation benefits using both and presenting the results as a range would introduce more variation to the analysis than is warranted. That is, the WTP values are from studies that represent largely a mix of the state and regional approaches. Applying the values at only the state level or only the regional level would ascribe some values at the scale that would be less appropriate, and thus introduce additional variation into the analysis. An additional reason that it is preferable to use a blended approach for the WTP estimates is that the WTP values from the studies represent both use and nonuse values. While we would expect the use values for a given household to be largely contained within the state where it is located, there is no reasonable justification for presuming that non-use values would only apply to wetlands contained within state boundaries. Instead, on a region by region basis, EPA has taken a blended approach, using the simple average of the WTP applied at the regional level and the weighted average WTP applied at the state level for the states in that region, and applied this blended WTP to the acreage estimated for that region.

Regional benefits for each wetland type were calculated using the following formula:

$$\begin{aligned} &Regional\ Forested/Emergent\ benefits \\ &= (Number\ of\ Households) \\ &* (Blended\ WTP\ per\ HH\ at\ a\ given\ discount\ rate) \end{aligned}$$

where *Blended WTP per HH* is the average of the WTPs per HH as applied at the state and regional levels, which also accounts for acreage of each wetland type in the region. The breakdown by region appears in Figure 13a and 13b. In the figures, multiplying the number of households by the household willingness to pay for each wetland type ($/HH), yields the total WTP. Given that the WTP per HH per acre is an order of magnitude lower for emergent wetlands than forested wetlands, while there are roughly double the acres of emergent wetlands relative to forested wetlands, the household WTP for emergent wetlands in each region is smaller than the household WTP for forested wetlands. The agencies observe the largest differences in HH WTP by wetland type in regions such as the Midwest and Northeast, where there are significantly more forested acres than emergent acres expected to be found jurisdictional. Assuming a 3 percent discount rate, this blended approach produces primary benefits estimates, depending on scenario assumptions regarding original or doubling of ORM2 other waters, of $306.1 and $501.2 million, respectively.

Figure 53a. Estimated Annual Compensatory Mitigation Benefits - Blended Approach Using Original Number of ORM2 Other Waters Records (2014$).

Blended Approach - 3% Discount Rate						
Region	**# Households**	**Acres Emergent**	**Acres Forested**	**HH WTP Emergent ($/HH)**	**HH WTP Forested ($/HH)**	**Total WTP**
AK	258,058	0.6	0.4	0.003	0.025	$7,143
Central Plains	3,293,676	14.9	6.1	0.046	0.224	$890,940
Delta and Gulf	15,407,697	40.3	47.7	0.154	1.910	$31,811,786
Midwest	24,277,640	36.4	140.9	0.104	4.610	$114,437,429
Mountain	7,835,482	62.1	25.8	0.173	0.859	$8,087,050
Northeast	24,477,954	22.5	77.9	0.063	2.599	$65,154,643
Pacific	16,716,512	31.8	12.4	0.128	0.575	$11,748,799
Prairie Potholes	2,234,657	507.4	13.2	1.403	0.435	$4,106,634
Southeast	21,492,571	14.8	99.3	0.045	3.206	$69,873,352
Total						**$306,117,776**
Blended Approach - 7%						
Region	**# HH**	**Acres Emergent**	**Acres Forested**	**HH WTP Emergent ($/HH)**	**HH WTP Forested ($/HH)**	**Total WTP**
AK	258,058	0.6	0.4	0.002	0.018	$5,126
Central Plains	3,293,676	14.9	6.1	0.036	0.159	$643,828
Delta and Gulf	15,407,697	40.3	47.7	0.121	1.356	$22,757,646
Midwest	24,277,640	36.4	140.9	0.082	3.272	$81,414,670
Mountain	7,835,482	62.1	25.8	0.136	0.610	$5,841,816
Northeast	24,477,954	22.5	77.9	0.049	1.845	$46,360,576
Pacific	16,716,512	31.8	12.4	0.100	0.408	$8,499,674
Prairie Potholes	2,234,657	507.4	13.2	1.101	0.309	$3,150,026
Southeast	21,492,571	14.8	99.3	0.036	2.275	$49,667,535
Total						**$218,340,897**

Figure 63b. Estimated Annual Compensatory Mitigation Benefits - Blended Approach Using Double the Number of ORM2 Other Waters Records (2014$).

Blended Approach - 3% Discount Rate						
Region	**# Households**	**Acres Emergent**	**Acres Forested**	**HH WTP Emergent ($/HH)**	**HH WTP Forested ($/HH)**	**Total WTP**
AK	258,058	1.0	0.7	0.005	0.041	$11,696
Central Plains	3,293,676	24.4	10.0	0.076	0.367	$1,458,757
Delta and Gulf	15,407,697	66.0	78.1	0.253	3.128	$52,086,199
Midwest	24,277,640	59.5	230.7	0.170	7.548	$187,371,142
Mountain	7,835,482	101.7	42.2	0.283	1.406	$13,241,121
Northeast	24,477,954	36.9	127.6	0.103	4.255	$106,679,257
Pacific	16,716,512	52.1	20.3	0.210	0.941	$19,236,590
Prairie Potholes	2,234,657	830.8	21.7	2.297	0.712	$6,723,890
Southeast	21,492,571	24.2	162.6	0.074	5.249	$114,405,313
Total						**$501,213,964**
Blended Approach - 7%						
Region	**# HH**	**Acres Emergent**	**Acres Forested**	**HH WTP Emergent ($/HH)**	**HH WTP Forested ($/HH)**	**Total WTP**
AK	258,058	1.0	0.7	0.004	0.029	$8,393
Central Plains	3,293,676	24.4	10.0	0.060	0.260	$1,054,155
Delta and Gulf	15,407,697	66.0	78.1	0.198	2.220	$37,261,639
Midwest	24,277,640	59.5	230.7	0.134	5.357	$133,302,188
Mountain	7,835,482	101.7	42.2	0.222	0.998	$9,564,945
Northeast	24,477,954	36.9	127.6	0.081	3.020	$75,907,281
Pacific	16,716,512	52.1	20.3	0.165	0.668	$13,916,720
Prairie Potholes	2,234,657	830.8	21.7	1.802	0.506	$5,157,613
Southeast	21,492,571	24.2	162.6	0.058	3.726	$81,321,845
Total						**$357,494,779**

Section 10: Summary of Estimated Indirect Costs and Benefits

Compared to a baseline of existing regulations and historic practice, this rule results in a decrease in CWA jurisdiction because the scope of regulatory jurisdiction in this rule is narrower than that under the existing regulations. Compared to a baseline of recent practice, this rule is estimated to result in a 2.84 to 4.65 percent increase in waters found jurisdictional under the Clean Water Act. Jurisdictional waters must not always be preserved in their natural state and never receive discharges of pollutants, but rather jurisdiction requires those seeking to discharge pollutants to receive a CWA permit and take required steps to ensure protection of water quality.

This analysis estimates potential increases in costs and benefits from CWA programs that may subsequently see increased permitting activity as a result of this rule, including CWA Sections 311; 401; 402 CAFO, stormwater, and pesticide permits; and 404.

Figures 14a and 14b display a summary of these monetized costs and benefits to CWA programs. There are several costs and benefits that are unable to be monetized, including permitting time and project redesign costs under Section 404, as well as the benefits of Section 404 stream mitigation, benefits of the 402 pesticide general permit, and benefits of the 401 certification program. A comparison of the monetized costs and benefits indicates that the benefits outweigh the costs.

Figure 74a. Estimated Annual Indirect Costs and Benefits to CWA Programs, 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	*not quantified*	
CWA 401 Administration	$0.8	$0.8	*not quantified*	
CWA 402 Pesticide General Permit Implementation	$3.3	$3.6	*not quantified*	

CWA 404 Mitigation – Streams	$22.8	$45.2		*not quantified*	
TOTAL	**$158.4**	**$306.6**		**$338.9**	**$349.5**

Figure 84b. Estimated Annual Indirect Costs and Benefits to CWA Programs, 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		*not quantified*	
CWA 401 Administration	$1.3	$1.3		*not quantified*	
CWA 402 Pesticide General Permit Implementation	$5.4	$5.9		*not quantified*	
CWA 404 Mitigation – Streams	$22.8	$45.2		*not quantified*	
TOTAL	**$236.0**	**$465.0**		**$554.9**	**$572.3**

Section 11: Other Social Costs and Benefits

The changes in the definition of "waters of the U.S." under the Clean Water Act as a result of this rule will also affect federal government operations. In general, the agencies believe that the final rule will expedite the permit review process in the long-term by clarifying jurisdictional matters that have been time-consuming and cumbersome for field staff and the regulated community. However, with a projected increase in waters that will be jurisdictional when compared to the recent practice baseline, the agencies anticipate that there will be an increase in permit applications to be managed. The estimated incremental administrative costs to the Corps are described below.

Corps Administrative Costs

The Corps anticipates that it will incur additional administrative costs under the rule associated with the increased permitting workload. The Corps is typically, but not always, the permitting authority for CWA 404 permits. The states of Michigan and New Jersey have assumed the CWA 404 permitting program and may experience additional costs, but these are not captured in this analysis. Sources of administrative costs include: responding to additional requests for jurisdictional determinations; an overall increase in workload-related tasks such as permit actions, consultations, and compliance and enforcement actions; and additional time to conduct significant nexus analyses. The Corps will also likely face additional costs to provide program management, training, and compliance oversight associated with administering the program, especially in the near term. Figure 16 briefly summarizes the principal cost categories for administering the CWA 404 program.

Figure 95 - Overview of CWA 404 Administrative Costs

Cost Category	Description (costs vary considerably by permit type and often by district)
Permitting Costs	Costs associated with the time needed to review additional permits (which may be more complex due to a larger scope of review, reduction in the ability to avoid and minimize impacts, requiring more project modifications and additional mitigation) additional compliance and enforcement costs, additional mitigation plan reviews, effort to conduct additional agency consultations and coordination and possible increase in permit appeal requests and litigation costs.
JD Review and Coordination Costs	Additional time needed to review additional JD requests, more coordination with Corps Headquarters for "other" (isolated) waters, additional time for District staff to prepare a significant nexus evaluation for "other" waters. More appeals of approved JDs may occur.
Automation Costs	Additional costs for automating new JD forms, updating the permit tracking system (ORM2) to reflect needed data elements, updating user

	documentation.
Training Costs	Additional costs for Corps districts to implement the new guidance/rule, includes webinars, field training, and outreach activities for the regulated public.[26]

The increase in waters that the agencies consider jurisdictional from the 2008 Guidance may result in an increase in requests for JDs. Some changes contained in the final rule, such as providing a definition of tributaries that are categorically jurisdictional, should reduce the administrative costs of establishing jurisdiction. If such changes balance the expected increase in JD requests, there would be no incremental change administrative costs related to jurisdictional determinations.

Because the agencies expect that most non-isolated waters will be jurisdictional under the policies under the proposed rule, applicants may find "preliminary JDs" (PJDs) more appealing. In a PJD a permit applicant elects to set aside the question of jurisdiction and voluntarily "opts in" to the permitting process and avoids a longer "approved JD" (AJD) process. In FY2010, 58 percent of JDs were PJDs (42 percent were AJDs). PJDs are less time-consuming to document than AJDs, but permit application processing may require more information describing jurisdictional waters (e.g., to assess impacts and formulate compensatory mitigation requirements). Alternatively, some applicants may request an AJD as a means to potentially reduce mitigation requirements and associated costs. If more landowners elect to request AJDs, the workload and administrative costs will increase.

The agencies expect that permit applications will increase as the Corps determines that more waters are jurisdictional. This increase in permit activity may increase required consultations under the Endangered Species Act (ESA) and Section 106 of the National Historic Preservation Act. This could increase costs for other agencies, such as the Fish and Wildlife Service, NOAA Fisheries, Advisory Council on Historic Preservation, and Tribal and State Historic Preservation Officers.

Figure 16 depicts the broad categories and specific tasks related to Corps administration of the CWA 404 program. To derive an estimate of the incremental administrative costs, the Corps identified how many hours per year are devoted to each task at the headquarters and district office level and translated this into dollars using average fully loaded salary rates for the needed personnel. Applying an adjustment for the final rule incremental percentage for the increase in CWA 404 permits relative to the proposal, and converting from 2010 to 2014 dollars using the CPI, the Corps estimates that their additional administrative costs will range from $5.5 to $9.9 million for the 2.84 percent scenario, and $9.0 to $16.3 for the 4.65 percent scenario.

[26] As the day-to-day permitting authority, the Corps will have primary responsibility for conducting outreach and training for industry and entities seeking permits.

Figure 16 - Categories of Corps CWA 404 Administrative Tasks

Category	Tasks
Wetland Delineation and Jurisdictional Determination (JD)	Preliminary JD
	Office/Desk JD
	Field JD
Permit Related Tasks	Pre-Application Meetings
	Standard Permit (SP) Processing Base
	Letter of Permissions (LOP)
	Nationwide (NWP) Processing without a Pre-Construction Notification (PCN)
	NWP Processing with PCN
	Regional/Programmatic (RGP/PGP) Processing without PCN (issued by Regulatory)
	RGP/PGP Processing with PCN (issued by Regulatory)
Consultation	Endangered Species Act (ESA) Formal Consultation Process
	ESA Informal Consultation Process
	Historic Properties
	Tribal
Environmental Impact Statement (EIS)	EIS as Lead
	EIS as Cooperating Agency
Compliance	Compliance
	Resolution of Non-Compliance
Enforcement	Unauthorized Activity

Section 12: Related Acts of Congress, Executive Orders, and Agency Initiatives

Paperwork Reduction Act

This action does not impose any information collection burden under the provisions of the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. Burden is defined at 5 CFR 1320.3(b). An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for the CWA section 402 program may be found at 40 CFR 9.1. (OMB Control No. 2040-0004, EPA ICR No. 0229.19). For the CWA section 404 regulatory program, the current OMB approval number for information requirements is maintained by the Corps of Engineers (OMB approval number 0710–0003). However, there are no new approval or application processes required as a result of this rulemaking that necessitate a new Information Collection Request (ICR).

Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice-and-comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions.

For purposes of assessing the impacts of this final action on small entities, "small entity" is defined as: (1) a small business that is a small industrial entity as defined in the U.S. Small Business Administration's size standards (see 13 CFR 121.201); (2) a small governmental jurisdiction that is a government of a city, county, town, school district, or special district with a population of less than 50,000; or (3) a small organization that is any not-for-profit enterprise that is independently owned and operated and is not dominant in its field.

After considering the economic impacts of this rule on small entities, I certify that this final rule will not have a significant economic impact on a substantial number of small entities. See, e.g., *Cement Kiln Recycling Coalition* v. *EPA*, 255 F.3d 855 (D.C. Cir. 2001); *Michigan* v. *EPA*, 213 F.3d 663 (D.C. Cir. 2000); *Am. Trucking Ass'n* v. *EPA*, 175 F.3d 1027 (D.C. Cir. 1999); *Mid-Tex Elec. Co-op, Inc.* v. *FERC*, 773 F.2d 327 (D.C. Cir. 1985).

Under the RFA, the impact of concern is any significant adverse economic impact on small entities, because the primary purpose of the initial regulatory flexibility analysis is to identify and address regulatory alternatives "which minimize any significant economic impact of the rule on small entities." 5 U.S.C. 603. The scope of regulatory jurisdiction in this rule is narrower than that under the existing regulations. *See* 40 CFR 122.2 (defining "waters of the United States"). Because fewer waters will be subject to the CWA under the rule than are subject to regulation under the existing regulations, this action will not affect small entities to a greater degree than the existing regulations. As a consequence, this action will not have a significant adverse economic impact on a substantial number of small entities, and therefore no regulatory flexibility analysis is required.

The final rule is not designed to "subject" any entities of any size to any specific regulatory burden. Rather, it is designed to clarify the statutory scope of "the waters of the United States, including the territorial seas" (33 U.S.C. 1362(7)), consistent with Supreme Court precedent. This question of CWA jurisdiction is informed by the tools of statutory construction and the geographical and hydrological factors identified in *Rapanos* v. *United States*, 547 U.S. 715 (2006), which are not factors readily informed by the RFA.

Nevertheless, the scope of the term "waters of the United States" is a question that has continued to generate substantial interest, particularly within the small business community, because permits must be obtained for many discharges of pollutants into those waters. In light of this interest, the agencies sought wide input from representatives of small entities while formulating the proposed and final definition of this term that reflects the intent of Congress consistent with the mandate of the Supreme Court's decisions. Such outreach, although voluntary, is also consistent with the President's January 18, 2011 Memorandum on Regulatory Flexibility, Small Business, and Job Creation, which emphasizes the important role small businesses play in the American economy. This process has enabled the agencies to hear directly from these representatives, throughout the rule development, about how they should approach this complex question of statutory interpretation, together with related issues that such representatives of small entities may identify for possible consideration in separate proceedings. The agencies have prepared a report summarizing their small entity outreach, the results of this outreach, and how these results have informed the development of this rule. This report, *Final Summary of the Discretionary Small Entity Outreach for the Revised Definition of Waters of the United States* (Docket Id. No. EPA-HQ-OW-2011-0880-1927), is available in the docket.

Unfunded Mandates Reform Act

This action does not contain any unfunded mandate under the regulatory provisions of Title II of the Unfunded Mandates Reform Act of 1995 (UMRA) (2 U.S.C. 1531-1538), and does not significantly or uniquely affect small governments. The action imposes no enforceable duty

on any state, local, or tribal governments, or the private sector, and does not contain regulatory requirements that might significantly or uniquely affect small governments. The definition of "waters of the United States" applies broadly to CWA programs.

Executive Order 13132: Federalism

This rule does not have federalism implications. It will not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government.

Keeping with the spirit of Executive Order 13132 and consistent with the agencies' policy to promote communications with state and local governments, the agencies consulted with state and local officials throughout the process and solicited their comments on the proposed action and on the development of the rule.

For this rule State and local governments were consulted at the onset of rule development in 2011, and following the publication of the proposed rule in 2014. In addition to engaging key organizations under federalism, the agencies sought feedback on this rule from a broad audience of stakeholders through extensive outreach to numerous State and local government organizations.

Early in the rulemaking process, EPA held two in-person meetings and two phone calls in the fall and winter of 2011. Organizations involved include the National Governors Association, the National Conference of State Legislatures, the Council of State Governments, the National Association of Counties, the National League of Cities, the U.S. Conference of Mayors, the County Executives of America, the National Associations of Towns and Townships, the International City/County Management Association, and the Environmental Council of States. Additionally, the National Association of Clean Water Agencies and the Association of Clean Water Administrators were invited to participate. The agencies held many additional calls and meetings with state and local governments and their associations, in preparation for the development of a proposed rule.

Similarly to the outreach conducted prior to the development of the rule, the agencies committed themselves to providing a transparent, comprehensive, and effective process for taking public comment on the proposed rule. As part of this consultation, EPA held a meeting on May 13, 2014 to seek technical input on the proposed rule from the largest national representative organizations for State and local governments. During this process the agencies also extended its focused outreach to include a series of meetings with the Local Government Advisory Committee, and the Environmental Council of the States in conjunction with the Association of Clean Water Administrators and the Association of State Wetland Managers. In

addition to engaging these key organizations under, the agencies sought additional feedback on the proposed rule through broader public outreach to state and local government organizations during the public comment period.

During the consultation process, some participants expressed concern that the proposed changes may impose a resource burden on state and local governments. Some participants urged EPA to ensure that states are not unduly burdened by the regulatory revisions.

The agencies have prepared a report summarizing their voluntary consultation and extensive outreach to State, local, and county governments, the results of this outreach, and how these results have informed the development of today's rule. This report, *Final Summary of the Discretionary Consultation and Outreach to State, Local, and County Governments for the Revised Definition of Waters of the United States* is available in the docket for this rule.

Executive Order 13175: Consultation and Coordination with Indian Tribal Governments

Subject to the Executive Order (E.O.) 13175 (65 FR 67249, November 9, 2000), agencies may not issue a regulation that has tribal implications, that imposes substantial direct compliance costs, and that is not required by statute, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by tribal governments, or the agencies consult with tribal officials early in the process of developing the proposed regulation and develops a tribal summary impact statement.

This action does not have tribal implications as specified in E.O. 13175. In compliance with the EPA Policy on Consultation and Coordination with Indian Tribes (May 4, 2011), the agencies consulted with tribal officials throughout the rulemaking process to gain an understanding of tribal issues and solicited their comments on the proposed action and on the development of today's rule. In the course of this consultation, the agencies participated in aspects of the process.

The agencies began consultation with federally-recognized Indian tribes on the Clean Water Rule defining waters of the U.S. in October 2011. The consultation and coordination process, including providing information on the development of an accompanying science report on the connectivity of streams and wetlands, continued, in stages, over a four year period, until the close of the public comment period on November 14, 2014. EPA invited tribes to provide written input on the rulemaking throughout both the tribal consultation process and public comment period.

EPA specifically consulted with tribal officials to gain an understanding of, and to address, the tribal implications of the proposed rule. In 2011, close to 200 tribal representatives

and more than 40 tribes participated in the consultation process, which included multiple webinars and national teleconferences and face-to-face meetings. In addition, EPA received written comments from three tribes during the initial consultation period.

EPA continued to provide status updates to the National Tribal Water Council and the National Tribal Caucus during 2012 through 2014. The final consultation event was completed on October 23, 2014 as a national teleconference with the Office of Water's Deputy Assistant Administrator. Ultimately, EPA received an additional 23 letters from tribes/tribal affiliations by the completion of the consultation period. The comments indicate that Tribes, overall, support increased clarity of waters protected by the Clean Water Act, but some express concern with the consultation process and the burden of any expanded jurisdiction. The feedback received through consultation and written comments have been incorporated in today's rule.

The agencies have prepared a report summarizing their consultation with tribal nations, and how these results have informed the development of this rule. This report, *Final Summary of Tribal Consultation for the Clean Water Rule: Definition of "Waters of the United States" Under the Clean Water Act; Final Rule* is available in the docket for this rule.

As required by section 7(a), EPA's Tribal Consultation Official has certified that the requirements of the executive order have been met in a meaningful and timely manner. A copy of the certification is included in the docket for this action.

Executive Order 13045: Protection of Children from Environmental Health and Safety Risks

This action is not subject to E.O. 13045 because the environmental health or safety risks addressed by this action do not present a disproportionate risk to children.

Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use

This action is not a "significant energy action" as defined in Executive Order 13211 (66 FR 28355, May 22, 2001), because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy.

Appendix A: Supplemental Cost Analysis Information

Figure 107. Occupational Employment and Wage Estimates.

Position	Occupational Code[1]	Mean Hourly Wage[1]	Benefits Adjustment Factor[3]	Year Adjustment[4]	Total Hourly Adjusted Wage
Private Industry					
Environmental Scientist	19-2041	$35.89	1.30	1.03	$47.96
Environmental Engineer	17-2081	$41.74			$55.77
Administrative Assistant	43-6011	$27.32			$36.51
Lawyer	23-1011	$66.41			$88.74
Economist	19-3011	$50.54			$67.53
Local Government					
Environmental Scientist	19-2041	$30.27	1.35	1.02	$41.88
Environmental Engineer	17-2081	$37.58			$51.99
Administrative Assistant	43-6011	$25.09			$34.71
Lawyer	23-1011	$46.13			$63.82
Economist	19-3011	$36.35			$50.29
State Government					
Environmental Scientist	19-2041	$28.50	1.35	1.02	$39.43
Environmental Engineer	17-2081	$35.26			$48.78
Administrative Assistant	43-6011	$21.42			$29.63
Lawyer	23-1011	$40.19			$55.60
Economist	19-3011	$30.78			$42.58
Federal Government					
Environmental Scientist	19-2041	$46.93	1.31	1.03	$63.18
Environmental Engineer	17-2081	$46.91			$63.16
Administrative Assistant	43-6011	$27.32[2]			$36.79
Lawyer	23-1011	$62.87			$84.65
Economist	19-3011	$53.54			$72.08

1. Occupational codes and mean hourly wage from BLS (2014). Bureau of Labor Statistics (BLS), United States Department of Labor. 2014. Occupational Employment and Wages, May 2013. http://www.bls.gov/oes/current/oes_nat.htm

2. Hourly mean wage for administrative assistants working in the federal government not calculated in the May 2013 dataset. Hourly mean wage for private industry used for federal government rate.

3. Adjusted for benefits according to the Employment Cost for Employee Compensation Index for professional and related for private industry, local and state employees, and civilian workers. Average value across all three quarters of 2013. http://www.bls.gov/ncs/ect/

4. Escalated to 2014 dollars using the seasonally-adjusted Employment Cost Index for private industry (May 2013 (Q2) =118.4, 2014 Q3=121.7), state and local employees (May 2013 (Q2) =121.0, 2014 Q3=124.0), and civilian workers (May 2013 (Q2) =118.9, 2014 Q3=122.2)

Figure 18. State-Level Unit Cost Data and Incremental Increases in Wetland and Stream Mitigation.

State	Increase in Wetland Mitigation (Acres)	Per Acre Unit Cost of Wetlands Mitigation		Increase in Stream Mitigation (Linear Feet)	Per Linear Foot Unit Cost of Stream Mitigation	
		Low	High		Low	High
AK	3.4	$5,500	$55,000	23	$1,000	$1,000
AL	23.7	$10,524	$21,049	2,259	$380	$964
AR	23.7	$2,105	$5,262	54,862	$185	$343
AZ	36.3	$9,000	$23,000	1,000	$185	$343
CA	122.1	$18,500	$350,000	723	$185	$343
CO	25.2	$33,678	$105,245	14	$185	$343
CT	0.5	$124,000	$470,448	-	$185	$343
DE	0.5	$41,244	$41,244	-	$185	$343
FL	93.5	$35,000	$217,800	47	$185	$343
GA	13.6	$12,000	$136,000	-	$878	$975
IA	6.8	$15,787	$15,787	162	$185	$343
ID	1.9	$41,244	$41,244	348	$185	$343
IL	170.1	$41,244	$206,221	3,920	$185	$343
IN	55.7	$45,671	$91,341	11,316	$185	$343
KS	33.9	$52,622	$52,622	714	$185	$343
KY	14.5	$30,000	$64,600	7,916	$170	$396
LA	6.3	$15,787	$64,600	44	$185	$343
MA	1.9	$124,000	$621,166	-	$100	$343
MD	7.3	$12,917	$68,109	-	$294	$688
ME	0.5	$254,390	$377,230	-	$185	$343
MI	0.5	$40,000	$80,000	-	$185	$343
MN	34.9	$9,294	$76,443	33	$185	$343
MO	4.4	$15,787	$26,311	62	$95	$387
MS	2.9	$3,157	$26,311	86	$185	$343
MT	89.6	$41,244	$41,244	793	$185	$343
NC	22.8	$25,874	$69,736	25	$289	$381
ND	1441.9	$15,787	$15,787	201	$185	$343
NE	32.5	$15,787	$15,787	148	$185	$343
NH	0.5	$92,042	$128,330	-	$185	$343
NJ	4.8	$82,489	$412,443	-	$185	$343
NM	0.5	$42,098	$63,147	-	$185	$343
NV	179.7	$56,711	$67,022	98	$185	$343
NY	145.3	$50,000	$94,000	249	$310	$420
OH	289.7	$12,000	$72,000	8,247	$240	$450

State	Increase in Wetland Mitigation (Acres)	Per Acre Unit Cost of Wetlands Mitigation		Increase in Stream Mitigation (Linear Feet)	Per Linear Foot Unit Cost of Stream Mitigation	
		Low	High		Low	High
OK	2.4	$15,787	$15,787	1,038	$185	$343
OR	18.9	$54,500	$125,170	-	$185	$343
PA	57.7	$12,000	$15,000	1,039	$185	$343
RI	0.5	$124,000	$160,000	-	$185	$343
SC	144.9	$26,311	$105,245	972	$79	$217
SD	166.7	$15,787	$15,787	331	$185	$343
TN	18.9	$25,000	$25,000	69	$54	$217
TX	236.4	$15,000	$45,000	5,837	$80	$220
UT	37.3	$56,711	$67,022	-	$185	$343
VA	75.1	$16,000	$140,000	-	$300	$977
VT	1.5	$110,000	$132,000	-	$185	$343
WA	3.9	$34,677	$318,546	48	$185	$343
WI	10.7	$58,000	$61,000	10	$185	$343
WV	108.0	$30,000	$64,000	9,279	$400	$869
WY	6.8	$15,787	$15,787	-	$185	$343
Total	**3,781**			**111,916**		

Appendix B: Supplemental Benefit Estimate Information

Summary of Wetland Benefits Studies Used to Generate WTP Estimates

Study	Location	NWI Category	Study Area (acres)	Survey Population	Response Rate	WTP Value from Study (2014$)[1]	WTP Description	Standardized One-Time WTP per Acre[2]
Azevedo et al (2000)	IA	Emergent	7,000 and 32,345[3]	Random sample of Iowa residents statewide, additional random sample of a targeted group of hunters/anglers	58.1%[4]	$13.75-$34.37	Iowa residents' one-time WTP to preserve and restore wetlands through the Prairie Pothole Joint Venture and Iowa River Corridor Project	$0.0011-$0.0020
Blomquist and Whitehead (1998)	KY, IN, TN, IL, MO	Forested/Shrub	500	Random dialing of households in Western Kentucky and nearby areas of Indiana, Tennessee, Illinois and Missouri from phone directories	66.7%	$3.06-$20.30	Household annual WTP for four wetlands with differing characteristics in western Kentucky	$0.1575-$1.0447

Study	Location	NWI Category	Study Area (acres)	Survey Population	Response Rate	WTP Value from Study (2014$)[1]	WTP Description	Standardized One-Time WTP per Acre[2]
Dillman et al (1993)	SC	Forested/Shrub	2,500	Random sample of South Carolina households statewide	21%	$28.25	South Carolina households' one-time WTP for preservation of one of three 2,500 acre wetlands in the Francis Biedler forest of South Carolina	$0.0113
Johnson and Linder (1986)	SD	Emergent	1,307,187	One percent random sample of a targeted group, South Dakota anglers and hunters statewide	61%	$626.18	South Dakota hunters' one-time WTP for wetlands statewide for hunting. Majority of hunting wetlands are located in the eastern part of the state.	$0.0005
Lant and Tobin (1989)	IA, IL	Forested/Shrub	2,109 and 1,108[5]	In-person interviews with residents of towns near the three rivers examined.	Not reported.	$46.30-$104.22	Annual WTP to improve water quality in two different river basins.	$0.3029-$2.4203

Study	Location	NWI Category	Study Area (acres)	Survey Population	Response Rate	WTP Value from Study (2014$)[1]	WTP Description	Standardized One-Time WTP per Acre[2]
Loomis et al. (1991)	CA	Emergent	85,000 and 125,000[6]	Random sample of households in San Joaquin Valley and throughout California	51%	$267.68-$441.49	Annual California statewide household WTP to protect and restore San Joaquin Valley wetlands.	$0.0435-$0.0909
Mullarky and Bishop (1999)	WI	Emergent	110	Random sample of Wisconsin residents statewide	43.5%	$19.44-$34.20	Annual WTP for a hypothetical rerouting of a highway expansion that would preserve 110 acres of wetlands in Wisconsin	$2.4389-$8.0003
Poor (1999)	NE	Emergent	41,000	Random statewide sample of Nebraska households	46%	$31.76	Annual WTP to increase the area of wetlands in Nebraska's rainwater basin wetland region by an average of 41.000 acres	$0.0107-$0.0199

Study	Location	NWI Category	Study Area (acres)	Survey Population	Response Rate	WTP Value from Study (2014$)[1]	WTP Description	Standardized One-Time WTP per Acre[2]
Roberts and Leitch (1997)	MN, SD	Emergent	5,000	Minnesota and South Dakota households within a 30-mile radius of Mud Lake	62%	$9.34	Annual value to households to households of Mud Lake, a managed lacustrine wetland on the border of Minnesota and South Dakota	$0.0258-$0.0480
Whitehead and Blomquist (1991)	KY	Forested	5,000	Random cluster sample of Western Kentucky households from phone directories	31%	$9.72-$31.71	Kentucky households' annual WTP for preservation of Clear Creek wetland, a large natural wetland with hardwood trees, standing water, and non-woody vegetation.	$0.0268-$0.1632

Study	Location	NWI Category	Study Area (acres)	Survey Population	Response Rate	WTP Value from Study (2014$)[1]	WTP Description	Standardized One-Time WTP per Acre[2]

1. If frequency of payment not specified, EPA assumed WTP is in terms of a one-time payment. Figures updated to 2014$ using CPI-U.
2. For estimates reported as annual WTP, the agencies derived the total present value over a period of 50 years using 3 percent and 7 percent discount rates.
3. Azevedo et all present WTP for two different study areas, sized 7,000 acres and a project to preserve a total of 40,000 acres of prairie potholes over 15 years, at a rate of 2,500 acres per year. This figure was discounted at a 3% rate, to develop a project size of 32,345
4. 58.1% represents average overall response rate for Azevedo et al. The response rate for Iowa River Corridor survey (study area 7,000 acres) was 56.5%. The response rate for the Prairie Pothole version of the survey (study area 32,345 acres) was 58.9%.
5. Lant and Tobin (1989) estimate the increase in wetland acreage in the riparian corridor to achieve water quality improvements in two different river basins. It is estimated an increase of 2,109 acres of wetlands would achieve the valued water quality improvements in the Edwards River basin and 1,108 new acres of wetlands would achieve the valued water quality improvements in the South Skunk River.
6. Loomis et al. present statewide WTP values to preserve existing wetlands of 85,000 acres and also for a program with a total size of 125,000 acres that would preserve the original 85,000 acres plus restore an additional 40,000 acres.

Summary of Wetland Benefits Studies

Azevedo, C., J.A. Herriges, and C.L. Kling. 2000. Iowa Wetlands: Perceptions and Values. Center for Agricultural and Rural Development. Staff Report 00-SR 91.

Azevedo et al. (2000) conducted a survey to understand how residents of Iowa value wetlands, specifically with regard to the following functions: wildlife viewing, fishing, biking, hiking, waterfowl and upland hunting. The 5-part survey collected information regarding wetland visitation patterns, perceived benefits and costs associated with wetlands, socioeconomic characteristics of respondents, and their WTP for preservation of existing wetlands and restoration of additional wetlands via two specific programs: the Prairie Pothole Joint Venture (PP) and the Iowa River Corridor Project (IRCP). The authors used contingent valuation to evaluate WTP for restoring additional wetlands through PP and ICRP. Results indicated that approximately 50% of Iowans would pay $25 in support of PP and less than $10 for ICRP (2000 dollars).

Blomquist, G.C. and J.C. Whitehead. 1998. Resource Quality Information and Validity of Willingness to Pay in Contingent Valuation. Resource and Energy Economics 20: 179-196.

Blomquist and Whitehead (1998) conducted a contingent valuation study to estimate the value of four wetlands in Western Kentucky with differing characteristics. One was a freshwater marsh, one was a temporarily flooded bottomland hardwood forest, one was a seasonally flooded bottomland hardwood forest, and one was a bald cypress swamp. Wetland functions included flood control, water quality improvements, and wildlife production/habitat. WTP ranged from $1.69 (1990 dollars) for Flat Creek, a freshwater marsh, to $11.21 (1990 dollars) for Cypress Creek, a cypress swamp.

Dillman, B., L.J. Beran, and D.D. Hook. 1993. Nonmarket Valuation of Freshwater Wetlands: The Francis Beidler Forest. South Carolina Water Resources Research Institute, Clemson University.

Dillman et al. (1993) estimated the WTP for preservation of 2,500 acres of wetlands in the Francis Biedler forest of South Carolina using dichotomous choice contingent valuation method. The study examined three types of wetland: frequently flooded bottomland (cypress-tupelo swamp), infrequently flooded bottomland hardwood forest, and non-bottomland pine plantation with hardwood runners. These wetlands served the following functions: flood control, wildlife habitat, recreational activities, water supply, and aesthetic value. The mean WTP estimated was $16.74 (1993 dollars) per household (ranging from $6.82 for infrequently flooded bottomland hardwood forests to $19.57 for pine plantations with scattered hardwood runners).

Johnson, C.W. and R.L. Linder. 1986. An Economic Valuation of South Dakota Wetlands as a Recreation Resource for Resident Hunters. Landscape Journal 5(1): 33-38.

Johnson and Linder (1986) conducted a contingent valuation study to estimate the value of wetlands in South Dakota as a recreational resource for resident hunters. The study examined wetlands statewide, the majority of which are located in the eastern part of the state. Their results indicated that the total value for waterfowl, upland, big game, and predator hunting in South Dakota wetlands in 1986 dollars was $34 million, and that the average total per user value of wetlands was $289.90 for a single hunting season.

Lant, C.L. and G.A. Tobin. 1989. "The Economic Value of Riparian Corridors in Cornbelt Floodplains: A Research Framework". Professional Geographer 41(3): 337-49.

Lant and Tobin (1989) studied willingness to pay higher state sales tax to improve water quality of riparian corridors in Iowa and Illinois. The study examined three river corridors utilizing face-to-face interviews: the Edwards River in Illinois, the South Skunk River in Iowa, and the Wapsipinicon River in Iowa. A necessary increase in wetland acreage in the Riparian corridor to achieve water quality improvements was estimated. WTP per person for improvement of quality in the Edwards River to that in the South Skunk was $8.85 per year (1989$), and value per person for improvement of quality in the South Skunk River to that in the Wapsipinicon was $20.37 per year (1989$). The study also reported a state mean average household size of 2.74 and 2.68 individuals per household in Illinois and Iowa respectively. This study had a very small sample size.

Loomis, J., M. Hanemann, B. Kanninen and T. Wegge. 1991. "Willingness to Pay to Protect Wetlands and Reduce Wildlife Contamination from Agricultural Drainage." In A. Dinar and D. Zilberman (eds.), The Economics and management of Water and Drainage in Agriculture. Boston, Massachusetts: Kluwer Academic Publishers, pp. 411-445.

Loomis et al. (1991) studied California residents' willingness to pay additional taxes to preserve and restore wetlands in California's San Joaquin Valley. The study's focus was wetlands as a habitat for migratory birds. The study found that average statewide annual household willingness to pay for a program to prevent further destruction of an existing 85,000 acres of wetlands was $154, and the mean statewide willingness to pay for a program including both maintenance of existing acreage plus the restoration of an additional 40,000 acres was $254 (1990 dollars). The study also examined a program to reduce and prevent further pollution of wildlife habitat in the region, and to increase Chinook salmon populations.

Mullarkey, D.J. and R.C. Bishop. 1999. Sensitivity to Scope: Evidence from a CVM Study of Wetlands. Presented at the Annual Meeting of the American Agricultural Economics Association, Nashville, TN, August 8-11, 1999.

Mullarkey and Bishop (1999) conducted a study of WTP for a hypothetical rerouting of a highway expansion that would preserve 110 acres of wetlands in Wisconsin. The wetlands in question provide a range of services including flood control, water purification, bird/wildlife habitat, and for a portion of the affected wetlands, fish habitat. The study reported six estimates

of WTP ranging from $13.68 to $57.83 (1999 dollars) depending upon whether respondents were informed that mitigation would be taking place if the wetland were destroyed and the degree of certainty respondents expressed in their answers.

Poor, P.J. 1999. The Value of Additional Central Flyway Wetlands: The Case of Nebraska's Rainwater Basin Wetlands. Journal of Agricultural and Resource Economics 24: 253-265.

Poor (1999) examined WTP to increase the area of wetlands in Nebraska's rainwater basin by an average of 41,000 acres across multiple survey versions. The basin is a large complex of 34,000 wetland acres, and a plan is already in place to create an additional 25,000 wetland acres. Wetland services in this study included flood control, water quality improvement, wildlife production and habitat, and bird watching/hiking. Median and mean household WTP were $4.17 and $21.05 (1996 dollars), respectively.

Roberts, L.A. and J.A. Leitch. 1997. Economic Valuation of Some Wetland Outputs of Mud Lake, Minnesota-South Dakota. North Dakota Agricultural Experiment Station. Agricultural Economics Report No. 381.

Roberts and Leitch (1997) conducted a contingent valuation study of the value of Mud Lake, a managed lacustrine wetland on the border of Minnesota and South Dakota. This study used a discrete choice survey to determine use, option/bequest, and existence values for Mud Lake. Use values, defined as WTP for management for water related recreation and fish/wildlife habitat ranged from $22,699 to more than $44,736 (1997 dollars) for all respondents in the sample. Option/bequest values ranged from $25,795 to more than $52,750 (1997 dollars) for all respondents in the sample. Existence values ranged from $18,508 to more than $40,451 (1997 dollars) for all respondents in the sample. Total overall median willingness to pay for the sample was estimated to be $102,000 (1997 dollars).

Whitehead, J.C. and G.C. Blomquist. 1991. Measuring Contingent Values for Wetlands: Effects of Information about Related Environmental Goods. Water Resources Research 27: 2523-2531.

Whitehead and Blomquist (1991) utilized contingent valuation to examine Kentucky residents' WTP for preservation of the Clear Creek wetland, a large natural wetland with hardwood trees, standing water, and non-woody vegetation. The wetland provides a range of services including water quality maintenance, fish and wildlife habitat, flood and sediment control, groundwater recharge, biological productivity and outdoor recreation. The study used three different survey versions consisting of two WTP questions each, with the difference in each case reflecting a difference in information presented about the wetland quality that would result if Clear Creek is not preserved. WTP values ranged from $5.09 to $16.61 (1991 dollars) under the scenario discussing preservation and reclamation of Clear Creek itself, and from $3.75 to $8.13 (1991 dollars) under scenarios discussing preservation of other wetlands concurrent with reclamation of Clear Creek.

Procedure for Standardizing and Weighting WTP Values from Benefits Studies

WTP estimates were standardized across studies as follows:

1. For WTP values reported as an annual value, the agencies derived the total present value over a period of 50 years using 3 percent and 7 percent discount rates.

2. In a few studies WTP values were reported for individuals as opposed to per household. In such cases, the agencies applied the individual value as if it were representative of the household value, with the exception of Lant and Tobin (1989), which explicitly stated the average household size at the time the study was completed. Where an individual was assumed to represent the household value, for studies where the average household size was actually greater than one, this leads to an underestimate of benefits.

3. WTP per household per acre was calculated using the reported size of the wetlands valued in the studies.

Standardized WTP values were sorted by NWI Category, and an overall WTP value was calculated using a geometric mean, weighted by the number of respondents per survey (a study may have more than one survey). In circumstances where multiple WTP values were extracted from a one survey, the total weight assigned to that survey was divided amongst the observations utilized.

Appendix C: Alternative Scenario Similar to Proposed Rule

This appendix examines the scenario of how overall costs and benefits to CWA programs as a result of the rule using one of the key assumptions in the jurisdictional analysis that was applied in the EA supporting the proposed rule. The scenario assumes a doubling of the number of ORM2 other waters records only for those waters that would be determined to be jurisdictional under (a)(7) and (a)(8) provisions. This approach to doubling is similar to the approach used in the economic analysis accompanying the proposed rule, where doubling was only utilized for the calculations for ORM2 other waters not becoming jurisdictional as adjacent. This alternative scenario uses the same costs and benefits methodologies and data as the rest of this economic analysis. This scenario corresponds to an overall increase in positive jurisdictional determinations of 3.67 percent. Corresponding costs range from $194.3 to $379.2 million with benefits of $437.9 to $451.7 million.

Figure 19. Estimated Annual Indirect Costs and Benefits, Using Double the Number of ORM2 Other Waters Records That Fall Under (a)(7) or (a)(8)

	Annual Costs (FY14$ millions)			**Annual Benefits (FY14$ millions)**	
	Low	**High**		**Low**	**High**
CWA 402 CAFO Administration	$0.2	$0.2		$4.9	$8.5
CWA 402 CAFO Implementation	$7.8	$7.8			
CWA 402 Stormwater Administration	$0.4	$0.4		$37.5	$47.5
CWA 402 Stormwater Implementation	$37.8	$47.0			
CWA 404 Permit Application	$37.1	$63.4		$395.6	$395.6
CWA 404 Mitigation – Wetlands	$70.3	$196.8			
SUBTOTAL	**$153.6**	**$315.7**		**$437.9**	**$451.7**
CWA 311 Compliance	$12.7	$12.7		*not quantified*	
CWA 401 Administration	$1.0	$1.0		*not quantified*	
CWA 402 Pesticide General Permit Implementation	$4.3	$4.7		*not quantified*	
CWA 404 Mitigation – Streams	$22.8	$45.2		*not quantified*	
TOTAL	**$194.3**	**$379.2**		**$437.9**	**$451.7**