Economic Analysis for the Navigable Waters Protection Rule: Definition of "Waters of the United States"

U.S. Environmental Protection Agency

and

Department of the Army

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Abbreviations

AFVO	Animal fats and vegetable oils
AJD	Approved jurisdictional determination
ASWM	Association of State Wetland Managers
BAT	Best Available Technology Economically Achievable
BMP	Best management practice
BPJ	Best professional judgment
BPT	Best Practicable Control Technology Currently Available
C&D	Construction and development
CAFO	Concentrated animal feeding operation
CEC	Commission for Environmental Cooperation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
EA	Economic analysis
ELI	Environmental Law Institute
EO	Executive Order
ESA	Endangered Species Act
FOSC	Federal on-site coordinator
FR	Federal Register
FRP	Facility Response Plan
HUC	Hydrologic unit code
HUC4	4-digit hydrologic unit code
HUC12	12-digit hydrologic unit code
ICR	Information Collection Request
IT	Information technology
LA	Load Allocation
LEDPA	Least environmentally damaging practicable alternative
MS4	Municipal Separate Storm Sewer System
MSGP	Multi-sector general permit
NHD	National Hydrography Dataset
NLCD	National Land Cover Database

NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPFC	National Pollution Funds Center
NRC	National Response Center
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OMB	Office of Management and Budget
OPA	Oil Pollution Act of 1990
ORM2	Operation and Maintenance Business Information Link, Regulatory Module
OSLTF	Oil Spill Liability Trust Fund
OSRO	Oil spill removal organization
PHMSA	Pipeline and Hazardous Materials Safety Administration
PJD	Preliminary jurisdictional determination
ppt	Parts per trillion
PRA	Paperwork Reduction Act
PWS	Public water system
Rapanos	*Rapanos v. United States*, 547 U.S. 715 (2006)
RFA	Regulatory Flexibility Act
RHA	Rivers and Harbors Act
RPA	Resource and Programmatic Assessment
RPWWN	Wetlands adjacent to but not directly abutting relatively permanent waters
SAB	EPA's Science Advisory Board
SBA	Small Business Administration
SPCC	Spill Prevention, Control and Countermeasure
SWANCC	*Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*, 531 U.S. 159 (2001)
SWMP	Stormwater management program
SWAT	Soil and Water Assessment Tool
U.S. EPA	U.S. Environmental Protection Agency
TAS	Treatment in a Manner Similar as a State
TBEL	Technology-based effluent limit
TMDL	Total Maximum Daily Load
TNW	Traditional navigable waters

TPV	Total present value
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WLA	Wasteload allocation
WOTUS	Waters of the United States
WTP	Willingness to pay
WQBEL	Water quality-based effluent limit
WQS	Water quality standards

Executive Summary

The U.S. Environmental Protection Agency and Department of the Army ("the agencies") are finalizing the Navigable Waters Protection Rule to revise the definition of the term "waters of the United States." "Waters of the United States" is a foundational term establishing the jurisdictional scope of the Clean Water Act (CWA). The agencies are establishing four categories of jurisdictional waters and twelve exclusions for features that would not be subject to CWA jurisdiction. As discussed further in this document, the final rule reduces the scope of federal CWA jurisdiction over certain waters (e.g., some ephemeral streams, isolated wetlands, and ditches) compared to prior regulations, although the agencies are unable to quantify these changes with any reliable accuracy.

This Economic Analysis (EA) assesses the potential impacts of the final changes to the definition of "waters of the United States" based on the potential effects to CWA programs that rely on the definition of "waters of the United States." In this EA, the agencies describe how the final regulation compares to the baseline of the Definition of "Waters of the United States" —Recodification of Pre-Existing Rules (hereinafter referred to as the 2019 Rule), as that rule is implemented. 84 FR 56626 (October 22, 2019). The 2019 Rule became effective on December 23, 2019 and is the current definition of "waters of the United States" in the Code of Federal Regulation. The agencies are implementing the 2019 Rule informed by applicable agency guidance documents and consistent with Supreme Court decisions and longstanding agency practice.

A separate Resource and Programmatic Assessment (RPA) (U.S. EPA and Army, 2020; available in Docket No. EPA-HQ-OW-2018-0149) outlines the agencies' assessment of the potential effects of the revised definition on the regulation of aquatic resources across the country, as well as the potential effects on CWA programs and certain other programs under other federal statutes. The RPA also provides snapshots of the applicable regulatory and legal frameworks currently in place in states and some tribes to provide context for how aquatic resources are regulated. The two documents together present an assessment of this final rule's potential impacts. The agencies have prepared these analyses pursuant to Executive Order 12866 and they may help inform the public of the potential effects associated with this rulemaking. The information presented in the EA and RPA, however, was not used by the agencies to help determine the extent of their authority under the CWA.

The economic analysis of this final rule examines the potential impacts of moving to a new definition of "waters of the United States" under the final rule from the baseline of the 2019 Rule. Due to the analytic and data challenges discussed throughout and confirmed by public comments on the proposed rule analyses, the agencies provide a series of qualitative analyses, three detailed case studies, and a national analysis of the estimated avoided costs and forgone benefits of the final rule's potential effects on the CWA section 404 program. The agencies believe these analyses to be the best assessment of potential impacts they can perform with any reliable accuracy. The agencies determined that a qualitative analysis and a series of case studies, where waters potentially could be assessed on a smaller scale in specific locations, was the best available alternative for applied empirical work estimating the potential benefits and costs of this final rule. Focusing on smaller geographic scales allows the analyses to focus on areas with better than average data availability, and when possible, to utilize additional location specific data sources. This approach avoids invoking assumptions regarding unwarranted generalizability of results based on specific, narrow studies and maintains the transparency and rigor of approaches that are feasible.

This economic analysis begins by systematically outlining the complexity and various layers of uncertainty regarding the potential implications of the change in CWA jurisdiction. The two main challenges faced by the economic analysis include determining the level of water resource regulation undertaken by individual states and tribes before and in response to the change, and the difficulty of quantifying the amount, type, and location of water resources that change CWA jurisdictional status. Each major challenge and uncertainty and its implications for the potential costs and benefits of the final rule are discussed below and in detail in this economic analysis.

The national annual avoided costs of the CWA section 404 program are estimated to range from approximately $109 million to $513 million. Mean values of the estimated national annual forgone benefits from the CWA section 404 program are estimated to range from approximately $55 to $173 million.

Environmental Federalism

The agencies examined the potential responses of the states based on the economics literature on environmental federalism, the local provision of public goods, and federalism more broadly. The agencies assessed current state programs and the insight they provide regarding predicting future plans under the CWA jurisdictional change. The state programs will ultimately reflect added efficiencies gained from state level programs rather than a national program, potentially superior information held by state regulators about local conditions that allow prioritization, and policies that reflect the preferences of their residents, and will differ from state-to-state. Informed by this information, the revealed behavior, along with economic theory gleaned from the literature, suggests how state governments could respond to the shift in the regulatory landscape. States have a continuum of responses to a change in CWA jurisdiction based on legal, economic, and other constraints. These responses may differ depending on the type of water resources, as well as across programs within a given state. The analysis considers CWA section 404 permitting and other surface water quality programs separately because a state's responses to a change in jurisdiction may differ between the two types of programs. In this analysis, the agencies examined four different scenarios of potential state responses, one of which is the continuation of current state programs without any modification.

A state might choose not to regulate waters that now fall solely under its jurisdiction. In this case, the agencies would expect potential avoided costs and forgone benefits. At the other end of the continuum are states with regulations that are as broad or broader in scope than this rule or the 2019 Rule. In these states, the change in jurisdictional scope would likely have no cost or benefit implications. Many, if not most, states likely fall in between these two ends of the continuum. The federalism literature illustrates that states may be in a better position than the federal government to regulate local environmental public goods (*e.g.*, water quality). When given more flexibility over which waters to regulate, states may be able to direct resources toward their high priority waters and limit expenditures on their low priority waters, thereby maximizing the net benefits derived from their waters.

Complicating the analysis are differences in state roles across CWA programs. While most states have been authorized to administer at least some, if not all, parts of the CWA section 402 National Pollutant Discharge Elimination System (NPDES) program, only two states have assumed administration of the CWA section 404 dredged and fill material program, and therefore, some states may lack the capacity to administer the section 404 program or expand state dredged and fill permit programs that currently exist.

The agencies emphasize, however, that if states do make regulatory changes to maintain the previous federal baseline level of CWA jurisdiction then the states will likely incur some transition costs in the short run. The cost to states could be more or less than the cost to the federal government.

For state dredged and fill programs, potential state responses to the change in CWA jurisdiction were grouped into three possible distinct categories based on how the state's laws may limit in some manner their regulations of aquatic resources, whether the state has a state-level dredged and fill program, and whether the state regulates waters more broadly than the CWA. The agencies recognize that not all states may behave as predicted, but made reasonable assumptions based on available information in order to perform this assessment for informational purposes. In addition, these potential responses were refined to reflect the further examination of state programs and comments from the state governments.

Table ES-1: Dredged/fill categorization criteria

Category	State regulatory indicators	Potential response
1	State has broad legal limitations on regulating aquatic resources OR does not have a state-level dredged and fill program and relies on CWA section 401 certification to address dredged and fill activities.	Unlikely to increase state regulatory practices to address changes in federal jurisdiction.
2	Has a state-level dredged and fill program that does not regulate waters of the state more broadly than CWA AND does not have broad legal limitations on regulating aquatic resources	Likely to continue the state's current permitting practices and may choose to change state programs to provide some regulatory coverage of waters that would no longer be "waters of the United States."
3	Has a state-level dredged and fill program AND regulates "waters of the state" more broadly than CWA	Likely to continue the state's current dredged/fill permitting practices, which already regulate beyond some areas of 2019 Rule.

For state surface water programs, potential state responses to the change in CWA jurisdiction were grouped into two possible distinct categories based on the state's legal limitations on regulating aquatic resources and whether the state has NPDES authorization. Again, states may not behave as predicted, but the analyses are based on reasonable interpretations of the existing information for illustrative purposes.

Table ES-2: Surface water discharge permitting categorization criteria

Category	State regulatory indicators	Potential response
1	State does not have NPDES authorization OR has broad legal limitations on regulating aquatic resources	State programs likely to reduce scope following a reduction of federal jurisdiction.
2	NPDES-authorized state that ALSO does not have broad legal limitations on regulating aquatic resources	States are likely to continue their current regulatory practices, which may provide partial regulatory coverage of waters that are no longer "waters of the United States."

The dredged and fill and other surface water state response categories were then used to create a number of possible state response scenarios for use in the analysis. Scenario 0 is a lower bound in which no states are assumed to regulate newly non-jurisdictional waters and Scenario 3 is an upper bound in which assumes the largest number of states would regulate newly non-jurisdictional waters. Table ES-3 lays out

what is included in each scenario. In the agencies best professional judgment, based on the environmental federalism literature (Fredriksson 2018), Scenario 0 is among the least likely scenarios to take place.

Table ES-3: Treatment of the effect of state response in the analysis of costs and benefits of a change in the definition of "waters of the United States"

	Scenario 0	Scenario 1	Scenario 2	Scenario 3
Change in baseline dredged and fill practices (affects CWA section 404 programs)[1]				
1 - Unlikely to increase (18)	Included	Included	Included	Included
2 - May increase (9)	Included	Included	Included	Excluded
3 - Likely continue (23)	Included	Excluded	Excluded	Excluded
Change in baseline surface water practices (affects CWA sections 402, 311, and 401 programs)				
1 - Likely reduce (11)	Included	Included	Included	Included
2 - Likely continue (39)	Included	Included	Excluded	Excluded

[1] Scenarios 1 and 2 are the same for the CWA section 404 program.

Data and Analytic Uncertainties

Limitations of the available data affected the agencies' ability to conduct national level analyses regarding the potential effect of the final rule and contributed to uncertainty in results. Despite prior administration positions indicating that it was not possible to map CWA jurisdictional waters with any accuracy, the agencies attempted to use the U.S. Geological Survey's National Hydrography Dataset (NHD) at high resolution and the U.S. Fish and Wildlife Service's (U.S. FWS) National Wetlands Inventory (NWI) to estimate the potential effect of the proposed rule on certain water types across the country. The datasets represent the most comprehensive national datasets of the potential location and extent of streams, rivers, lakes, ponds, and wetlands of which the agencies are aware. After attempting the analysis, however, the agencies concluded that because neither dataset was created for regulatory purposes, even where streams and wetlands are identified in the datasets the question of CWA jurisdiction under the baseline and the final rule often cannot be answered. For example, the final rule differentiates between intermittent and ephemeral flow for purposes of federal regulatory jurisdiction under the CWA, but the NHD does not differentiate between streams with intermittent or ephemeral flow in much of the country and may misclassify streamflow permanence, for example, mapping certain perennial streams as ephemeral and vice versa. Likewise, the NWI uses a different definition of wetlands than the agencies' regulatory definition and does not contain sufficient information that would allow the agencies to identify wetlands that meet or do not meet the definition of "adjacent wetlands" under either the baseline or the final rule, such as whether there is a natural berm between the wetland and the nearest river. Such flow misclassification and difference in definitions along with other data limitations prevent the agencies from identifying potential changes in jurisdiction with any degree of reliable accuracy. The agencies have not updated their exploratory analyses using these datasets for the final rule but describe their attempted methodology in the RPA for the proposed and final rules with additional information in Appendix A of the RPA for the proposed rule (U.S. EPA and Department of the Army, 2018a). Please refer to these documents for a more in-depth discussion of these datasets.

Economic Analysis: CWA Jurisdictional Change from the 2019 Rule to the Final Rule

The economic analysis consists of a series of qualitative analyses, three detailed case studies, and a national analysis of the CWA section 404 program. Unless otherwise note, all values are expressed as

annual values and in 2018 dollars. The purpose of the qualitative analysis is to provide a national assessment of the potential effects of this final rule without providing quantitative assessment. As stated, the agencies currently lack the datasets to quantitatively assess the potential effects of the final rule. The qualitative analysis is intended to provide information on the potential direction of the effects based on the best professional judgment of the agencies. In addition, the agencies conducted three case studies in three major watersheds to provide more detailed information on the potential quantitative assessment of the effects. The case studies have considered potential ecological effects and their accompanying economic effects. The case studies highlight the complexity of the potential decision matrices and the depth of data and modeling requirements. The case studies conclude that the potential effects of provisions going beyond the baseline of the 2019 Rule are modest regardless of the level of state engagement in water resource protection as modeled in Scenarios 1 through 3. The anticipated total cost savings for the three case studies range from $7.1 to $22.6 million, and the estimated forgone benefits less than $1 to $3.4 million.[1] The results of the case studies demonstrate that only the potential avoided costs and forgone benefits of the CWA section 404 program can be estimated nationwide with the available data. Using the same methodologies employed in the case studies, the national annual avoided costs of the CWA section 404 program are estimated to range from $244.5 million to $512.7 million under Scenario 0 and from $109.2 to $263.7 million over Scenarios 1 through 3. Mean values of the estimated national annual forgone benefits from the CWA 404 program are estimated at $173.2 million under Scenario 0. Average national annual forgone benefit estimates range from $55.2 to $62.5 million over Scenarios 1 through 3. Low and high estimates of the national annual forgone benefits range from $6.0 million to $206.7 million over Scenarios 1 through 3. For purposes of Executive Order 13771 accounting, the estimated annualized cost savings of the rule (in 2018$) is $277,303,339 and the present value of the cost savings (in 2018$) is $3,247,190,553.

Economic Analysis: Qualitative Analyses of the Potential Effects of the Final Rule on Major CWA Programs

The first component of the analysis relies on a series of qualitative analyses of the major CWA programs likely affected by a change in the definition of "waters of the United States." The CWA programs, including the section 303(c) water quality standards program, the section 311 oil spill prevention program, the section 401 water quality certification program, the section 402 NPDES permit program, and the section 404 permit program for the discharge of dredged or fill material, rely on the definition of "waters of the United States" for program implementation. A revised definition of "waters of the United States" may affect these CWA programs as implemented at the state level. Potential effects vary from state to state based on a state's ability and authority under their own state law to regulate or address their aquatic resources through non-regulatory programs. Please refer to the RPA for a more detailed description of these and other programs potentially affected by this final rule.

CWA Section 402

Facilities that currently have a NPDES permit under CWA section 402 or an authorized state program can be assumed to either discharge to a "water of the United States" or to waters designated to be "waters of the state" by the authorized state in which they are located. The final regulation may result in a

[1] All estimates in this analysis are annual estimates. There are no fixed components (*e.g.*, fixed costs) to the calculations.

jurisdictional change to a discharger's receiving water or downstream water, and thus may result in a potential change to the discharger's permit. This is more likely the case if the state does not currently consider these immediate receiving waters to be "waters of the state" and/or if the state does not extend this status to these waters in response to a change in the definition of "waters of the United States." However, where the receiving water is no longer jurisdictional under the final rule but conveys pollutants from a discharger to a downstream jurisdictional water, a section 402 permit may still be required depending on the circumstances.

CWA Section 311

Section 311 of the CWA, Oil Spill Prevention, Preparedness, Reporting and Response, includes two main components that address the risk and harm from oil spills: (1) spill prevention and preparedness, as contained in the EPA's Spill Prevention, Control, and Countermeasure (SPCC) and Facility Response Plan (FRP) regulations for non-transportation related facilities and in United States Coast Guard and Department of Transportation regulations for transportation-related facilities, and (2) spill notification and response, as described under the National Contingency Plan. The agencies estimate that approximately 540,000 facilities are currently subject to SPCC requirements. This estimate is based on the number of establishments in each industry sector and oil storage capacities. The estimate does not account for the location of the facilities and whether they pose a reasonable potential for a discharge to reach a water subject to CWA jurisdiction; therefore, it is not possible to assess the degree to which a change in the scope of jurisdictional waters will affect the number of regulated facilities. In determining the reasonable expectation of a discharge, facility owners consider solely the geographical and locational aspects of the facility.

In addition, the EPA requires a subset of SPCC facilities that could, because of their location, need to prepare and submit an FRP to the EPA Regional Administrator for the state or tribe where the facility is located. Changes in CWA jurisdiction could affect the need for compliance with FRP requirements.

The agencies expect no change to compliance costs or spill risk for facilities required to comply with equivalent state regulations or that elect to voluntarily implement SPCC measures. At the other end of the spectrum are facilities located in states and Indian lands without spill prevention requirements and that do not voluntarily follow industry standards. The compliance cost savings and spill risk are potentially larger for these facilities. The agencies anticipate that most facilities potentially affected by the final rule may fall between these two ends of the continuum. In addition, facilities may choose to implement some spill prevention measures that are considered good engineering practices for their industry, such as secondary containment, overfill prevention, practices to ensure the safe transfer of oil to bulk storage containers and visual inspections of bulk storage containers, even if they are not subject to 40 CFR part 112.

CWA Section 404

The final rule could affect requirements to obtain CWA section 404 permits for certain activities in waters whose jurisdictional status will change, and for permittees to mitigate unavoidable impacts from those activities, where applicable. Absent any state, tribal, or local programs regulating these waters under their own dredged/fill programs, developers and other project proponents affecting these non-jurisdictional waters may not take the same steps to avoid impacts to wetlands and other aquatic resources, as compared to activities requiring a CWA section 404 permit in the 2019 Rule baseline, nor would they need to

demonstrate that they have minimized potential impacts to the maximum extent practicable. Further, the amount of mitigation required to offset impacts of activities may decrease due to the final rule, in the absence of any similar state, tribal, or local requirements.

CWA Section 303

The potential effect of the definitional change on the number of waterbodies added to the impaired waters list (and subsequent total maximum daily load (TMDL) development) is uncertain. Absent the application of the CWA to newly non-jurisdictional waters, states and tribes can still choose to impose similar state or tribal law requirements on these waters irrespective of federal mandates. The development and revision of statewide or tribal water quality standards is typically an ongoing process independent from changes to the definition of "waters of the United States," although some states have developed standards for certain categories of water (*e.g.*, ephemeral features) that would be non-jurisdictional under the final rule.

Changes in CWA jurisdiction may lead to requests for changes in TMDL waste load allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources. Given that there are currently more than 73,000 completed TMDLs nationwide, requests to revise even a small percentage of them could require significant resources to complete (U.S. EPA and U.S. Department of the Army, 2018a).

CWA Section 401

Under the final rule, the number of CWA section 404 permits would be expected to decrease since wetlands that no longer meet the definition of "adjacent wetlands" and ephemeral features, for example, would be categorically excluded from the definition of "waters of the United States." Some of these features are regulated based upon a case-specific significant nexus analysis under the 2019 Rule as implemented. A reduction in CWA section 404 permits could result in costs savings to states and authorized tribes by reducing the number of section 401 reviews and required staff time. However, a reduction in the scope of CWA jurisdiction could affect a state or tribe's ability to review proposed impacts to wetlands that no longer meet the definition of "adjacent wetlands," ephemeral features, and certain other waters via CWA section 401 authority.

The vast majority of states have been authorized to administer all or parts of the CWA section 402 program. States that have not been authorized for the section 402 program and tribes authorized to administer section 401 would continue to have the opportunity to complete section 401 certification on EPA-issued 402 permits. If there are fewer EPA-issued section 402 permits, then there would be a reduction in the number of section 401 reviews and associated staff time. As with section 404 permits, a reduction in the scope of CWA jurisdiction could affect a state or tribe's ability to review proposed impacts to wetlands that may no longer meet the definition of "waters of the United States" via section 401 authority.

Economic Analysis: Case Study Analyses

To support benefit-cost analyses of the final rule, the agencies relied on three case studies for the second component of the economic analysis. The case studies enable the agencies to focus on key geographical areas to explore factors that determine potential rule impacts in greater detail than would be possible in a national analysis given the large size and limitations of critical datasets. The agencies initially selected three geographic regions. Within these regions, the agencies then identified a total of six watersheds

intersecting 10 states to explore potential changes and resulting forgone benefits and avoided costs. The major factors in selecting specific case study locations included: complete NHD data coverage, availability of other data (*e.g.*, studies needed for monetizing forgone benefits), and projected state responses to a change in CWA jurisdiction. The case study locations analyzed include the Ohio River Basin, the Lower Missouri River Basin, and the Rio Grande River Basin.

The case studies illustrate the potential impacts of the final rule on major program areas – notably on the number of facilities subject to CWA section 311 oil spill prevention and preparedness regulations, section 402 permits, and section 404 permits requiring mitigation – and on the potential resulting environmental effects and impacts on regulated entities. For each case study, the agencies first identified the facilities and activities covered under each of the three CWA programs under baseline conditions. The identified facilities and activities were then assessed to determine whether they could be affected by the changes to regulatory requirements under the final rule. The high-resolution NHD and NWI data have significant gaps and limitations that impede the agencies' ability to use them as standalone tools to categorically identify waters that will change jurisdictional status under the final rule. Therefore, the agencies identified affected facilities and activities using data from the relevant program database(s) that can be interpreted to describe the flow classification of the affected resources, where feasible. These data most often reflect site-specific assessments that supported the issuance of the permit.

The agencies then estimated the potential impacts of the final rule on compliance costs, stream flows, water quality, drinking water treatment, endangered and threatened species habitats, and other ecosystem services. The agencies quantified and monetized the potential impacts where possible given the available data and methods. In general, estimated annual avoided costs exceed annualized forgone benefits, but limitations of the data curtailed the agencies' ability to quantify or monetize some of the potential environmental effects and forgone benefits of the final rule as well as some of the avoided costs.

Under state response Scenario 0, annual avoided costs range from $0.1 million to $31.6 million per case study watershed, while annual forgone benefits range from almost $0 to around $4.6 million.

Table ES-4: Estimates of avoided costs and forgone benefits of the potential CWA jurisdictional change from the 2019 Rule to the Final Rule including all states (Scenarios 0)

	Annual Avoided Costs (2018$ millions)			Annualized Forgone Benefits (2018$ millions)[1]	
	Low	High		Low	High
Ohio River Basin					
CWA 402	$0.00	$0.00		$0.00	$0.00
CWA 404 Permit Application	$0.41	$0.41		N/A	N/A
CWA 404 Mitigation – Wetlands & Ephemeral Streams	$8.46	$31.16		$0.70[2]	$4.63
CWA 404 Mitigation – Water Quality	N/A	N/A		*not monetized*	*not monetized*
CWA 404 – Reservoir Dredging	N/A	N/A		negligible[3]	negligible
CWA 311 – FRP Requirements	*not monetized*	*not monetized*		*not monetized*	*not monetized*
CWA 311 – SPCC Requirements	*not monetized*	*not monetized*		*not monetized*	*not monetized*
SUBTOTAL	**$8.87**	**$31.57**		**$0.70**	**$4.63**

Table ES-4: Estimates of avoided costs and forgone benefits of the potential CWA jurisdictional change from the 2019 Rule to the Final Rule including all states (Scenarios 0)

	Annual Avoided Costs (2018$ millions)			Annualized Forgone Benefits (2018$ millions)[1]	
	Low	**High**		**Low**	**High**
Lower Missouri River Basin					
CWA 402	*not monetized*	*not monetized*		*not monetized*	*not monetized*
CWA 404 Permit Application	$0.27	$0.27		N/A	N/A
CWA 404 Mitigation – Wetlands & Ephemeral Streams	$1.41	$5.51		$0.13[4]	$0.84
CWA 404 Mitigation – Water Quality	N/A	N/A		*not monetized*	*not monetized*
CWA 404 Mitigation – Reservoir Dredging	N/A	N/A		negligible[3]	negligible
CWA 311 – FRP Requirements	*not monetized*	*not monetized*		*not monetized*	*not monetized*
CWA 311 – SPCC Requirements	*not monetized*	*not monetized*		*not monetized*	*not monetized*
SUBTOTAL	**$1.68**	**$5.78**		**$0.13**	**$0.84**
Rio Grande River Basin					
CWA 402	*not monetized*	*not monetized*		*not monetized*	*not monetized*
CWA 404 Permit Application	$0.11	$0.11		N/A	N/A
CWA 404 Mitigation – Wetlands & Ephemeral Streams	negligible[5]	negligible		*not monetized*	*not monetized*
CWA 404 Mitigation -Water Quality	N/A	N/A		*not quantified*	*not quantified*
CWA 404 Mitigation-Reservoir Dredging	N/A	N/A		*not quantified*	*not quantified*
CWA 311 – FRP Requirements	*not monetized*	*not monetized*		*not monetized*	*not monetized*
CWA 311 – SPCC Requirements	*not monetized*	*not monetized*		*not monetized*	*not monetized*
SUBTOTAL	**$0.11**	**$0.11**		**$0.00**	**$0.00**
Total 3 Case Studies					
TOTAL (Monetized Categories)	**$10.66**	**$37.46**		**$0.83**	**$5.47**

[1] Annualized forgone benefits presented in the body of the table are estimated at a 3 percent discount rate.

[2] For comparison purposes, the estimated annualized forgone benefits from reduced mitigation requirements in the Ohio River Basin range from a low of $0.52 to a high $3.42 million at a 7 percent discount rate.

[3] The estimated increase in annualized dredging costs is estimated to be less than one thousand dollars per year.

[4] For comparison purposes, annualized forgone benefits from reduced mitigation requirements in the Lower Missouri River Basin range from a low of $0.09 million to a high of $0.61 million at a 7 percent discount rate.

[5] The estimated annual mitigation cost savings range from range of $192 to $269 (actual dollars, not millions of dollars).

Under state response Scenarios 1 and 2, annual avoided costs ranged from $0.1 million to $16.8 million per case study watershed, while annual forgone benefits ranged from almost $0 to $2.5 million.

Table ES-5: Estimates of avoided costs and forgone benefits of the potential CWA jurisdictional change from the 2019 Rule to the Final Rule excluding the impact from states that may continue the 2019 Rule practices (Scenarios 1 & 2)

	Annual Avoided Costs (2018$ millions)		Annual Forgone Benefits (2018$ millions)	
	Low	**High**	**Low**	**High**
Ohio River Basin				
CWA 402	$0.0	$0.0	$0.0	$0.0
CWA 404 Permit Application	$0.32	$0.32	N/A	N/A
CWA 404 Mitigation – Wetlands & Ephemeral Streams	$6.64	$16.48	$0.38[2]	$2.51
CWA 404 Mitigation -Water Quality	N/A	N/A	*not quantified*	*not quantified*
CWA 404 Reservoir Dredging	N/A	N/A	*not quantified*	*not quantified*
CWA 311 – FRP Requirements	*not monetized*	*not monetized*	*not monetized*	*not monetized*
CWA 311 – SPCC Requirements	*not monetized*	*not monetized*	*not monetized*	*not monetized*
SUBTOTAL	**$6.96**	**$16.80**	**$0.38**	**$2.51**
Lower Missouri River Basin				
CWA 402	*not monetized*	*not monetized*	*not monetized*	*not monetized*
CWA 404 Permit Application	$0.27	$0.27	N/A	N/A
CWA 404 Mitigation – Wetlands & Ephemeral Streams	$1.41	$5.51	$0.13[3]	$0.84
CWA 404 Mitigation -Water Quality	N/A	N/A	*not quantified*	*not quantified*
CWA 404 Mitigation-Reservoir Dredging	N/A	N/A	*not quantified*	*not quantified*
CWA 311 – FRP Requirements	*not monetized*	*not monetized*	*not monetized*	*not monetized*
CWA 311 – SPCC Requirements	*not monetized*	*not monetized*	*not monetized*	*not monetized*
SUBTOTAL	**$1.68**	**$5.78**	**$0.13**	**$0.84**
Rio Grande River Basin				
CWA 402	*not monetized*	*not monetized*	*not monetized*	*not monetized*
CWA 404 Permit Application	$0.11	$0.11	N/A	N/A
CWA 404 Mitigation – Wetlands & Ephemeral Streams	negligible[4]	negligible	*not monetized*	*not monetized*
CWA 404 Mitigation -Water Quality	N/A	N/A	*not quantified*	*not quantified*
CWA 404 Mitigation-Reservoir Dredging	N/A	N/A	*not quantified*	*not quantified*
CWA 311 – FRP Requirements	*not monetized*	*not monetized*	*not monetized*	*not monetized*
CWA 311 – SPCC Requirements	*not monetized*	*not monetized*	*not monetized*	*not monetized*
SUBTOTAL	**$0.11**	**$0.11**		
Total 3 Case Studies				
TOTAL (Monetized Categories)	**$8.75**	**$22.69**	**$0.51**	**$3.35**

[1] Annualized forgone benefits presented in the body of the table are estimated at a 3 percent discount rate.

[2] For comparison purposes, the estimated forgone annualized benefits from reduced mitigation requirements in the Ohio River Basin range from a low of $0.28 to a high of $1.85 million at a 7 percent discount rate.

[3] For comparison purposes, annualized forgone benefits from reduced mitigation requirements in the Lower Missouri River Basin range from a low $0.09 to a high $0.61 at a 7 percent discount rate.

[4] The estimated annual mitigation cost savings range from $192 to $269 (actual dollars, not millions of dollars).

Under state response Scenario 3, total avoided costs and forgone benefit estimates decrease somewhat. Annual avoided costs across all case studies range from less than $0.1 million to $16.8 million per case study watershed, while annual forgone benefits range from close to $0 to $2.5 million.

Table ES-6: Estimates of avoided costs and forgone benefits of the potential CWA jurisdictional change from the 2019 Rule to the Final Rule excluding the impact from states that may continue the 2019 Rule practices (Scenario 3)

	Annual Avoided Costs (2018$ millions)		Annual Forgone Benefits (2018$ millions)	
	Low	**High**	**Low**	**High**
Ohio River Basin				
CWA 402	$0.0	$0.0	$0.0	$0.0
CWA 404 Permit Application	$0.32	$0.32	N/A	N/A
CWA 404 Mitigation – Wetlands & Ephemeral Streams	$6.64	$16.48	$0.38[2]	$2.51
CWA 404 Mitigation -Water Quality	N/A	N/A	*not quantified*	*not quantified*
CWA 404 Reservoir Dredging	N/A	N/A	*not quantified*	*not quantified*
CWA 311 – FRP Requirements	*not monetized*	*not monetized*	*not monetized*	*not monetized*
CWA 311 – SPCC Requirements	*not monetized*	*not monetized*	*not monetized*	*not monetized*
SUBTOTAL	**$6.96**	**$16.80**	**$0.38**	**$2.51**
Lower Missouri River Basin				
CWA 402	*not monetized*	*not monetized*	*not monetized*	*not monetized*
CWA 404 Permit Application	$0.03	$0.03	N/A	N/A
CWA 404 Mitigation – Wetlands & Ephemeral Streams	$0.01	$0.03	<$0.01	$0.01
CWA 404 Mitigation -Water Quality	N/A	N/A	*not quantified*	*not quantified*
CWA 404 Mitigation-Reservoir Dredging	N/A	N/A	*not quantified*	*not quantified*
CWA 311 Compliance	*not monetized*	*not monetized*	*not monetized*	*not monetized*
CWA 311 Compliance	*not monetized*	*not monetized*	*not monetized*	*not monetized*
SUBTOTAL	**$0.04**	**$0.06**	**<$0.01**	**$0.01**
Rio Grande River Basin				
CWA 402	*not monetized*	*not monetized*	*not monetized*	*not monetized*
CWA 404 Permit Application	$0.11	$0.11	N/A	N/A
CWA 404 Mitigation – Wetlands & Ephemeral Streams	negligible[3]	negligible	*not monetized*	*not monetized*
CWA 404 Mitigation – Water Quality	N/A	N/A	*not quantified*	*not quantified*
CWA 404 Mitigation – Reservoir Dredging	N/A	N/A	*not quantified*	*not quantified*
CWA 311 – FRP Requirements	*not monetized*	*not monetized*	*not monetized*	*not monetized*
CWA 311 – SPCC Requirements	*not monetized*	*not monetized*	*not monetized*	*not monetized*
SUBTOTAL	**$0.11**	**$0.11**	**$0.00**	**$0.00**
Total 3 Case Studies				
TOTAL (Monetized Categories)	**$7.11**	**$16.97**	**$0.38**	**$2.52**

[1] Annualized forgone benefits presented in the body of the table are estimated at a 3 percent discount rate.

[2] For comparison purposes, the estimated forgone annualized benefits from reduced mitigation requirements in the Ohio River Basin range from a low of $0.28 to a high of $1.85 million at a 7 percent discount rate.

[3] The estimated annual mitigation cost savings range from range of $192 to $269 (actual dollars, not millions of dollars).

Economic Analysis: National Analysis CWA Section 404 Analysis

The case studies demonstrate that data limitations constrain the agencies' ability to estimate, quantify, and value the potential effects of the final rule on the CWA sections 402 and 311 programs across the country, but that it is possible to estimate, quantify, and value at least some of the potential effects of the final rule through the CWA section 404 program nationwide. Accordingly, to evaluate the potential impacts of the final rule at the national level, the agencies focused on potential CWA section 404 program impacts of the final rule for which data are sufficient to develop certain quantitative estimates. The approach incorporates the predicted state response under various scenarios (*see* Section II.A.4). Inputs for this analysis were derived using the same approach as described for the case studies (*see* Section III.B.2.2.2), which relies on CWA section 404 permit data from the Corps' Operation and Maintenance Business Information Link, Regulatory Module (ORM2) database to identify aquatic resources and permits potentially affected by the final rule. To estimate cost savings, the agencies used the same methodology described in Section III.B.2.2.2.1.

Table ES-7: Total national estimated CWA section 404 related annual cost savings (millions 2018$)

Cost Type	Scenario 0[1]		Scenarios 1&2[2]		Scenario 3[3]	
	Low	High	Low	High	Low	High
Permit Cost Savings	$27.2	$27.2	$14.6	$14.6	$11.7	$11.7
Mitigation Cost Savings	$217.2	$485.5	$115.9	$249.1	$97.5	$202.8
Total	**$244.5**	**$512.7**	**$130.6**	**$263.7**	**$109.2**	**$214.5**

[1] Includes all states except Hawaii.

[2] Scenario 1 and 2 are identical for the CWA section 404 program. These scenarios include Alaska, Alabama, Arkansas, Arizona, Colorado, Delaware, Georgia, Iowa, Idaho, Kansas, Kentucky, Louisiana, Missouri, Mississippi, Montana, North Carolina, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, South Carolina, South Dakota, Texas, Utah, and Wisconsin.

[3] Includes Alaska, Alabama, Arkansas, Arizona, Colorado, Idaho, Kentucky, Louisiana, Missouri, Mississippi, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, South Carolina, South Dakota, and Texas.

To estimate forgone benefits, the agencies relied upon a wetland valuation meta-analysis function. The meta-analysis uses the results of multiple wetland valuation studies to derive an underlying valuation function that can be adjusted and applied nationally (*see* Appendix D).

Table ES-8: Total national estimated CWA section 404 related annual forgone benefits (millions 2018$)

Scenario	Mean WTP per household per acre (2018$)	Mean estimate of forgone benefits (millions 2018$)	Lower 5th WTP per household per acre (2018$)	Lower 5th estimate of forgone benefits (millions 2018$)	Upper 95th WTP per household per acre (2018$)	Upper 95th estimate of forgone benefits (millions 2018$)
Scenario 0[1,2]	$0.02	$173.20	<$0.01	$28.62	$0.10	$554.94
Scenario 1&2 [1,3]	$0.02	$62.49	<$0.01	$8.22	$0.10	206.70
Scenario 3[1,4]	$0.02	$55.15	<$0.01	$6.04	$0.10	192.31

[1] Estimated annual average mitigation reduction based on permits issued in years 2011-2015 with mitigation requirements on waterways determined to be RPWWN-type wetlands or interpreted to be ephemeral streams. Excludes permits issued for mitigation or restoration activities because the main purpose of these activities is to restore or enhance ecosystem services provided by water resources as opposed to dredge and fill activities that lead to permanent or temporary losses of ecosystem services.

[2] Includes all states except Hawaii.

[3] Scenario 1 and 2 are identical for the CWA section 404 program. These scenarios include Alaska, Alabama, Arkansas, Arizona, Colorado, Delaware, Georgia, Iowa, Idaho, Kansas, Kentucky, Louisiana, Missouri, Mississippi, Montana, North Carolina, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, South Carolina, South Dakota, Texas, Utah, and Wisconsin.

[4] Includes Alaska, Alabama, Arkansas, Arizona, Colorado, Idaho, Kentucky, Louisiana, Missouri, Mississippi, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, South Carolina, South Dakota, and Texas.

The estimated CWA section 404-related cost savings from avoided permit applications and mitigation generally exceed forgone benefits of wetlands.[2] This is true for all four state response scenarios the agencies analyzed and under most cost or willingness to pay (WTP) assumptions. For example, under Scenarios 1 & 2, estimated annual cost savings range between $130.6 million and $263.7 million (under low and high cost assumptions), compared to estimated forgone benefits of $62.5 million (based on mean WTP). However, high estimates of forgone benefits based on the 95th percentile of the WTP for wetlands are greater than the lower bound of estimated cost savings under Scenarios 1 through 3. Under Scenario 0, high estimates of forgone benefits are greater than cost estimates under both low and high cost assumptions.

[2] To calculate the value for wetlands, the agency estimated the lump sum value for household willingness to pay for additional acres of wetlands. For more detailed discussion on valuation of wetlands, please *see* Appendix D.

I. Introduction and Overview

The U.S. Environmental Protection Agency and Department of the Army ("the agencies") are finalizing The Navigable Waters Protection Rule that revises the definition of "waters of the United States." "Waters of the United States" is a foundational term establishing the jurisdictional scope of the Clean Water Act (CWA). The agencies are establishing four categories of jurisdictional waters and twelve categories of exclusions for waters and features that are not subject to CWA jurisdiction. Waters that are either within or outside the scope of CWA jurisdiction may be subject to separate state or tribal authorities.

The definition of "waters of the United States" was changed on June 29, 2015, when the agencies published a final rule entitled "Clean Water Rule: Definition of 'Waters of the United States'" (hereinafter referred to as the 2015 Rule). 80 FR 37054. On February 28, 2017, the President issued Executive Order 13778 entitled "Restoring the Rule of Law, Federalism, and Economic Growth by Reviewing the 'Waters of the United States' Rule." The Executive Order directs the EPA and the Army to review the 2015 Rule and to issue a proposed rule rescinding or revising the 2015 Rule as appropriate and consistent with law. The Executive Order also directs the agencies to "consider interpreting the term 'navigable waters' . . . in a manner consistent with" Justice Scalia's plurality opinion in *Rapanos v. United States*, 547 U.S. 715 (2006).

The agencies have engaged in a two-step rulemaking process to implement the Executive Order. On October 22, 2019, the agencies completed the first step by finalizing a rule that repealed the 2015 definition of "waters of the United States" and recodified the pre-2015 regulations (hereinafter referred to as the 2019 Rule). 84 FR 56626.

On February 14, 2019, the agencies published a proposed rule to revise the "definition of waters of the United States." 84 FR 4154. The agencies proposed six categories of "waters of the United States" and eleven categories of waters and features that would be excluded from the definition. The public comment period closed on April 15, 2019. A summary of the agencies' response to comments is available in the docket for the final rule. This final rule revising the definition of "waters of the United States" completes the second step in the two-step approach to implement EO 13778.

This Economic Analysis (EA) assesses the potential impacts of the changes to the definition of "waters of the United States" based on the potential effects to CWA programs that rely on the definition of "waters of the United States." In this EA, the agencies describe how the regulation compares to the baseline of the 2019 Rule as implemented. The 2019 Rule became effective on December 23, 2019, and is the current definition of "waters of the United States" in the Code of Federal Regulations. The agencies implement the 2019 Rule informed by applicable agency guidance documents and consistent with Supreme Court decisions and longstanding agency practice.

Unlike some other environmental regulations, this final rule is not correcting a market failure. Instead, the agencies are promulgating this rule to better align the regulatory definition of "waters of the United States" with the agencies' authority under the CWA as informed by the statutory text, U.S. Constitution, and Supreme Court guidance. The rule also provides clarity and regulatory certainty to states, tribes, the regulated community, and the public.

A separate Resource and Programmatic Assessment (RPA) (U.S. EPA and Army, 2020; available in the docket on Regulations.gov at Docket Id. No. EPA-HQ-OW-2018-0149 for this final rule) outlines the agencies' assessment of the potential effects of the revised definition on the regulation of aquatic resources across the country, as well as the potential effects on CWA programs and certain other programs under other federal statutes. The RPA also provides snapshots of the applicable regulatory and legal framework currently in place in states and some tribes to provide context for how aquatic resources are regulated. The two documents together present an assessment of this rule's potential impacts.

The agencies prepared this EA and corresponding RPA to satisfy the requirements of EO 12866 and to provide information to the public about the potential effects of the final rule within the limitations of available data, but have not used this information to determine where to draw the line of the agencies' statutory authority. The basis for the final rule is described in detail in the preamble.

This EA is organized as follows. Chapter One describes the jurisdictional scope of the CWA under the 2019 Rule baseline and how jurisdiction may change under the final rule, including a discussion of potential effects across categories of waters. Chapter Two describes the potential state, tribal, and regulated entity responses to this final rule. Chapter Two also details the data and analytic issues faced by the agencies in analyzing the potential effects of this rule. Chapter Three contains the analysis of the potential impacts of this rule on CWA programs, three detailed case studies examining the potential impacts of the rule, and a national-level evaluation of the CWA section 404 program. Chapter Four of this EA provides a Regulatory Flexibility Act analysis.

I.A Summary of the Changes in CWA Jurisdiction Due to the Final Rule

I.A.1 The 2019 Rule

The agencies are currently implementing nationwide the definition of "waters of the United States" under the 2019 Rule as informed by applicable agency guidance documents and consistent with the *United States v. Riverside Bayview Homes*, *SWANCC*, and *Rapanos* decisions and longstanding agency practice. Consistent with the *Rapanos* Guidance, in most portions of the country, the agencies determine that a water can meet either the plurality's or Justice Kennedy's standard to be a jurisdictional water.

The agencies currently assert jurisdiction over the following waters:

- Traditional navigable waters (TNWs);
- Wetlands adjacent to TNWs;
- Non-navigable tributaries of TNWs that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (*e.g.*, typically three months); and
- Wetlands that directly abut such tributaries.

Under the *Rapanos* Guidance, the agencies currently assess whether the following waters are jurisdictional based on a case-specific analysis to determine whether they have a significant nexus with a TNW:

- Non-navigable tributaries that are not relatively permanent;

- Wetlands adjacent to non-navigable tributaries that are not relatively permanent; and
- Wetlands adjacent to, but that do not directly abut, a relatively permanent non-navigable tributary.

A significant nexus analysis performed according to the *Rapanos* Guidance assesses the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary, including consideration of hydrologic and ecologic factors, to determine if they significantly affect the chemical, physical, and biological integrity of downstream TNWs.

Relatively permanent waters are interpreted in the guidance documents as tributaries[3] that typically flow year-round or have continuous flow at least seasonally (*e.g.*, typically three months).[4] Wetlands that have a "continuous surface connection" are those that are directly abutting (*e.g.*, they are not separated by uplands, a berm, dike, or similar feature from the "water of the United States" to which they are adjacent). The agencies' *Rapanos* Guidance recognizes that the plurality's "continuous surface connection" is a "physical-connection requirement" and "does not require surface water to be continuously present between the wetland and the tributary."[5]

The agencies have long defined TNWs or (a)(1) waters as "[a]ll waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide." Under the 2019 Rule, the agencies interpret TNWs to encompass tidal waters, including tidally-influenced ditches and wetlands. The agencies issued guidance in 2007 regarding TNWs that helped inform the application of pre-2015 Rule practice and is used under the 2019 Rule.[6]

The agencies' 2019 Rule includes wetlands that are adjacent to other jurisdictional waters as jurisdictional, defining "adjacent" to mean "bordering, contiguous, or neighboring." The 2019 Rule also states, "Wetlands separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are 'adjacent wetlands.'" In the *Rapanos* Guidance, the agencies clarified that they consider wetlands adjacent if they meet one of three criteria: 1) there is an unbroken

[3] For purposes of the *Rapanos* Guidance, a tributary includes natural, man-altered, or man-made water bodies that carry flow directly or indirectly into a traditional navigable water. Furthermore, a tributary, for the purposes of the guidance, is the entire reach of the stream that is of the same order (*i.e.*, from the point of confluence, where two lower order streams meet to form the tributary, downstream to the point such tributary enters a higher order stream). The flow characteristics of a particular tributary generally will be evaluated at the farthest downstream limit of such tributary (*i.e.*, the point the tributary enters a higher order stream), unless data indicate the flow regime at the downstream limit is not representative of the entire tributary.

[4] The agencies have further clarified that three months for seasonal flow was provided as an example in the guidance, and the agencies have flexibility under the guidance to determine what seasonally means in a specific case. For instance, in one case, the agencies found that two months of continuous flow was seasonal at a particular site in a particular region of the country. *See* "Memorandum to Assert Jurisdiction for NWP-2007-945," *available at* https://usace.contentdm.oclc.org/utils/getfile/collection/p16021coll5/id/1437.

[5] *See, e.g., Rapanos* Guidance at n.28.

[6] *See* "U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook, Appendix D, 'Traditional Navigable Waters,'" *available at* https://usace.contentdm.oclc.org/utils/getfile/collection/p16021coll11/id/2316.

surface or shallow sub-surface connection to jurisdictional waters; 2) they are physically separated from jurisdictional waters by man-made dikes or barriers, natural river berms, beach dunes, and the like; or 3) their proximity to a jurisdictional water is reasonably close, supporting the science-based inference that such wetlands have an ecological interconnection with jurisdictional waters. Under the guidance, non-jurisdictional ditches and other features like swales can contribute to a surface hydrologic connection between a wetland and the water to which it is adjacent.

Under the 2019 Rule baseline, ditches are "waters of the United States" where they meet the criteria under one of the categories for jurisdiction (*e.g.,* TNWs, interstate waters, relatively permanent waters).

The *Rapanos* Guidance does not address waters not at issue in the *Rapanos* case, including interstate waters, the territorial seas, and the "(a)(3)" provision for nonnavigable, isolated, intrastate waters. The (a)(3) provision was addressed in the 2001 *SWANCC* decision and the agencies' subsequent 2003 *SWANCC* guidance.[7] Since the 2001 decision in *SWANCC,* the agencies are not aware of assertions of jurisdiction over nonnavigable, isolated, intrastate waters using the (a)(3) portion of the regulations by the agencies.

The 2019 Rule defines "waters of the United States" to include interstate waters, including interstate wetlands. Under the 2019 Rule, interstate waters are "waters of the United States" even if they are not navigable for purposes of Federal regulation under (a)(1) and do not connect to such waters. In ORM2, these waters are generally captured under other categories in the approved jurisdictional determination (AJD) form, including categories for TNWs, tributaries (relatively permanent waters or non-relatively permanent waters), adjacent wetlands (those adjacent to a TNW, directly abutting a relatively permanent water, adjacent to but not directly abutting a relatively permanent water, or adjacent to non-relatively permanent waters), and impoundments of jurisdictional waters.

The CWA[8] and the agencies' 2019 Rule include "the territorial seas" as "waters of the United States." The territorial seas are also considered to be TNWs under the 2019 Rule and are portrayed as such in the ORM2 database.

Under the 2019 Rule, impoundments of jurisdictional waters remain jurisdictional. Impoundments were not addressed directly by the *Riverside Bayview*, *SWANCC*, or *Rapanos* Supreme Court decisions.

Under the 2019 Rule, certain waters are excluded from the definition of "waters of the United States" in rule language or are generally not considered "waters of the United States" per the *Rapanos* Guidance or preamble language from the 1980s regulations, which the agencies utilize as part of implementation of the 2019 Rule. Excluded waters are non-jurisdictional and not subject to the regulatory programs of the CWA. Prior converted cropland and waste treatment systems have been excluded from the regulatory definition of "waters of the United States" since 1993 and 1979, respectively, and those exclusions were recodified in the 2019 Rule. In preamble language explaining the 1980s regulations[9] and in the *Rapanos* Guidance, the agencies have also interpreted certain waters to be non-jurisdictional. The 1986 and 1988

[7] *See* 68 FR 1991, 1995 (January 15, 2003).

[8] *See* 33 U.S.C. 1362(7), defining "navigable waters" as "the waters of the United States, including the territorial seas."

[9] *See* 51 FR 41206, 41217 (Nov. 13, 1986) and 53 FR 20764, 20765 (June 6, 1988).

preamble language states that the agencies do not consider certain waters, such as artificially irrigated areas which would revert to upland if the irrigation ceased or certain artificial stock watering ponds created by excavating and/or diking dry land, to be "waters of the United States." The *Rapanos* Guidance states that the agencies generally will not assert jurisdiction over the following features: swales or erosional features (*e.g.*, gullies, small washes characterized by low volume, infrequent, or short duration flow) and ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water. The Corps documents when they find aquatic resources under the 2019 Rule/*Rapanos* Guidance practice to be non-jurisdictional as a category in ORM2. The database, however, does not record the reason for such determinations.

I.A.2 The Final Rule

The agencies' revised definition of "waters of the United States" encompasses the following waters:

- The territorial seas and TNWs (paragraph (a)(1) waters);
- Tributaries (paragraph (a)(2) waters);
- Lakes, ponds, and impoundments of jurisdictional waters (paragraph (a)(3) waters); and
- Adjacent wetlands (paragraph (a)(4) waters).

With the final rule, the agencies continue to include the territorial seas and TNWs (including water which are subject to the ebb and flow of the tide) as "waters of the United States." The rule incorporates "the territorial seas" into the (a)(1) category to simplify the regulation. The final rule is consistent with how the Corps captures these types of waters on its *Rapanos* AJD form and in its ORM2 database under the 2019 Rule/*Rapanos* Guidance practice. The rule eliminates interstate waters as a separate, standalone category of jurisdictional waters. Interstate waters remain jurisdictional if they meet another category of jurisdictional waters under the final rule (territorial seas or TNWs, tributaries, lakes, ponds, and impoundments of jurisdictional waters, and adjacent wetlands). These waters did not have a separate category on the *Rapanos* AJD form or in the ORM2 database.

The agencies include tributaries of the territorial seas and TNWs as "waters of the United States" in the final rule. The rule defines "tributary" to mean:

> A river, stream, or similar naturally occurring surface water channel that contributes surface water flow to a paragraph (a)(1) water in a typical year either directly or indirectly through one or more paragraph (a)(2) through (4) waters. A tributary must be perennial or intermittent in a typical year. The alteration or relocation of a tributary does not modify its jurisdictional status as long as it continues to satisfy the flow conditions of this definition. A tributary does not lose its jurisdictional status if it contributes surface water flow to a downstream jurisdictional water in a typical year through a channelized non-jurisdictional surface water feature, through a subterranean river, through a culvert, dam, tunnel, or similar artificial feature, or through a debris pile, boulder field, or similar natural feature. The term tributary includes a ditch that either relocates a tributary, is constructed in a tributary, or is constructed in an adjacent wetland as long as the ditch satisfies the flow conditions of this definition.

"Perennial" is defined as "surface water flowing continuously year-round." "Intermittent" is defined as "surface water flowing continuously during certain times of the year and more than in direct response to precipitation (*e.g.*, seasonally when the groundwater table is elevated or when snowpack melts)." "Ephemeral" is defined as "surface water flowing or pooling only in direct response to precipitation (*e.g.*, rain or snow fall)." The final rule's definition of "tributary" includes only those rivers and streams with perennial and intermittent flow. The agencies are using the term "reach" in the final rule to mean a section of a stream or river along which similar hydrologic conditions exist, such as discharge, depth, area, and slope.

Ditches are not a standalone category in the final rule, but they are jurisdictional if they are TNWs (including tidal ditches) or if they are tributaries. The term "tributary," as defined, includes those ditches that either relocate a tributary, are constructed in a tributary, or are constructed in adjacent wetlands as long as those ditches satisfy the flow conditions of the "tributary" definition. The term "ditch" is defined as "a constructed or excavated channel used to convey water." Portions of ditches constructed in adjacent wetlands may also be jurisdictional as adjacent wetlands under certain circumstances.

The final rule includes lakes, ponds, and impoundments of jurisdictional waters as a separate category of "waters of the United States." "Lakes and ponds, and impoundments of jurisdictional waters" is defined to mean standing bodies of open water that contribute surface water flow to a territorial sea or TNW in a typical year either directly or through one or more jurisdictional waters. A lake, pond, or impoundment does not lose its jurisdictional status if it contributes surface water flow to a downstream jurisdictional water in a typical year through a channelized non-jurisdictional surface water feature, through a culvert, dike, spillway, or similar artificial feature, or through a debris pile, boulder field, or similar natural feature. A lake or pond, or impoundment of a jurisdictional water is also jurisdictional if it is inundated by flooding from a territorial sea, a TNW, a tributary, or another jurisdictional lake, pond, or impoundment of a jurisdictional water in a typical year.

A lake, pond, or impoundment of a jurisdictional water is jurisdictional under the final rule if it is a TNW (*e.g.*, Lake Michigan or Lake Mead), though it would be identified as jurisdictional under that category of the final rule, not the "lakes and ponds, and impoundments of jurisdictional waters" category.

The fourth and final category of "waters of the United States" in the final rule is adjacent wetlands. The final rule defines "adjacent wetlands" as those wetlands that: (i) abut, meaning to touch at least at one point or side of, a territorial sea, a TNW, a tributary, or a lake, pond, or impoundment of a jurisdictional water; (ii) are inundated by flooding from a territorial sea, a TNW, a tributary, or a lake, pond, or impoundment of a jurisdictional water in a typical year; (iii) are physically separated from a territorial sea, a TNW, a tributary, or a lake, pond, or impoundment of a jurisdictional water only by a natural berm, bank, dune, or similar natural feature; or (iv) are physically separated from a territorial sea, a TNW, a tributary, or a lake, pond, or impoundment of a jurisdictional water only by an artificial dike, barrier, or similar artificial structure so long as that structure allows for a direct hydrologic surface connection between the wetlands and the jurisdictional water in a typical year, such as through a culvert, flood or tide gate, pump, or similar artificial feature. An adjacent wetland is jurisdictional in its entirety when a road or similar artificial structure divides the wetland, as long as the structure allows for a direct hydrologic surface connection through or over that structure in a typical year.

The final rule lists 12 types of non-jurisdictional waters, also known as excluded waters, one of which makes clear that waters or water features that are not explicitly included as "waters of the United States" are not jurisdictional. The agencies retain two existing exclusions for prior converted cropland and waste treatment systems, though they are defining those categories in regulatory text for the first time. The agencies define "prior converted cropland" in the regulatory text as:

> Any area that, prior to December 23, 1985, was drained or otherwise manipulated for the purpose, or having the effect, of making production of an agricultural product possible. EPA and the Corps will recognize designations of prior converted cropland made by the Secretary of Agriculture. An area is no longer considered *prior converted cropland* for purposes of the Clean Water Act when the area is abandoned and has reverted to wetlands, as defined in paragraph (c)(16) of this section. Abandonment occurs when prior converted cropland is not used for, or in support of, agricultural purposes at least once in the immediately preceding five years. For the purposes of the Clean Water Act, the EPA Administrator shall have the final authority to determine whether prior converted cropland has been abandoned.

Thus, the agencies are clarifying that a designation of "prior converted cropland" for purposes of the CWA no longer applies if the area has been abandoned and reverted to wetlands. In the final rule, the agencies define "waste treatment systems" to include "all components, including lagoons and treatment ponds (such as settling or cooling ponds), designed to either convey or retain, concentrate, settle, reduce, or remove pollutants, either actively or passively, from wastewater prior to discharge (or eliminating any such discharge)."

Also excluded from the definition of "waters of the United States" under the final rule are groundwater, including groundwater drained through subsurface drainage systems; ephemeral features, including ephemeral streams, swales, gullies, rills, and pools; diffuse stormwater run-off and directional sheet flow over upland; ditches that are not specifically included as the territorial seas, TNWs, or tributaries, as well as those portions of ditches that have been constructed in adjacent wetlands that do not satisfy the conditions of the "adjacent wetlands" definition; artificially irrigated areas, including fields flooded for agricultural production, that would revert to upland should application of irrigation water to that area cease; artificial lakes and ponds including water storage reservoirs and farm, irrigation, stock watering, and log cleaning ponds, constructed or excavated in upland or in non-jurisdictional waters, so long as those artificial lakes and ponds are not impoundments of jurisdictional waters that meet the conditions of the definition of "lakes and ponds, and impoundments of jurisdictional waters;" water-filled depressions constructed or excavated in upland or in non-jurisdictional waters incidental to mining or construction activity, and pits excavated in upland or in non-jurisdictional waters for the purpose of obtaining fill, sand, or gravel; stormwater control features constructed or excavated in upland or in non-jurisdictional waters to convey, treat, infiltrate, or store stormwater run-off; and groundwater recharge basins, water reuse, and wastewater recycling structures, including detention, retention, and infiltration basins and ponds, constructed or excavated in upland or in non-jurisdictional waters.

The final rule includes definitions for "high tide line," "ordinary high water mark," "snowpack," "tidal waters and waters subject to the ebb and flow of the tide," "typical year," "upland," and "wetlands." The definition for "wetlands" remains unchanged from the 2019 Rule baseline. The terms "high tide line" and "ordinary high water mark" also are unchanged from the Corps' regulation in the baseline. The agencies

add the term "upland" to their regulations for the first time. "Upland" is defined in the final rule as any land area that under normal circumstances does not satisfy all three wetland factors (*i.e.*, hydrology, hydrophytic vegetation, hydric soils) identified in the definition of "wetland" and that does not lie below the ordinary high water mark or the high tide line of a jurisdictional water.

I.A.3 Comparison of Scope of Jurisdiction between the 2019 Rule and the Final Rule

In this section, the agencies describe potential changes to the CWA jurisdictional status of categories of waters under the final rule. The agencies describe these potential changes compared to the 2019 Rule baseline.

I.A.3.1 Traditional Navigable Waters (TNWs)

Under the final rule, the agencies continue the regulation of TNWs, or (a)(1) waters, including waters subject to the ebb and flow of the tide. The final rule modifies the regulatory text compared to the baseline by adding the territorial seas to the (a)(1) category, but this change in the regulatory text does not have an effect on which waters would be regulated as TNWs. The agencies discuss in Section III.A of the final rule preamble the case law and their principles for determining TNWs. The agencies generally determine whether a water is a TNW for purposes of a specific AJD (*i.e.*, on a "case-specific" basis) based on tests established by the courts reaching all the way back to the late 1800s. The agencies' application of those tests evolves as the case law evolves, and the agencies will continue this practice under the final rule as it applies to the baseline.

A "case-specific" determination does not designate the upper and lower extents of the TNW; a water is only designated a TNW for that one AJD and only in the specified review area. In addition, under the 2019 Rule/*Rapanos* Guidance practice some Corps Districts have chosen to document an aquatic resource as a perennial relatively permanent water instead of a case-specific TNW for ease of documentation and workload. Some AJDs for relatively permanent waters therefore are TNWs, so the ORM2 data on TNWs under the 2019 Rule/*Rapanos* Guidance practice likely underestimate the number of TNWs. However, those aquatic resources would be captured in the relatively permanent waters category described in the "Tributaries" section below. According to ORM2 data for FY13-FY18, 18,204 waters were determined to be jurisdictional as TNWs under the *Rapanos* Guidance practice, which the 2019 Rule re-established. This number includes any tidal wetlands that the Corps has determined are (a)(1) waters, but the agencies are unable to parse out how many of these determinations may have been for such wetlands.

I.A.3.2 Interstate Waters

The final rule removes interstate waters as a separate category of "waters of the United States," which is a change from the baseline. With this change, interstate waters are jurisdictional if they meet one of the categories of "waters of the United States" under the final rule (TNWs, tributaries, lakes, ponds, impoundments of jurisdictional waters, adjacent wetlands). Under the 2019 Rule, any waters that are part of a state or international boundary or that cross state or international boundaries may be considered jurisdictional as interstate waters regardless of whether they are TNWs or actually connect to a TNW or other jurisdictional water. For example, a wetland straddling a state line would be considered jurisdictional without satisfying any of the conditions for adjacency described in either the *Rapanos* plurality or concurring opinions. The final rule may therefore reduce the number of waters, including wetlands, considered to be jurisdictional compared to the baseline where they would not meet one of the

categories of jurisdictional waters under the final rule, but the agencies lack sufficient data to quantify the difference

The *Rapanos* AJD form and the associated ORM2 data do not indicate whether a water is jurisdictional because it is an "interstate water." Instead, these waters are generally represented by other ORM2 categories of aquatic resources. Because "interstate waters" are not identified on the *Rapanos* AJD form or in the associated ORM2 data, the agencies are unable to quantify the potential change in jurisdiction under the final rule relative to the baseline with respect to interstate waters. The agencies are not aware of any database that identifies the jurisdictional status of interstate waters (including any interstate wetlands or interstate ephemeral waters) based solely on the fact that they cross state lines or any other resource that would identify these waters and therefore lack the analytical ability to perform a comparative analysis with precision.

I.A.3.3 Territorial Seas

Under the final rule, the agencies continue the regulation of "the territorial seas" as "waters of the United States," but combine the territorial seas in (a)(1) with TNWs. The agencies anticipate that there will be no change in the jurisdictional status of these waters compared to the baseline.

The ORM2 database does not record under the 2019 Rule/*Rapanos* Guidance practice whether a water is a "territorial sea." Territorial seas would all be categorized as TNWs in AJDs conducted under the 2019 Rule/*Rapanos* Guidance practice.

I.A.3.4 Tributaries

The agencies include "tributaries" as categorically jurisdictional in the final rule. As finalized, tributaries may be perennial or intermittent, while ephemeral features are not considered tributaries, nor jurisdictional. To be jurisdictional as a tributary under the final rule, a river, stream, or similar naturally occurring surface water channel must contribute surface water flow to a territorial sea or a TNW in a typical year[10] either directly or through other jurisdictional waters, through certain artificial features (including non-jurisdictional ditches, culverts, dams, or tunnels), through subterranean rivers, or through certain natural features (including non-jurisdictional ephemeral features debris piles or boulder fields). Ditches that are jurisdictional as tributaries under the rule include those constructed in a tributary or that relocate a tributary and ditches constructed in an adjacent wetland as long as those ditches satisfy the flow conditions of the tributary definition. Ditches are also jurisdictional where they meet the requirements to be TNWs. If a ditch is constructed in an adjacent wetland and wetlands within the ditch meet the definition of "adjacent wetlands," those portions may be jurisdictional as adjacent wetlands under the final rule. All other ditches are excluded from the definition of "waters of the United States."

Under the 2019 Rule, all tributaries that are relatively permanent waters and non-relatively permanent tributaries that have a significant nexus with a TNW are jurisdictional. Relatively permanent waters include waters that are perennial as well as intermittent waters that are seasonal. Non-relatively permanent waters include non-seasonal intermittent tributaries and ephemeral tributaries. Perennial

[10] In the final rule, the term *typical year* means when precipitation and other climatic variables are within the normal periodic range (*e.g.*, seasonally, annually) for a geographic area of the applicable aquatic resource based on a rolling thirty-year period.

relatively permanent waters are jurisdictional without the need for further analysis under the 2019 Rule. Seasonal relatively permanent waters are also jurisdictional under the 2019 Rule, but as a matter of policy the Corps conducts a significant nexus determination for such waters for documentation purposes. Under the 2019 Rule, ephemeral streams which flow only in response to precipitation and non-seasonal intermittent streams which do not have continuous flow at least seasonally are not categorically jurisdictional; rather, these non-relatively permanent waters are evaluated according to the significant nexus standard.[11] Ditches are not explicitly excluded from "waters of the United States" under the 2019 Rule; however, ditches (including roadside ditches) excavated wholly in and draining only upland and that do not carry a relatively permanent flow of water are generally not jurisdictional consistent with the *Rapanos* Guidance.

Under the baseline, the unit of analysis of the significant nexus evaluation is the individual tributary (*i.e.,* the entire reach of the stream that is of the same order) and any wetlands that are adjacent to that reach of the tributary. Note that the term "reach" under the 2019 Rule as addressed in the *Rapanos* Guidance differs from implementation of the term "reach" under the final rule. Under the 2019 Rule, the agencies implemented the term "reach" using a stream order approach, while the final rule identifies the term "reach" with respect to similar flow characteristics.

Compared to the 2019 Rule, the final rule does not regulate any ephemeral streams, including those ephemeral streams found to be jurisdictional based on a case-specific significant nexus evaluation. The final rule will regulate non-seasonal intermittent tributaries that meet the definitions of "intermittent" and "tributary" under the final rule, while some intermittent streams may not have satisfied the significant nexus standard. In addition, although the final rule allows for ephemeral streams to serve as a non-jurisdictional connection between upstream and downstream jurisdictional tributaries, it does not regulate perennial or intermittent streams that flow into ephemeral features that do not contribute surface water flow in a typical year to a downstream jurisdictional water. Under the 2019 Rule and *Rapanos* Guidance practice, such upstream perennial and intermittent streams would be jurisdictional if they are relatively permanent waters regardless of the frequency of a connection to downstream jurisdictional waters, and ephemeral streams would be jurisdictional if they have a significant nexus to a TNW.

There may be some ditches that drain wetlands that would be considered jurisdictional under the 2019 Rule that will not be jurisdictional under the final rule. Under the 2019 Rule, a ditch may be jurisdictional if it is either a relatively permanent water or is a non-relatively permanent tributary that has a case-specific significant nexus to a TNW. Under the baseline, a ditch does not need to relocate a tributary, be constructed in a tributary, or be constructed in an adjacent wetland and have perennial or intermittent flow to be jurisdictional. Under the final rule, however, a ditch must satisfy one of these three criteria to be jurisdictional as a tributary.

[11] Ephemeral features, including ephemeral streams, are not categorically jurisdictional under the 2019 Rule. As described in the agencies' *Rapanos* Guidance, under the baseline the agencies conduct a significant nexus analysis for certain types of waters referred to as "non-relatively permanent waters," which includes ephemeral streams and some intermittent streams. *See Rapanos* Guidance at 7 ("'[R]elatively permanent' waters do not include ephemeral tributaries which flow only in response to precipitation and intermittent streams which do not typically flow year-round or have continuous flow at least seasonally. However, CWA jurisdiction over these waters will be evaluated under the significant nexus standard[.]"). The *Rapanos* Guidance also notes that "[t]he agencies generally will not assert jurisdiction over . . . small washes characterized by low volume, infrequent, or short duration flow." *Id.* at 1.

Although the agencies are unable to quantify the change in jurisdiction for tributaries compared to the 2019 Rule on a national scale due to the lack of information on the extent of ephemeral streams and the fact that ephemeral and some intermittent streams are not categorically jurisdictional under the 2019 Rule, the agencies expect that in portions of the country where ephemeral streams are more prevalent (*e.g.*, the arid West), the change in jurisdiction for tributaries will be greater relative to other parts of the country. The agencies are also unable to quantify how many perennial or intermittent streams have downstream ephemeral reaches that do not contribute any surface water flow to a jurisdictional water in a typical year (which likely would render such waters non-jurisdictional under the final rule).

Tributaries evaluated under the 2019 Rule/*Rapanos* Guidance practice are categorized as either relatively permanent waters or non-relatively permanent waters. In ORM2, relatively permanent waters are not further categorized into seasonal intermittent or perennial relatively permanent waters, so separating these two components of relatively permanent waters to identify a subset for the baseline would be impracticable. In ORM2 from FY13-FY18, 17,496 waters were determined to be jurisdictional as relatively permanent waters under *Rapanos* Guidance practice. The agencies anticipate that the final rule will not change the jurisdictional status of many of these relatively permanent waters, and that they will continue to be jurisdictional. There may be some relatively permanent waters that will no longer be jurisdictional under the final rule because they do not contribute surface water flow to a territorial sea or TNW in a typical year.

Data from ORM2 indicate that many but not all non-relatively permanent waters are jurisdictional under *Rapanos* Guidance practice. From FY13-FY18, 4,078 waters in ORM2 were determined to be jurisdictional non-relatively permanent waters after a case-specific significant nexus evaluation, while 2,426 non-relatively permanent waters were determined to be non-jurisdictional after a case-specific significant nexus evaluation. The agencies are unable to approximate what percentage of currently jurisdictional non-relatively permanent waters are ephemeral streams that will no longer be jurisdictional under the revised definition of "waters of the United States." In addition, the agencies are not able to quantify the extent of non-relatively permanent waters that are intermittent tributaries that were determined to be non-jurisdictional under the 2019 Rule/*Rapanos* Guidance practice after a case specific significant nexus evaluation that could be included as "waters of the United States" under the final rule. There may be some intermittent non-relatively permanent waters found to have a significant nexus under the 2019 Rule/*Rapanos* Guidance practice that will no longer be jurisdictional under the final rule because they do not contribute surface water flow to a territorial sea or TNW in a typical year. ORM2 does not track ditches separately as a category for jurisdiction, so the data cannot be used to determine which ditches the agencies have found to be jurisdictional under the 2019 Rule/*Rapanos* Guidance practice will not be jurisdictional under the final rule.

I.A.3.5 Lakes and Ponds

Under the final rule, the agencies have combined the "lakes and ponds" category from the proposed rule with the "impoundments" category into a single category, and have provided a definition for this category of "lakes and ponds, and impoundments of jurisdictional waters." Because impoundments are their own category under the baseline, they are discussed separately in this document. The following lakes and ponds are jurisdictional under the final rule:

- lakes and ponds that contribute surface water flow to a territorial sea or TNW in a typical year either directly or through one or more tributaries, other jurisdictional lakes and ponds or jurisdictional impoundments, or adjacent wetlands;
- lakes and ponds that contribute surface water flow to a downstream jurisdictional water in a typical year through a channelized non-jurisdictional surface water feature, through a culvert, dike, spillway, or similar artificial feature, or through a debris pile, boulder field, or similar natural feature; and
- lakes and ponds that are inundated by flooding from a territorial sea, TNW, tributary, or jurisdictional lake, pond, or impoundment in a typical year.

Open waters that are TNWs (*e.g.*, Lake Michigan, Lake Champlain) are not included in the rule's definition of "lakes and ponds, and impoundments of jurisdictional waters," but would be treated as jurisdictional TNWs under the final rule as discussed previously.

Under the 2019 Rule and *Rapanos* Guidance, TNW lakes and ponds, interstate lakes and ponds, and all relatively permanent lakes and ponds that are considered tributaries are regulated as "waters of the United States," and most would continue to be jurisdictional under the final rule. TNWs and interstate waters are discussed previously. The agencies anticipate that most relatively permanent lakes and ponds that are considered tributaries under the 2019 Rule will be jurisdictional under the final rule because they contribute surface water flow to a territorial sea or TNW in a typical year either directly or indirectly through an otherwise jurisdictional water or through a non-jurisdictional channel, artificial feature, or natural feature that conveys surface water flow downstream. In addition, under the 2019 Rule, non-relatively permanent lakes and ponds that are considered tributaries undergo a case-specific significant nexus evaluation to determine their jurisdictional status. These non-relatively permanent lakes and ponds would include both non-seasonal intermittent waters as well as ephemeral waters. Some ephemeral lake and pond tributaries may be jurisdictional under the 2019 Rule/*Rapanos* Guidance practice. Those ephemeral lakes and ponds will be non-jurisdictional under the final rule. Non-seasonal intermittent lakes and ponds that contribute surface water flow to a territorial sea or TNW in a typical year will be jurisdictional under the final rule. Some but not all of these non-seasonal intermittent lake and pond tributaries may be jurisdictional under the 2019 Rule*/Rapanos* Guidance practice.

The final rule also includes as "waters of the United States" lakes and ponds that are inundated by flooding from a territorial sea, a TNW, a tributary, or a jurisdictional lake, pond, or impoundment in a typical year, such as certain oxbow lakes. Such waters may have been considered jurisdictional under the 2019 Rule as tributaries, although some may not be part of the stream network and may not have been considered jurisdictional under the (a)(3) "other waters category." Some of these lakes and ponds may be jurisdictional under the final rule that had not been found jurisdictional under the baseline. Thus, the agencies assume that there may be a change in jurisdiction between the 2019 Rule and the final rule, but these changes cannot be quantified.

Available FY13-FY18 data from ORM2 on the status of lakes and ponds that are tributaries under *Rapanos* Guidance practice is discussed in the "Tributaries" section above. The agencies are not able to parse out from the available AJD data under the 2019 Rule/*Rapanos* Guidance practice if the tributary at issue is a lake, a pond, or a stream, as there is no field in ORM2 for the Corps to note this status. Thus, the

agencies are not able to estimate the percentage of non-relatively permanent lake and pond tributaries which are deemed jurisdictional under the baseline. In addition, as discussed above in the "Tributaries" section, the agencies do not indicate if a non-relatively permanent water is a non-seasonal intermittent water or ephemeral, further complicating any quantification of potential change for this category of waters. The agencies are also unable to quantify how many lakes and ponds are upstream of ephemeral reaches that do not contribute surface water flow to a downstream jurisdictional water in a typical year and thus would render those lakes and ponds non-jurisdictional under the final rule.

I.A.3.6 Impoundments of Jurisdictional Waters

The agencies include certain impoundments of jurisdictional waters in the definition of "waters of the United States," with some changes from the baseline. This category has been combined with lakes and ponds, which had been proposed as their own separate category, into a single category of jurisdictional waters, and the category is defined in the regulatory text. In order to be "waters of the United States" under the final rule, impoundments must be impoundments of jurisdictional waters and must contribute surface water flow to a territorial sea or TNW in a typical year either directly or through one or more jurisdictional waters or through a channelized non-jurisdictional surface water feature (*e.g.*, an ephemeral stream or non-jurisdictional ditch), through a culvert, dike, spillway or similar artificial feature, or through a debris pile, boulder field, or similar natural feature. An impoundment of a jurisdictional water is also jurisdictional if it is inundated by flooding from a territorial sea, a TNW, or a jurisdictional lake, pond, or impoundment in a typical year. Impounded waters that are themselves TNWs (*e.g.*, Lake Mead, Lake Powell) are jurisdictional under the final rule under the (a)(1) category.

The number of impounded waters that are jurisdictional may change under the final rule because certain waters (*e.g.*, streams not meeting the final rule's definition of "tributary") that are impounded would be no longer jurisdictional and because certain impoundments of jurisdictional waters may not meet the requirement to contribute surface water flow in a typical year to a territorial sea or TNW. For example, impoundments of those ephemeral streams determined to be jurisdictional under the 2019 Rule via a significant nexus analysis would have also been jurisdictional themselves. Such impoundments would not be jurisdictional under the final rule, however, because ephemeral streams are non-jurisdictional. Other impoundments of jurisdictional waters that are disconnected from the tributary system will not be jurisdictional under the final rule if they do not contribute surface water flow to a TNW or territorial sea in a typical year. In addition, certain other wetlands will no longer be jurisdictional under the final rule that may have been jurisdictional under the 2019 Rule. Therefore, impoundments of such wetlands would not be jurisdictional under the final rule. Under the baseline, generally, an impoundment of a "water of the United States" does not affect the water's jurisdictional status.

According to ORM2 data from FY13-FY18, 874 waters were determined to be jurisdictional impoundments under *Rapanos* Guidance practice. Based on these ORM2 data, 7.5 percent of impoundments were located on non-relatively permanent waters. However, non-relatively permanent waters as implemented under the 2019 Rule/*Rapanos* Guidance practice do not directly correlate with ephemeral streams, as previously discussed. Some percentage of non-relatively permanent waters are intermittent streams that are not seasonal but that would be included as jurisdictional waters under the final rule. ORM2 data are not available for impoundments of interstate waters that might not be jurisdictional under the final rule because interstate waters themselves were not tracked separately in

ORM2 for AJDs made under the 2019 Rule/*Rapanos* Guidance. The agencies are unable to determine if any of the impoundments that were found to be jurisdictional under the baseline would no longer be considered jurisdictional because they do not contribute surface water flow in a typical year to a territorial sea or TNW. Thus, the agencies cannot quantify the change in jurisdiction of impoundments compared to the baseline.

I.A.3.7 Adjacent Wetlands

Under the final rule, the following are adjacent wetlands:

- wetlands that abut jurisdictional waters;
- wetlands that are inundated by flooding from a jurisdictional water in a typical year;
- wetlands that are physically separated by a jurisdictional water only by a natural berm, bank, dune, or similar natural feature; and
- wetlands that are physically separated from a jurisdictional water only by an artificial dike, barrier, or similar artificial structure so long as that structure allows for a direct hydrologic surface connection between the wetlands and the jurisdictional water in a typical year, such as through a culvert, flood or tide gate, pump, or similar feature.

An adjacent wetland is jurisdictional in its entirety when a road or similar artificial structure divides the wetland, as long as the structure allows for a direct hydrologic surface connection through or over that structure in a typical year.

Under the 2019 Rule, wetlands that are adjacent include wetlands that are bordering, contiguous, or neighboring a "water of the United States," including wetlands behind a natural river berm, beach dunes, constructed dikes or barriers, and the like. Not all "adjacent" wetlands are jurisdictional under the 2019 Rule. The *Rapanos* Guidance states that adjacent wetlands are evaluated differently depending on the water to which they are adjacent (TNWs, relatively permanent waters, and non-relatively permanent waters). Under the 2019 Rule, wetlands adjacent to relatively permanent waters are analyzed in different ways, depending on whether or not they are directly abutting. Adjacent wetlands that directly abut a relatively permanent water are jurisdictional without the need for further analysis under the 2019 Rule. Wetlands adjacent to but not directly abutting a relatively permanent water require a case-specific significant nexus analysis to determine their jurisdictional status under the 2019 Rule. Similarly, all wetlands adjacent to non-relatively permanent waters require a case-specific significant nexus evaluation to determine their jurisdictional status under the 2019 Rule. The 2019 Rule includes more streams (such as certain ephemeral streams) as jurisdictional tributaries than the final rule, and therefore, likely includes more wetlands adjacent to those tributaries as jurisdictional. However, because many of the additional streams the 2019 Rule regulates compared to the final rule are likely ephemeral, the jurisdictional status of wetlands adjacent to such streams must be determined according to a significant nexus test; such wetlands are not categorically jurisdictional under the 2019 Rule.

Non-abutting adjacent wetlands under the 2019 Rule include those with an unbroken surface or shallow sub-surface connection to jurisdictional waters. Some of these wetlands may be adjacent under the final rule, for example, where they are inundated by flooding from a jurisdictional water in a typical year, but

others may not, including, for example, those wetlands that would be adjacent under the 2019 Rule solely due to a hydrological connection to a jurisdictional water via an unbroken shallow subsurface connection. Wetlands physically separated from jurisdictional waters by natural river berms, beach dunes, and the like are also considered adjacent under the 2019 Rule and will continue to be considered adjacent under the final rule. The 2019 Rule also includes wetlands separated from jurisdictional waters by artificial dikes, barriers, or similar artificial structures as adjacent non-abutting wetlands, regardless of whether the wetlands have a direct hydrologic surface connection to those jurisdictional waters in a typical year via a culvert, flood or tide gate, or similar feature. This differs from the final rule which requires a direct hydrologic surface connection in a typical year for such wetlands to be jurisdictional.

Finally, non-abutting adjacent wetlands under the 2019 Rule also include wetlands that are physically proximate (*i.e.*, reasonably close) to jurisdictional waters, either categorically or through a significant nexus test. Such wetlands would only be adjacent under the final rule if they are inundated in a typical year by a jurisdictional water, if they are physically separated from a jurisdictional water only by a natural berm or similar natural structure, or if they are physically separated from jurisdictional water only by an artificial structure so long as that structure allows for a direct hydrologic surface connection in a typical year. Other proximate wetlands will not be considered adjacent under the final rule that may have been found jurisdictional under the 2019 Rule. Under the 2019 Rule such non-abutting wetlands that are adjacent to TNWs are *per se* jurisdictional, while such non-abutting wetlands that are adjacent to relatively permanent waters and non-relatively permanent waters are jurisdictional only if they have significant nexus to a TNW.

Changes in the "adjacent wetlands" category compared to the baseline are due to both the revised definition for "adjacent wetlands" in the final rule as well as revisions to the other categories of waters that are considered jurisdictional as tributaries and as jurisdictional lakes and ponds, and impoundments of jurisdictional waters. Thus, the final rule will likely include fewer wetlands as "waters of the United States" than the 2019 Rule. The final rule will likely regulate wetlands adjacent to non-seasonal intermittent tributaries that may have been found to be non-jurisdictional under the 2019 Rule after a case-specific significant nexus evaluation. The agencies are unable to quantify this change.

The agencies analyzed data in ORM2 from FY13-18 for AJDs for adjacent wetlands conducted under *Rapanos* Guidance practice, which the 2019 Rule reinstated nationwide. The ORM2 database under the 2019 Rule/*Rapanos* Guidance practice includes the following categories of adjacent wetlands: wetlands adjacent to TNWs, wetlands that directly abut relatively permanent waters, wetlands adjacent to but that do not directly abut relatively permanent waters, and wetlands adjacent to non-relatively permanent waters. Data in ORM2 from FY13-FY18 indicate that 6,170 waters were determined to be jurisdictional as wetlands adjacent to TNWs under *Rapanos* Guidance practice. For these AJDs, the agencies cannot parse out directly from available data whether a wetland is abutting or not abutting, because for TNWs, Corps staff are only required to record that the wetland is adjacent and do not specify which type of adjacency.

To assess the potential effect of the proposed rule on the CWA jurisdiction of wetlands adjacent to TNWs under *Rapanos* Guidance practice, 25 of the 38 Corps Districts examined specific AJD ORM2 data from FY13-FY17 for wetlands adjacent to TNWs (all but 38 of the 5,261 wetlands adjacent to TNWs during this time period were completed in those 25 Corps Districts) to assess whether the wetlands are abutting

or not abutting a TNW. Some Corps Districts examined all AJDs for this wetland category from FY13-FY17, while other Corps Districts analyzed a random sample of AJDs. The Corps examined 3,581 of the 5,261 wetlands adjacent to TNWs in the analysis. The Districts used AJD hard copies, information in the administrative file, remote tools, as well as experience with regional resources and the specific review area in this analysis to determine whether the wetlands were adjacent and abutting, or whether they were considered neighboring or were behind a berm or similar feature. Those desktop assessments were compiled in spreadsheets and the agencies used these raw data to calculate the following statistics.

The Corps Districts found that 55 percent of wetlands adjacent to TNWs in the AJDs that were evaluated were abutting (*i.e.*, touching) and 45 percent of wetlands adjacent to TNWs in the AJDs that were evaluated were not abutting.[12] To be clear, such non-abutting wetlands may remain jurisdictional under the final rule. About 10 percent of wetlands adjacent to TNWs in the desktop assessment that do not abut the TNW have a surface connection to the TNW via a culvert or tide gate. Such wetlands would likely meet the agencies' definition of adjacent in the final rule. The agencies do not have additional information to estimate how many of the other non-abutting wetlands adjacent to TNWs would be found jurisdictional under the final rule because they are inundated by flooding from the TNW or are separated from the TNW only by a natural barrier. Because the final rule would include as adjacent wetlands those wetlands that are separated from the jurisdictional water only by a natural berm or similar feature, those that are separated from a jurisdictional water only by an artificial dike or similar artificial feature but that still have a direct hydrologic surface connection to that water in a typical year via a culvert or similar feature, and those that are inundated by flooding from a jurisdictional water in typical year, it is likely that fewer wetlands may be considered jurisdictional compared to the baseline. The agencies, however, are unable to quantify this change based on existing data limitations.

Under *Rapanos* Guidance practice, from FY13-FY18, 12,889 waters were determined to be jurisdictional wetlands directly abutting a relatively permanent water. The agencies do not anticipate that the final rule will change the jurisdictional status of these wetlands.

Under *Rapanos* Guidance practice, the agencies' data indicate that most wetlands that are adjacent to but that do not directly abut relatively permanent waters are found to be jurisdictional following a significant nexus analysis. In ORM2 from FY13-FY18, there were 4,495 adjacent wetlands that do not directly abut a relatively permanent water, and thus required additional jurisdictional analysis. Of these, 4,359 waters were determined to be jurisdictional because they had a significant nexus to a TNW, and 136 were found non-jurisdictional because they lacked a significant nexus – meaning approximately 97 percent of such wetlands were determined to be jurisdictional under *Rapanos* Guidance practice. Compared to the final rule, these wetlands will be jurisdictional if they are separated from the jurisdictional water only by a natural berm or similar feature, are separated from a jurisdictional water only by an artificial dike or similar artificial feature but have a direct hydrologic surface connection to that water in a typical year via a culvert or similar structure, or are inundated by flooding from a jurisdictional water in a typical year. Thus, compared to the baseline, fewer wetlands may be jurisdictional under the final rule for this category

[12] The agencies have placed in the docket as a "Supporting Document" a table of the Corps wetlands adjacent to TNW determinations that were evaluated listed by their Department of Army (DA) Number. Docket materials are available at https://www.regulations.gov/ (Docket ID: EPA-HQ-OW-2018-0149).

of non-abutting wetlands, as discussed previously in this section, but the agencies are not able to quantify this estimate based on the limits of the available information.

Available data from AJDs indicate that under *Rapanos* Guidance practice, most wetlands adjacent to non-relatively permanent waters have been determined to be jurisdictional after a case-specific significant nexus analysis that considered both the non-relatively permanent water and its adjacent wetlands. In ORM2 from FY13-FY18, 1,983 waters were determined to be jurisdictional wetlands adjacent to a non-relatively permanent water[13] and 181 wetlands adjacent to a non-relatively permanent water were determined to be non-jurisdictional, meaning that 91 percent of wetlands adjacent to non-relatively permanent waters were determined to be jurisdictional. The agencies are not able to further parse out which of these non-relatively permanent waters were intermittent or ephemeral or to parse out which adjacent wetlands were abutting or would meet the final rule's revised definition of "adjacent wetlands." Thus, the agencies are unable to quantify what the change in jurisdiction will be for this category of wetlands compared to the final rule.

Wetlands adjacent to tributaries with intermittent flow will be jurisdictional under the final rule. Wetlands adjacent to ephemeral features will not be jurisdictional under the final rule. There may be some wetlands adjacent to intermittent non-relatively permanent waters that would be found non-jurisdictional under the 2019 Rule after a case-specific significant nexus evaluation that will be jurisdictional under the final rule, where such wetlands meet the final rule's definition of "adjacent wetlands." However, the agencies do not have the data to quantify such a change. Because ephemeral features and wetlands adjacent thereto are excluded under the final rule and because fewer wetlands will be considered adjacent under the final rule, compared to the baseline, the agencies anticipate fewer wetlands may be considered jurisdictional under the final rule for wetlands adjacent to non-relatively permanent waters (such as ephemeral streams).

I.A.3.8 Nonnavigable, Isolated, Intrastate Waters

Nonnavigable, isolated, intrastate waters will not be considered "waters of the United States" under the final rule. They will expressly fall into the rule's first exclusion for waters not identified in the four categories of "waters of the United States." As noted previously, since the Supreme Court's decision in 2001 in *SWANCC*, the agencies are not aware of circumstances where they have determined jurisdiction based on the (a)(3) category of the 1980s regulations, which were recodified with the 2019 Rule.

In ORM2 from FY13-FY18, 28,264 waters were determined to be non-jurisdictional non-navigable, isolated, intrastate waters under *SWANCC* Guidance practice, which the 2019 Rule re-established. Compared to the baseline, the agencies do not anticipate that there will be a change in jurisdiction for nonnavigable, isolated, intrastate waters.

I.A.3.9 Waters Excluded from the Definition of "Waters of the United States"

The final rule explicitly excludes waters that are not included in the definition of "waters of the United States." This section addresses potential effects of the final rule's exclusions compared to exclusions under the baseline and waters that are generally considered non-jurisdictional under the baseline. Where

[13] The non-relatively permanent waters were also determined to be jurisdictional in these cases, because under *Rapanos* Guidance practice the agencies evaluate the tributary along with any adjacent wetlands for a case-specific significant nexus.

the agencies assume no changes or limited changes when comparing the exclusions identified in paragraph (b) of the final rule and those waters excluded or generally considered non-jurisdiction under the 2019 Rule, there is no further discussion. For example, many of the water features that are generally not considered "waters of the United States" under the 2019 Rule would not be included in the final rule's definition of "waters of the United States" and therefore would be excluded under paragraph (b)(1) of the revised definition. In addition, groundwater, including groundwater drained through subsurface drainage systems, is excluded in the final rule, and such groundwater is not considered a "water of the United States" under the 2019 Rule and longstanding policy of the agencies. Similarly, diffuse stormwater run-off and directional sheet flow over upland are excluded in the final rule, and such features are not considered "waters of the United States" under the 2019 Rule and longstanding policy of the agencies.

Under the 2019 Rule/*Rapanos* Guidance practice, the agencies do not record in the ORM2 database if a water is excluded from the definition of "waters of the United States" due to one of the regulatory exclusions. Such waters may be entered into the database as "uplands." However, other aquatic resources or features that the Corps determines do not meet the definition of "waters of the United States" are also categorized as "uplands" in the database. The Corps conducted 18,068 upland determinations in FY13-18 under *Rapanos* Guidance practice, which the 2019 Rule reestablished. The agencies are unable to query ORM2 to determine how many waters have been determined to meet an exclusion from the definition of "waters of the United States" under the 2019 Rule/*Rapanos* Guidance practice and are unable to quantify the magnitude of the changes in jurisdiction due to these exclusions. Therefore, the following section is a qualitative discussion.

Ephemeral Features

The final rule excludes ephemeral features, including ephemeral streams, swales, gullies, rills, and pools, from the definition of "waters of the United States." As previously discussed, the exclusion for all ephemeral features represents a change from the 2019 Rule. For example, the 2019 Rule includes those ephemeral streams, lakes, and ponds that contribute surface water flow to downstream TNWs as jurisdictional when they have a case-specific significant nexus. Features like non-wetland swales, gullies,[14] and rills would generally be considered non-jurisdictional under the 2019 Rule because they are not tributaries or because they do not have a significant nexus to a downstream TNW. For such features that are non-jurisdictional under the baseline, the final rule's exclusion does not represent a change. The exclusion for diffuse stormwater runoff does not represent a change, as diffuse stormwater water run-off (including directional sheet flow over upland) is not considered jurisdictional under the baseline.

Ditches

All ditches that are not subject to jurisdiction as a territorial sea, TNW, or tributary, as well as those portions of ditches that have been constructed in an adjacent wetland that do not satisfy the conditions of the "adjacent wetlands" definition are excluded in the final rule. Some of the ditches that will be excluded under the final rule are generally considered non-jurisdictional under the 2019 Rule, such as ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a

[14] Some ephemeral streams are colloquially called "gullies." Regardless of the name they are given locally, some such ephemeral streams may have been found jurisdictional under the 2019 Rule if they crossed state lines regardless of any connection to a TNW or if they satisfied a significant nexus evaluation.

relatively permanent flow of water. In addition, non-relatively permanent ditches that lack a case-specific significant nexus are also non-jurisdictional under the 2019 Rule. Thus, the ditch exclusion in the final rule does not represent a change for ditches that are non-jurisdictional under the 2019 Rule. Other ditches, however, that are excluded under the final rule may have been jurisdictional under the 2019 Rule if they crossed state lines regardless of any connection to a TNW, are relatively permanent waters, or are non-relatively permanent waters with a case-specific significant nexus to a TNW. The discussion of the change from the baseline for those ditches that are considered jurisdictional tributaries under the 2019 Rule is included in the "Tributaries" section above. Due to data limitations and the non-categorical jurisdictional treatment of certain ditches subject to a case-specific significant nexus analysis under the baseline, the agencies are unable to quantify potential changes in jurisdiction as a result of the final rule's ditch exclusion.

Prior Converted Cropland

The agencies anticipate that there may be a change from the baseline for the final rule's exclusion for prior converted cropland with the codification of the "abandonment" principle, as well as changes to the categories of jurisdictional waters including the definition of "adjacent wetlands;" however, the agencies are unable to quantify what that change will be. Not all prior converted cropland that has been officially designated by U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) has been mapped throughout the country. In addition, all land that qualifies under the Food Security Act of 1985 as prior converted cropland may not have been formally designated as such. Further, the agencies note that NRCS is statutorily prohibited from sharing data and information on program participants and their land, even with other federal agencies.[15] Therefore, the agencies cannot obtain certain information from NRCS, which may help in identifying potential effects or changes in jurisdiction. Estimates of the acreage of prior converted croplands have been made (*e.g.*, 53 million acres[16]) in the past, but the agencies cannot verify the accuracy of these estimates. In addition, the agencies have not documented in ORM2 when waters meet the prior converted cropland exclusion under the 2019 Rule/*Rapanos* Guidance practice, so no agency data exist to provide estimates on the current extent of prior converted cropland.

Finally, in order to establish a baseline and estimate the potential effect of the final rule language, the agencies would need to have estimates of the acreage of prior converted cropland that could lose the prior converted designation if it were subject to the "abandonment" principles versus the acreage of prior converted cropland that could lose the designation if it were subject to the "change in use" principles. To establish a baseline, the agencies would need data on how frequently the agencies applied these two

[15] Section 1619 of the Food, Conservation, and Energy Act of 2008 prohibits USDA, its contractors, and cooperators, from disclosing information provided by an agricultural producer or owner of agricultural land concerning the agricultural operation, farming or conservation practices, or the land itself, in order to participate in a USDA program, as well as geospatial information maintained by USDA with respect to such agricultural land or operations, subject to certain exceptions and authorized disclosures. Covered information may only be shared with other federal agencies outside USDA for specific purposes under a cooperative program, *i.e.*, not for general regulatory or enforcement purposes. *Available at* https://www.agriculture.senate.gov/imo/media/doc/110-246%20-%20Food,%20Conservation,%20And%20Energy%20Act%20Of%202008.pdf.

[16] *See* the 1993 report entitled, "Protecting America's Wetlands: A Fair, Flexible, and Effective Approach."

principles in the field. In addition to being "abandoned" or having a "change in use," such areas would also need to meet the federal regulatory definition of "wetlands" as well as the definition of "waters of the United States."

The preamble to the EPA and the Corps' 1993 regulations, which the agencies utilize to implement the 2019 Rule, provides that land would lose its prior converted status if it is abandoned and it exhibits wetland characteristics (abandonment).[17] Subsequently, a 2005 Memorandum to the Field issued by the Corps and USDA stated that a certified prior converted cropland determination remains valid as long as the area is devoted to an agricultural use.[18] The memorandum further stated that if the land changes to a non-agricultural use, the prior converted determination no longer applies and a new jurisdictional determination is required (change in use). In that memorandum, the status of prior converted cropland that lies fallow was not clear. The change in use policy was later declared unlawful by one district court because it effectively modified the 1993 preamble language without any rulemaking process.[19]

Under the baseline, prior converted cropland loses its status as an excluded water under the CWA if it is either abandoned or if it is subject to a change in use. The final rule clarifies that the only way for prior converted cropland to lose its status as an excluded water under the CWA is when the area is abandoned and has reverted to wetlands meeting the regulatory definition of "wetlands" and meets the revised definition of "adjacent wetlands." The rule further clarifies that prior converted cropland is abandoned if it is not used for, or in support of, agricultural purposes at least once in the immediately preceding five years. The agencies note that most prior converted cropland should not regain wetland status since it is generally manipulated to such a degree that wetland conditions would not return. As is the practice under the baseline, where wetland conditions do not return, the area is not subject to the CWA. However, where wetland conditions do return, a new JD would be required.

Under the 2019 Rule, "change in use" does not require that the area not be used for agricultural purposes at least once in the immediately preceding five years (this time requirement was only in place for the abandonment provision); change from an agricultural to a non-agricultural use could occur immediately thereby making the land potentially subject to CWA jurisdiction. In the final rule, the agencies have clarified abandonment "occurs when prior converted cropland is not used for, or in support of, agricultural purposes at least once in the immediately preceding five years." This clarification may result in less prior converted cropland being declared abandoned compared to the 2019 Rule.

Artificially Irrigated Areas, Artificial Lakes and Ponds, and Water-Filled Depressions

The final rule has an exclusion for artificially irrigated areas, including fields flooded for agricultural production, that would revert to upland should application of irrigation water to that area cease. The text of the exclusion changes somewhat from the 1986 and 1988 preamble language used under the 2019 Rule by adding "including fields flooded for agricultural production" and with a slight modification from "if the irrigation ceased" to "should application of irrigation water to that area cease." Despite the differences

[17] 58 FR 45034 (August 25, 1993), *available at* https://www.loc.gov/item/fr058163/.

[18] "Memorandum to the Field: Guidance on Conducting Wetland Determinations for the Food Security Act of 1985 and Section 404 of the Clean Water Act," February 25, 2005 (USDA, 2005). *Available at* https://prod.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_007869.pdf.

[19] *New Hope Power Co. v. U.S. Army Corps of Eng'rs*, 746 F. Supp. 2d 1272, 1282 (S.D. Fla. 2010).

in the language for the exclusion in the final rule, the agencies anticipate that there will be no or little change as compared to the baseline.

The final rule includes an exclusion for artificial lakes and ponds, including water storage reservoirs and farm, irrigation, stock watering, and log cleaning ponds, constructed or excavated in upland or in non-jurisdictional waters, so long as those artificial lakes and ponds are not impoundments of jurisdictional waters that meet the conditions of the "lakes and ponds, and impoundments of jurisdictional waters" definition in the rule. The final rule differs from waters generally considered non-jurisdictional under the 2019 Rule in a few ways, including by identifying water storage reservoirs, farm ponds, and log cleaning ponds as excluded types of artificial lakes and ponds, and does not specifically include settling basins or artificial lakes and ponds used for rice growing in this category of exclusions. Settling ponds are specifically mentioned in the definition of waste treatment systems in the final rule, which are discussed below. Artificial lakes and ponds used for rice growing may be excluded under this exclusion or the exclusion for artificially irrigated areas used for agricultural production.

The final rule allows artificial lakes and ponds constructed or excavated in non-jurisdictional waters to be excluded, which represents a change from the 2019 Rule which applied the exclusion to upland. Artificial ponds and lakes constructed or excavated in newly non-jurisdictional waters will now be excluded. For example, under the final rule an artificial pond could be constructed by impounding an ephemeral stream and be excluded, but such a pond would be jurisdictional under the 2019 Rule as an impoundment if the ephemeral stream met the significant nexus test requirements to be jurisdictional under the baseline. Therefore, there are some water features that could be excluded under the final rule that theoretically could have been considered jurisdictional under the baseline for this category. The agencies are unable to quantify this change.

The final rule's exclusion for water-filled depressions constructed or excavated in upland or in non-jurisdictional waters incidental to mining or construction activity, and pits excavated in upland or in non-jurisdictional waters for the purpose of obtaining fill, sand, or gravel differs from the text of the 1986 and 1988 preamble language used under the 2019 Rule for waters that are generally not jurisdictional. The 1986 and 1988 preamble language include additional specifications that such waters are generally non-jurisdictional unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of "waters of the United States." Although not included in the regulatory text, in the preamble to the final rule the agencies clarify that once a feature subject to this exclusion is no longer used for its original purpose, it no longer qualifies for the exclusion. Thus, the agencies do not intend for this textual change to represent a difference for such water-filled depressions. The final rule will allow for such features that are constructed or excavated in non-jurisdictional waters to be excluded, which represents a change from the 2019 Rule. Similar to artificial lakes and ponds, water-filled depressions and pits that meet the terms of the exclusion that are constructed or excavated in newly non-jurisdictional waters will be non-jurisdictional under the final rule. The agencies are unable to quantify this change.

Stormwater Control Features

The final rule excludes stormwater control features constructed in upland or in non-jurisdictional waters that convey, treat, infiltrate, or store stormwater run-off. There is no such exclusion for stormwater control features under the 2019 Rule, though some stormwater features were clearly non-jurisdictional

under the 2019 Rule. Similar to some of the other exclusions, stormwater control features that meet the terms of the exclusion and are constructed in newly non-jurisdictional waters will be non-jurisdictional under the final rule. The agencies are unable to quantify this change.

Groundwater Recharge, Water Reuse, and Wastewater Recycling Structures

The final rule excludes groundwater recharge, water reuse, and wastewater recycling structures, including detention, retention, and infiltration basins and ponds, constructed or excavated in upland or in non-jurisdictional waters. The 1986 and 1988 preamble language utilized under the 2019 Rule does not include a similar category of waters generally considered non-jurisdictional. Such waters are likely not considered jurisdictional under the 2019 Rule unless they are connected to the tributary network or are jurisdictional impoundments, and even then, some such waters could be considered excluded under the exclusion for waste treatment systems. Where such waters are jurisdictional under the 2019 Rule, there could be a change in jurisdiction under the final rule. Similar to some of the other exclusions, structures that meet the terms of the exclusion that are constructed in newly non-jurisdictional waters will be non-jurisdictional under the final rule. The agencies are unable to quantify this change.

Waste Treatment Systems

Under the final rule, the agencies continue the exclusion for waste treatment systems but with textual changes from the baseline. The agencies have revised the text in the waste treatment system exclusion to read just "waste treatment systems" and define "waste treatment system" for the first time to include all components, including lagoons and treatment ponds (such as settling or cooling ponds), designed to either convey or retain, concentrate, settle, reduce, or remove pollutants, either actively or passively, from wastewater prior to discharge (or eliminating any such discharge). The agencies do not intend for the final rule to change the application under the 2019 Rule regarding the waste treatment systems exclusion. Thus, the agencies do not anticipate a significant change from the baseline for the exclusion for waste treatment systems, but note that if a system is located on a water whose jurisdictional status changes under the final rule, the application of the exclusion would likewise change.

I.A.4 Summary

As discussed in this chapter, the agencies' ability to make quantitative estimates of changes in CWA jurisdiction under the final rule relative to the baseline is severely limited by available data and the case-by-case consideration of jurisdiction for certain waters and wetlands under the baseline practice. That said, the agencies anticipate that the potential effects associated with the final rule will be most applicable to ephemeral streams and to wetlands. The agencies note that not all ephemeral streams are "waters of the United States" under the baseline, but where they would be found jurisdictional according to a significant nexus analysis, they will be considered ephemeral features and non-jurisdictional under the final rule. Similarly, not all wetlands are jurisdictional under the 2019 Rule, but certain wetlands found jurisdictional under the baseline would not be jurisdictional under the final rule. This includes certain wetlands that are jurisdictional under the baseline as adjacent but that do not meet the requirements to be adjacent under the revised definition, and wetlands adjacent to those ephemeral streams considered jurisdictional under the baseline. Some additional streams may also no longer be jurisdictional under the final rule that would be jurisdictional under the 2019 Rule, if such streams do not contribute surface water flow to a territorial sea or TNW in a typical year (*e.g.*, an intermittent or perennial stream that eventually dissipates on the desert floor with surface flow never reaching a downstream jurisdictional water). In

addition, there could be a subset of interstate waters that were categorically jurisdictional under the baseline that may not be jurisdictional under the final rule due to the elimination of interstate waters as a standalone category of jurisdictional waters.

The final rule will not affect the scope of jurisdictional territorial seas or TNWs nor the jurisdictional status of most perennial and many intermittent streams relative to the baseline. As discussed above, the agencies anticipate that the final rule may result in a decrease in jurisdictional lakes, ponds, and impoundments as compared to the baseline.

The agencies recognize that some of the waters that will not be subject to federal CWA jurisdiction under the final rule may be otherwise be regulated under state or tribal authorities and programs. This is discussed further in Section II.B and in the RPA.

I.B Overview of Economic Analysis

For the proposed rule, the agencies were confronted with limitations in a critical dataset that they determined would not allow analysis of the proposed rule from the primary baseline. Specifically, the agencies attempted a geospatial analysis of the regulatory options and identifying specific waterbodies that would potentially no longer be jurisdictional. However, the dataset which the agencies understood to be the most comprehensive and nationally-consistent geospatial surface hydrology data available, the National Hydrography Dataset (NHD),[20] does not differentiate between waterbody types at a sufficiently refined level nationally to make accurate distinctions. For instance, the NHD at high resolution does not distinguish intermittent from ephemeral streams in the majority of the country. Furthermore, frequent flow misclassification (*e.g.*, actual perennial streams mapped as ephemeral and vice-versa) has been documented in the NHD at high resolution, particularly with respect to headwaters.[21] Additionally, the National Wetlands Inventory (NWI) does not use the agencies' regulatory definition of wetlands, further complicating the task of assessing the potential effects of the final rule. Further, certain waters are not categorically jurisdictional under the 2019 Rule as implemented (*e.g.*, non-relatively permanent waters such as all ephemeral streams and some intermittent streams), and the jurisdictional status of such waters must be determined using a case-specific significant nexus analysis.

The agencies solicited comment on all aspects of the analyses performed and published in support of the proposed rule, including the assumptions made, information used, and the three case studies presented in the EA. Some commenters questioned the analyses primarily because the agencies did not use the NHD or NWI, even heavily caveated. Other commenters raised concerns about the lack of the quantification of potential changes in jurisdiction. Other commenters noted that even though the NHD and the NWI have limitations, the errors associated with the datasets would underestimate, not overestimate, the scale of resources likely to be identified as non-jurisdictional under the proposed rule. On the other hand, some commenters raised concerns regarding the limitations of data currently available for creating geospatial datasets of jurisdictional waters, particularly commenting on the limitations of the NHD and the NWI. Commenters also expressed concerns about the resolution, completeness, accuracy, and usefulness of

[20] United States Geological Survey (USGS), https://nhd.usgs.gov/, accessed April 17, 2018.

[21] *See, e.g.*, Fritz, Ken M., *et al.* 2013. "Comparing the Extent and Permanence of Headwater Streams from Two Field Surveys to Values from Hydrographic Databases and Maps. *Journal of the American Water Resources Association* 49(4) 867-882.

publicly-available data, with some stating that geospatial datasets cannot accurately assess the details needed to remotely determine or delineate jurisdictional waters.

Due to the analytic and data challenges discussed below and in the preamble, throughout the EA and RPA, and in the agencies' response to comments, the agencies did not use the NHD or NWI to assess potential changes in jurisdiction as a result of the final rule. Rather, the agencies qualitatively describe the potential effects of this final rule relative to the baseline of the 2019 Rule as implemented. The agencies provide a series of qualitative analyses, three detailed quantitative case studies, and a national CWA section 404 program analysis. The agencies determined that a qualitative analysis and a series of case studies, where waters potentially could be assessed on a smaller scale in specific locations, was the best available alternative for applied empirical work estimating the potential benefits and costs of this final rule. Focusing on smaller geographic scales allows the analyses to focus on areas with better than average data availability, and when possible, to utilize additional location specific data sources. The results of the case studies illustrate that only data for the CWA section 404 program are available and suitable for conducting a national level analysis. The national CWA section 404 program analysis does not provide the total avoided costs and forgone benefits of the final rule (CWA sections 402, 311, and other programs are not captured), but it does provide national totals for the CWA section 404 program.

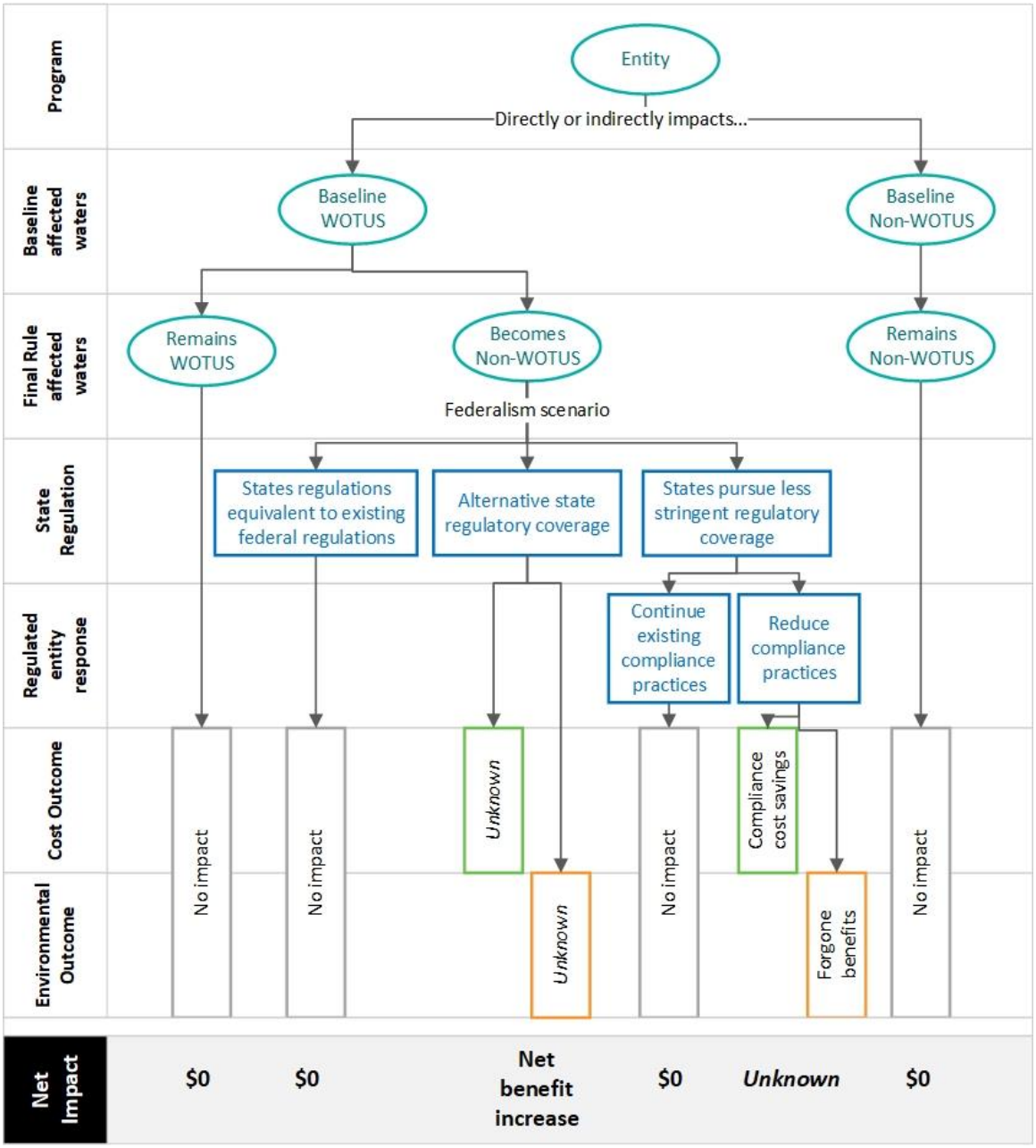
II. Discussion and Analyses of the Major Causes of Uncertainty

The first section of this EA systematically outlines the complexity and various layers of uncertainty regarding the potential implications of the change in the regulatory regime. The final economic welfare implications of this final rule will be a function of the amount, type, and location of water resources that change CWA jurisdictional status, the level of water resource regulation undertaken by individual states and tribes before and in response to the change, and the responses of regulated entities to the change.

Tree-diagrams like the one in Figure II-1 provide a systematic framework for understanding and qualitatively analyzing the potential implications of the final rule and provide a useful introduction to the subsequent analyses that go into further detail regarding one or several layers of uncertainty. As shown in the stylized example in Figure II-1, the potential effects of the change in the jurisdictional status of waters can range from having a minimal and possibly zero impact, to yielding savings in compliance costs and losses in environmental benefits.[22] In some cases, the final rule may result in an increase in net benefits.

[22] *See* Section III for analogous diagrams and qualitative analyses specific to three key CWA programs potentially affected by the proposed rule (CWA sections 402, 404, and 311).

Figure II-1: Stylized tree diagram of potential impacts from final rule.



In the simplest case, as shown in the rightmost branch in Figure II-1, if an entity (*e.g.*, a development project, manufacturing facility, or state transportation project) impacts a water that is not considered a "water of the United States" in the baseline regulatory regime, then it is also assumed not to be a "water of the United States" under the final rule, and hence there would be no changes in the compliance costs incurred by that entity nor in the environmental benefits experienced. Therefore, there is no impact to society in this situation.

At the other extreme, in the leftmost branch of Figure II-1, if an entity impacts a water that is considered a "water of the United States" in the baseline, and this water is also considered a "water of the United States" under the final rule, then there will also be no change in regulatory requirements, and thus no change in compliance costs or environmental benefits. Again, in this situation there is a zero-net impact to society. As described in the program specific analyses in Section III, many categories of baseline activities regulated under CWA sections 401, 402, 303(d), 404, and 311 will likely fall into this type of situation and continue to be regulated by the CWA under the final rule.

The cases of interest are those where an entity directly or indirectly impacts a water that is considered a "water of the United States" under the baseline regulatory regime but would no longer be considered a "water of the United States" under the final rule. Generally, the state/tribal governments could take one of three actions in response to the final rule. First, a state or tribe's current regulatory regime under state or tribal law may already be as comprehensive, or more comprehensive, than that of the federal government. It is also possible that a state or tribe will revise its current laws and regulations to address these waters and continue the actions required by the CWA in the baseline. In either case, state or tribal requirements would fully address any regulatory difference in the wake of the change in what waters are considered a "water of the United States." This will result in no change in compliance costs to the regulated community and no change in environmental benefits.

It is important to emphasize that any shift in regulatory administration, implementation, and enforcement from the federal government to states or tribes represents a transfer in administrative costs. If federal and state or tribal administrative costs are similar, the net impact should be roughly zero in the long run. However, there could be significant short-run, and possibly long run, costs to states and tribal governments to build, expand, and maintain the necessary regulatory infrastructure. To the extent that state, tribe, or local cost of implementing an expanded regulatory framework are greater than the previous federal expenses, net benefits could decrease. It is also possible that the state and local management costs could be borne most directly by state and local taxpayers, although the data necessary to estimate the size and distribution of the tax impacts was not available for use in this analysis. The agencies recognize that this would be more of an issue in some programs than others (*e.g.*, oil spill response under the CWA section 311 program), and is described in more detail in the program specific analyses in Section III and in the state response analysis in Section II.A.

Another potential outcome is a federalism scenario, where states, tribes, and local governments who may be more knowledgeable of the local factors that can influence the environmental and economic values of the waterbodies in their jurisdiction can allocate resources more efficiently than the federal government to focus programs on aquatic resources of relatively higher environmental and social value. Depending on whether the newly federally non-jurisdictional water would be regulated by the state, tribe, or local government, the compliance costs for an individual water resource could increase or decrease accordingly. And in turn, the corresponding environmental benefits could increase or decrease.

A final scenario is that states or tribes would invoke a less comprehensive regulatory regime in response to the change in CWA coverage, or not implement any state or tribal regulations beyond federal requirements. For example, a few states and all tribes are currently not authorized to implement the National Pollutant Discharge Elimination System (NPDES) program, and so they would potentially not have the capacity (staff and resources) to regulate discharges to waters that would no longer be

jurisdictional. These states or tribes may opt to not build such a capacity depending on the preferences of their residents and budget constraints, or the fact that they currently have legal requirements to not regulate beyond the CWA.[23] In such cases, unless regulated entities continue to behave as if still regulated (due to fixed costs already incurred, fear of future liability, or goodwill with local citizens), there will likely be avoided costs to the regulated community and forgone benefits to the public. Whether the net effect is positive or negative would depend on whether the resulting cost-savings are greater than the absolute value of the forgone environmental benefits. Regulated entities' potential responses are more thoroughly described in Section II.B and under the program specific discussions in Section III.A.

Overall, the generalized tree diagram here (Figure II-1) and program specific tree-diagrams in Section III.A provide a systematic and transparent organization to the qualitative discussion. These diagrams convey that in many cases the potential net effects could be minimal. Quantifying the frequency in which the scenarios in any branches of the tree take place, not to mention the magnitude of any resulting costs and benefits, is extremely difficult. Doing so requires data and well-informed assumptions regarding the current characterization of waters nationwide, the changes in the scope of "waters of the United States" across the country, and the potential response of state and tribal governments and the regulated entities across the various CWA programs and regulated waters. In addition, such a quantitative analysis faces the usual challenges of trying to model, quantify, and monetize the potential costs and benefits. For these reasons, the agencies pursue qualitative analyses organized around each of the key layers of uncertainty (as discussed through the remainder of Section II) and around key CWA programs where the agencies would expect to see potential effects (*see* Section III.A).

II.A Potential State and Tribal Response

The CWA programs outlined in this section, including the CWA section 303 water quality standards program, the CWA section 311 Oil Spill Prevention program, the section 401 water quality certification program, the CWA section 402 NPDES permit program, and the CWA section 404 permit program for the discharge of dredged or fill material, rely on the definition of "waters of the United States" for program implementation. A revised definition of "waters of the United States" will affect these federal programs as implemented at the state or tribal level. Potential effects of this rule, however, will vary based on a state's independent legal authority and programs under its own state law to regulate aquatic resources. For this analysis, the agencies focus on state responses as no tribe administers the CWA section 402 or 404 permit programs, and the majority of tribes do not have approved water quality standards or issue CWA section 401 water quality certifications.

II.A.1 Implementation of the CWA at the State Level

The purpose of this section is to summarize the current status of CWA programs in the states based on the agencies' current understanding, including the incorporation of updated information from public comments, and describe how that information is used to characterize the states' potential responses regarding waters that will no longer be jurisdictional under the CWA following the revised definition of "waters of the United States." The agencies recognize that the federal and state laws and programs can overlap and some states have more stringent requirements than the federal regulations. The way in which

[23] For example, to prepare for NPDES authorization, the state of Alaska created a capacity building plan that increased the full-time equivalents (FTEs) allocated to the program by nearly 50 percent (ADEC 2008), and the state of Idaho anticipated more than doubling the relevant staff (IDEQ 2017).

these programs are administered and affect sources of water pollution will depend on the requirements or permits issued.

II.A.1.1 CWA Section 401 Water Quality Certification Program

All 50 states, the District of Columbia, and the territories of the United States have 401 certification programs which provide the states authority to approve, disapprove, or conditionally approve federal permits and licenses issued within their state. States vary in their implementation of CWA section 401 authority; some states involve themselves in federal permitting activities and make informed certification decision, while others often waive their certification authority over federal permits and licenses. For purposes of this analysis, the agencies assume that state approaches to CWA section 401 certification are unlikely to change as a result of this rule.

The authority of states under CWA section 401 corresponds directly to the issuance of federal permits and licenses within the state. Any change in the scope of the "waters of the United States" definition will alter the frequency with which the federal government issues permits and licenses for activities affecting "waters of the United States." In turn, this will affect how often states exercise their authority under CWA section 401. In other words, as the federal government reduces the jurisdictional scope under the CWA (*e.g.*, fewer CWA section 404 permits are issued), it may not issue as many permits, and the states then would not issue as many CWA section 401 certifications. This results in states likely issuing fewer CWA section 401 certifications but is unlikely to change how states approach the CWA section 401 process.

II.A.1.2 CWA Section 402 National Pollutant Discharge Elimination System

The CWA section 402 NPDES permit program is administered by the EPA, unless states have received authorization for the program. Forty-seven states and the U.S. Virgin Islands have authority to administer the NPDES program.[24] States may be approved for all or some of the major components of an NPDES program: biosolids, pretreatment, federal facilities, and general permits and basic municipal and industrial permits. Seven states are fully authorized for all components of the NPDES program.[25] Forty states have authority over one or more of the NPDES program components, with EPA administering the other components.[26] Currently, the EPA issues all NPDES permits in the three states that do not have authority for the NPDES program as well as all permits in the District of Columbia, all U.S. Territories (excluding the U.S. Virgin Islands), and on virtually all tribal reservation lands.[27]

[24] Idaho was approved to run its own NPDES program, effective July 1, 2018, and will be taking over administration of the program in four phases over four years.

[25] Those states with fully authorized programs are: Arizona, Michigan, Ohio, Oklahoma, South Dakota, Utah, and Wisconsin.

[26] Those states with partial NPDES authorization are: Alabama, Alaska, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Jersey, New York, North Carolina, North Dakota, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Vermont, Virginia, Washington, West Virginia, and Wyoming.

[27] The three states are Massachusetts, New Hampshire, and New Mexico. At present, no tribes have authorization to administer a tribal NPDES program. Maine is authorized to issue NPDES permits on some tribal lands.

Under state authority and law, states may already regulate state waters that are not considered "waters of the United States" or could use their existing authorities to do so in the future. At this time, the agencies do not have sufficient information to determine the extent of these programs. With this final rule changing federal CWA jurisdiction, states may continue issuing permits under state law as they have been for discharges into waters outside the scope of CWA jurisdiction. In some 402 permits, water quality-based effluent limitations may be modified where a facility discharges to a water that is non-jurisdictional under the final rule but through which the pollutant is conveyed to a jurisdictional water. As such, states may modify existing NPDES permits to recognize that the receiving waterbody of concern is further away from the pollutant discharge point requiring an NPDES permit.

II.A.1.3 CWA Section 404 Dredged and Fill Permit Program

The CWA section 404 permitting program regulates the discharge of dredged or fill material into "waters of the United States" including wetlands. The Corps administers the day-to-day program in tribal reservation lands, the District of Columbia, and all U.S. Territories, as well as in the 48 states that have not assumed the program. To date only New Jersey and Michigan have assumed the CWA section 404 program for those "waters of the United States" within their borders that are assumable,[28] meaning that the EPA has approved their administration of a state dredged and fill program in lieu of the federal section 404 program administered by the Corps. The Corps continues to administer the CWA section 404 permitting program in "waters of the United States" that New Jersey and Michigan are not able to assume under CWA section 404(g)(1).

In addition to the CWA section 404 program, 33 states have some form of dredged and fill permitting programs for state inland waters, which vary in scope and do not necessarily address waters already covered under CWA section 404.[29] The other 17 states rely on the CWA section 401 certification program to address dredged and fill activities that are permitted by the Corps in inland waters. Those states with a state dredged and fill program may have a greater capacity to administer dredged and fill permitting for "waters of the state," including waters that would not be considered "waters of the United States" based on the changes to CWA jurisdiction in this rule.

Five states that rely on the CWA section 401 certification program for inland waters have state programs that cover coastal or tidal waters. For the purpose of the EA, the agencies have concluded that inland programs are more indicative of a state's capacity to address waters that will no longer be federally jurisdictional under the rule than coastal or tidal programs. Similarly, the agencies recognize that all states have the authority to regulate submerged lands in their state. While some states have used these authorities in part to develop regulatory programs that address a wide scope of dredged and fill activities,

[28] CWA section 404(g) authorizes states, with approval from the EPA, to assume authority to administer the 404 program in some, but not all, "waters of the United States," within their borders. CWA section 404(g)(1) describes the waters over which the Corps must retain administrative authority even after program assumption by a state or tribe.

[29] Thirty-three states have explicit authority to issue permits for dredged and fill activities in inland waters: California, Connecticut, Delaware, Florida, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Montana, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oregon, Pennsylvania, Rhode Island, Tennessee, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming. The agencies have identified the presence of these programs in state laws and regulations, but did not attempt to characterize how the states implement these programs or what effects these programs have on a state's aquatic resources.

others have not, or have focused those programs on areas where federal jurisdiction is unlikely to change following the revised definition.[30] As a result, the agencies treated the presence of submerged lands regulatory authority similarly to coastal wetlands permitting programs. The presence of such authority indicates some capacity of the state to permit dredged and fill activities but is not sufficiently indicative of a state's capacity to address waters that will no longer be federally jurisdictional under the final rule.

The agencies also note that the presence of a state program that regulates dredged and fill activities does not necessarily indicate that the state program parallels or regulates waters equivalent to the geographic scope and range of activities regulated under CWA section 404. Section 404 regulates a wide variety of activities that result in the discharge of dredged or fill material from a point source into any water that is a "water of the United States." State dredged and fill programs vary widely in what types of waters and activities they regulate, with states often relying on a range of laws and regulations that are targeted to different waters and activities.[31] While some of these programs may regulate more broadly than the geographical jurisdiction of the CWA, they often do not regulate all types of waters or activities covered by section 404 of the CWA. However, the existence of these state dredged and fill programs serves as an indicator of a state's interest and capacity in regulating dredged and fill activities within waters of their state. As a result, the agencies have assumed for purposes of this analysis that the 33 states with existing inland programs, regardless of scope, are likely to have the capacity and interest to regulate waters that are no longer jurisdictional under this final rule.[32]

II.A.1.4 CWA Section 303(c) Water Quality Standards and 303(d) Impaired Waters Listing and Total Maximum Daily Load Program

Currently, all states and 46 tribes have approved or EPA-promulgated federal water quality standards (WQS) under CWA section 303(c). Under CWA section 303(d) and the EPA's implementing regulations, states are required to assemble and evaluate all existing and readily available water quality-related data and information and submit a list of impaired waters to the EPA every two years. For waters identified on a CWA section 303(d) list, states must establish Total Maximum Daily Loads (TMDLs) for all pollutants preventing or expected to prevent attainment of relevant WQS. While several tribes have expressed interest in obtaining 303(d) treatment in a manner similar as a state (TAS) authority, none have submitted applications for 303(d) TAS to date. States and tribes may develop standards under state or tribal law for waters that are not "waters of the United States," but they would not be in effect for CWA purposes. States and many authorized tribes already have WQS that do or could apply to waters that are currently outside the scope of CWA jurisdiction. With the change in federal CWA jurisdiction for certain waters

[30] Those states that the agencies are aware of having used their authority to regulate navigable waters and submerged lands to establish a comprehensive permit program for a wide scope of surface waters are given credit as having an inland program which regulates dredged and fill activities for the purposes of this analysis.

[31] *See* Appendix A of the RPA for more details (U.S. EPA and Department of the Army, 2020).

[32] Additionally, these state programs may have mitigation and enforcement provisions that differ from those that apply to CWA section 404 permits. The agencies recognize that the mitigation and enforcement abilities of states under these programs may affect a state's capacity to address waters that may no longer be federally jurisdictional under the final rule, including effects on benefits associated with compensatory mitigation. However, the agencies cannot adequately determine a state's ability to require mitigation or enforce the provisions of their state programs and as a result considered only the presence or absence of a state program in this analysis.

under the final rule, such states could apply their WQS as a matter of state law, and authorized tribes could apply their WQS to the extent their authority under tribal law would allow.

II.A.1.5 CWA Section 311 Oil Spill Prevention, Preparedness, and Response

Implementation of the CWA section 311 program cannot be delegated to states or tribes. Thus, the scope of the CWA section 311 programs is tied to the extent of "waters of the United States."[33] Coordination with states or tribes is a part of the program's implementation by EPA Regions. For spill response, the Oil Pollution Act of 1990 (OPA) authorizes the Oil Spill Liability Trust Fund (OSLTF) to reimburse costs of assessing and responding to oil spills in waters subject to CWA jurisdiction. Funding from the OSLTF allows for an immediate response to a spill, including containment, countermeasures, cleanup, and disposal activities. The OSLTF is not available to reimburse costs incurred by states or tribes to clean up spills, as well as costs related to business and citizen impacts (*e.g.*, lost wages and damages), for spills to waters not subject to CWA jurisdiction.

Generally, all states have a program that covers at least some of the areas included in CWA section 311. These programs vary from state to state in their requirements, coverage, and process. Additionally, all states have some mechanism, with a large variety of approaches, for oil spill cleanup reimbursement from responsible parties, with 46 states providing for clean-up cost recovery, 45 states allowing for some form of civil penalties, and 34 with trust funds to aid in cleanup. The agencies do not have sufficient information at this time to assess how these state programs and funding mechanisms may be affected by a revised definition of "waters of the United States."

II.A.1.6 "Waters of the State"

Each state has its own definition of "waters of the state," and many states define similar types of areas and aquatic resources as "waters of the state." A few states also reference "waters of the United States" within their definitions of "waters of the state." All state definitions are more inclusive than past and current definitions of "waters of the United States" in at least some way. Most state definitions also include some combination of groundwater and artificial waters. Some states may choose not to regulate all waters within the scope of their definition of "waters of the state," often including exemptions in their regulations for certain types of "waters of the state," for certain industries, or for certain types of permits.

[33] 33 U.S.C. 2701(21). While CWA section 311(b) uses the phrase "navigable waters of the United States," EPA and the courts have historically interpreted it to have the same breadth as the phrase "navigable waters" used elsewhere in CWA section 311, and in other sections of the CWA. *See United States v. Texas Pipe Line Co*., 611 F.2d 345, 347 (10th Cir. 1979); *United States v. Ashland Oil & Transp. Co.*, 504 F.2d 1317, 1324–25 (6th Cir. 1974). EPA also has historically interpreted "navigable waters of the United States" in CWA section 311(b), in the pre-2002 regulations, and in the 2002 rule to have the same meaning as "navigable waters" in CWA section 502(7) (defining "navigable waters" as "waters of the United States"). In 2002, EPA revised its regulatory definition of "navigable waters" in 40 CFR 112 to make it consistent with the regulatory language of other CWA programs. Oil Pollution Prevention & Response; Non-Transportation-Related Onshore & Offshore Facilities, 67 FR 47042, July 17, 2002; *see also* 56 FR 54612, October 22, 1991. A district court vacated the rule for failure to comply with the Administrative Procedure Act and reinstated the prior regulatory language. *American Petroleum Ins. v. Johnson*, 541 F. Supp. 2d 165 (D. D.C. 2008).

Effectively, about half of the states regulate at least some waters beyond the scope of federal CWA requirements.

All states have a definition of "wetlands" in their state laws and regulations. While these definitions also vary widely in exact language, they all either recite, reference, incorporate, or outline similar factors as the federal regulatory definition of wetlands. Some are more inclusive than the federal regulatory definition, while others incorporate the exact federal factors of a wetland. Many states have different wetland definitions for tidal, nontidal, coastal, and freshwater wetlands. Isolated waters are rarely explicitly included under these definitions, but at least 26 states have programs to cover all or some isolated waters, including wetlands.[34] The agencies do not have sufficient information at this time to conclude that only those 26 states cover some or all isolated waters.

II.A.1.7 State Conditions and Requirements

States retain authority under the CWA to determine what kinds of aquatic resources are regulated under state law to protect the interests of the state and their citizens. State environmental agencies and some local governments may use existing state legal authorities to address certain water resources that do not meet the definition of "waters of the United States." As noted above, about half of the states regulate at least some waters beyond the scope of federal CWA requirements. There are also some state laws that constrain a state's authority to regulate more broadly than the federal "floor" set by the CWA in various respects. Whether a state actually regulates more broadly is not necessarily controlled by the presence or absence of state determinations that federal standards are sufficient.

Thirteen states have adopted laws that require their state regulations to parallel federal regulations.[35] Some state laws included in this discussion only limit the application of state regulations to certain industries, types of resources, or types of permits. Thus, five of these states still regulate some waters that are not considered within the scope of "water of the United States." The remaining eight states do not regulate waters beyond the scope of federal regulation.

Twenty-four states have adopted laws that require extra steps or findings of benefits to impose state regulations beyond federal requirements.[36] The effects of these laws vary widely, depending on their exact requirements and how they are implemented in a given state. Some of these regulations effectively restrict state authority to regulate waters more stringently than federal CWA requirements; other "extra step" laws appear to have no noticeable restriction on state regulations that are broader in scope than federal CWA requirements. Eight of these 24 states are also included in the 13 states above that have determined that federal standards are sufficient. Of the 16 states that only have the "extra step"

[34] This count includes the twenty-five states that regulate the discharge of dredged and fill activities in isolated waters and one additional state (Hawaii) that regulates point source discharges to isolated wetlands.

[35] The 13 states that require their regulations to parallel federal regulations are: Arizona, Colorado, Idaho, Iowa, Kentucky, Minnesota, Mississippi, North Carolina, Oregon, South Dakota, Texas, Virginia, and Wisconsin.

[36] The 24 states that have requirements for extra steps or findings are: Arkansas, Colorado, Florida, Idaho, Indiana, Iowa, Kentucky, Maine, Maryland, Michigan, Minnesota, Montana, Nevada, New Jersey, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Tennessee, Utah, Virginia, West Virginia, and Wisconsin.

requirements, ten regulate some waters that are not covered by the federal CWA. The other six states with these requirements have not established regulations for waters outside the scope of the CWA.

The remaining twenty-one states and the District of Columbia do not appear to have any laws that address state regulations outside the scope of the CWA. Ten of these states regulate waters beyond the scope of the CWA, while the other 11 states and the District of Columbia do not.[37]

Some states may adjust their current practices in light of the revised definition of "waters of the United States." The agencies are not able to predict what changes might result from the final rule. The agencies are aware that there are currently, and have been in the past, bills before state legislatures to either add or repeal laws that address the scope of state regulation compared to federal requirements. While future legislative changes could affect waters that are not "waters of the United States" in the future, the agencies will not speculate on the outcomes of these efforts and instead are focused in this chapter on the information that is available to the agencies at this time.

II.A.2 Environmental Federalism

Changing the definition of "waters of the United States" in a way that reduces the amount of aquatic resources under federal jurisdiction effectively returns sole regulatory authority of those resources to the states and tribes. States can respond by maintaining an equivalent level of regulation over those resources or allowing those resources to be managed without permitting and regulation, or in a less complete or less stringent way so that the result is between the two bounding cases. The balance of regulatory authority over environmental resources between centralized and local governments and the result when that balance changes is a question of environmental federalism.[38]

II.A.2.1 Lessons Learned from the Literature

To help the agencies better understand the environmental federalism literature, the EPA commissioned a comprehensive literature review report (Fredriksson, 2018). The report reviews literature on environmental federalism and political economy, focusing on that which is most relevant for the potential change in regulatory control of waters under the CWA. The author describes several theoretical predictions and summarizes the literature.

- *Efficiency of Decentralization*: The seminal paper by Oates and Schwab (1988) suggests that, to the extent benefits and costs are contained within the state jurisdiction, decentralized state policymaking can be more efficient than national policies. Decentralized policymaking has efficiency enhancing properties – state regulators have a better ability and more flexibility to produce the highest returns (benefits less costs) for their citizens. However, their model assumes

[37] ELI (2013), State Constraints: State-Imposed Limitations on the Authority of Agencies to Regulate Waters Beyond the Scope of the Federal Clean Water Act, available at https://www.eli.org/sites/default/files/eli-pubs/d23-04.pdf. The agencies note that this report has been criticized as inaccurate and recognize its limitations as a definitive resource. *See, e.g.*, Comments of the Waters Advocacy Coalition on the Environmental Protection Agency's and U.S. Army Corps of Engineers' Proposed Rule to Define "Waters of the United States" Under the Clean Water Act EPA-HQ-OW-2011-0880 (November 13, 2014) at 7 - 11. Docket ID: EPA–HQ–OW–2011–0880–14568, available at https://www.regulations.gov/document?D=EPA-HQ-OW-2011-0880-14568.

no transboundary pollution, many jurisdictions, perfectly mobile capital and immobile labor, a homogenous population, perfect information, production costs and benefits that are locally internalized, and welfare maximizing local governments. Some real-world modifications, such as transboundary pollution, fewer mobile firms (imperfect competition) or jurisdictions, transportation costs, different policy instruments, and various political economy pressures, change Oates and Schwab's main result. In general, the theoretical literature argues that decentralization can yield inefficiently weak regulations (Dijkstra and Fredriksson, 2010, as cited in Fredriksson, 2018).[39]

- Local regulators may have superior information regarding local conditions and may therefore implement more efficient regulations (Levinson, 2003, as cited in Fredriksson, 2018). Environmental dimensions may also be closely related to other local issues such as urban planning, favoring a decentralized approach (Sjöberg, 2016, as cited in Fredriksson, 2018). On the other hand, environmental protection may involve economies of scale, which favors a centralized system (Adler, 2005, as cited in Fredriksson, 2018). The central government likely has an advantage in supporting research in environmental science and pollution control technologies (Oates, 2001, as cited in Fredriksson, 2018). Seabright (1996) argues that decentralization reduces policy coordination but raises the accountability of government.

- *Race to the Bottom*: Local jurisdictions may engage in strategic policymaking to attract and retain mobile industry and jobs, raise wages and expand the local tax base. The fear is that such capital (investment) competition could lead to sub-optimally weak environmental regulations under decentralized systems. The literature review finds that most of the results in the empirical literature fail to support a race to the bottom.[40] If a race occurs, it may take more complicated forms. For example, states may respond only to changes in neighboring states with more stringent policies. A state's regulatory stringency is pulled upward by neighbors which already have stricter policies. However, changes in neighbors with weaker regulations have no impact. This asymmetrical result contradicts the race-to-the-bottom hypothesis.

- *Political Economy*: To understand and predict actual policy outcomes, it is critical to take the political pressures on policy into account. The majority political party (in the U.S. Congress, or in state capitals), tends to favor the social welfare of its home districts (its constituency) over other minority districts. Helland (1998, as cited in Fredriksson, 2018) finds evidence that local special interests influence enforcement effort when national policy is delegated to the state level.

Given the literature's findings, states and tribes are likely to manage their environmental resources with the benefit of local knowledge and with the welfare of their constituents in mind. A race to the bottom is presumed to be unlikely to occur once states and tribes assume authority over aquatic resources. Effective regulation of the resources, however, requires the political capital and fiscal resources to do so. As such, the best indication of how states will exercise their authority as the federal government retracts its jurisdiction is how they have exercised existing authority in the past and whether the infrastructure to

[39] Dijkstra and Fredriksson (2010) limit their review to models in which pollution does not cross jurisdictional boundaries and in which labor and households are immobile between jurisdictions.

[40] *See also* Oates (1997, 2002).

manage the regulatory programs already exists. The agencies collected data on these factors and the following sections summarize the data sources and how they inform this analysis.

II.A.2.2 State Snapshots, Listening Sessions, and Comments

The agencies compiled information on state wetland and surface water programs and regulations to describe the breadth of state authorities and to provide a current picture of federal and state regulatory management of aquatic resources. Information was drawn from multiple state and federal sources, as well as from previous analyses undertaken by independent associations and institutions. Definitions for state and territorial waters, including wetlands, were drawn from online directories of regulatory titles and codes, therefore pulled directly from state laws. Information on state and territorial water laws and programs was found through state and territorial agency websites, and information on the various CWA programmatic areas (CWA sections 303, 311, 401, 402, and 404) was drawn from EPA and Corps websites, numerous publications, maps, and from EPA regional staff. These summaries were shared with state and territorial agencies for corrections.

In order to ensure that the economic analysis was as accurate as possible, the agencies reviewed information about CWA-related state laws and programs since publishing the economic analysis for the proposed rule, including information submitted in response to the proposal. The agencies have made recommended changes and clarified their findings as appropriate in response to those comments. The agencies have also incorporated the latest and most accurate information of which they have become aware about CWA-related state laws and programs into this final rule analysis. The State Snapshots are provided in Appendix A of the RPA (U.S. EPA and Department of the Army, 2020).

II.A.2.3 Status and Trends Report on State Wetland Programs in the United States

The Association of State Wetland Managers (ASWM) has prepared state wetland program summaries approximately every 10 years starting in the 1980s. The most recent report (ASWM, 2015) relies on information from past state summaries (both by ASWM and the Environmental Law Institute), state and federal reports, websites, and other related resources and compiles this information into draft state summaries. ASWM conducted verification phone calls and correspondence via email with 50 states, attempting to ensure that information for each state summary is up-to-date for the status of state wetland program activities as of December 2014. Information compiled in this report focuses on four core elements: 1) wetland regulation, 2) wetland monitoring and assessment, 3) wetland water quality standards, and 4) voluntary wetland restoration.

Wetland regulation is the element most relevant from the ASWM report to anticipating potential state responses to changes to the "waters of the United States" definition. States take one of three approaches to regulating discharges of dredged or fill material: CWA section 404 assumption,[41] state-level dredged and

[41] Although only two states (Michigan and New Jersey) have assumed the 404 permitting program to date, states and tribes have recently expressed significant interest in assuming the program. *See, e.g.,* Final Report of the Assumable Water Subcommittee (May 2017).

fill programs for inland waters in addition to CWA section 401 certifications, and primarily relying on CWA section 401 certifications.[42]

The agencies found it reasonable to assume that there will be little or no change to the permitting process in New Jersey, one of the two states that has assumed CWA section 404 permitting authority. In Michigan, unless the state legislature passes new legislation, it is reasonable to assume that there will be at least some change to the permit process correlating to the change in CWA jurisdiction, as the state currently limits its permit program to the jurisdictional scope of the CWA.[43] The other states that have developed their own dredged and fill programs may choose to expand their programs to cover waters that will no longer be considered "waters of the United States" under the revised definition. States that rely primarily on CWA section 401 certifications to address dredged and fill activities may or may not develop a state-level permitting program for non-jurisdictional waters.

II.A.2.4 State-Imposed Limitations on the Authority of Agencies to Regulate Waters Beyond the Jurisdictional Scope of the Clean Water Act

The agencies collected information from several sources to characterize states' ability to regulate waters beyond the jurisdictional scope of the CWA. The main source is the State Snapshot analysis presented in Appendix A of the RPA for this final rule (U.S. EPA and Department of the Army, 2020). Alternate sources of information, including an Environmental Law Institute (ELI) report that "examines [the] limitations imposed by state law that could constrain the ability of state agencies" to regulate water resources in the absence of CWA regulation (ELI, 2013)[44] were also consulted to corroborate and supplement the information in the agencies' State Snapshot analysis. The agencies recognize that these summaries do not necessarily capture all the complexities of state programs.[45]

II.A.3 State Response Categories

Following the findings of the environmental federalism literature, the agencies assumed that states will have a continuum of different responses to a change in CWA jurisdiction based on their current regulatory

[42] Five of these states issue permits for dredged and fill activities in coastal waters and wetlands. However, the agencies have concluded that inland programs are more indicative of a state's capacity to address waters that may no longer be federally jurisdictional.

[43] Passed in 2013, PA 98 states: "Sec. 30101a. For the purposes of this part, the powers, duties, functions, and responsibilities exercised by the department because of federal approval of Michigan's permit program under section 404(g) and (h) of the federal water pollution control act, 33 USC 1344, apply only to "navigable waters" and "waters of the United States" as defined under section 502(7) of the federal water pollution control act, 33 USC 1362, and further refined by federally promulgated rules and court decisions that have the full effect and force of federal law. Determining whether additional regulation is necessary to protect Michigan waters beyond the scope of federal law is the responsibility of the Michigan legislature based on its determination of what is in the best interest of the citizens of this state."

[44] *See* Appendix I of the ELI report.

[45] While the ELI report is a readily available summary of potential limitations imposed by state law that could constrain states to regulate waters in the absence of federal regulation, commenters on the then-proposed 2015 Rule have identified numerous shortcomings and inaccuracies of the analysis and results that may limit the degree to which the agencies can rely upon it. *See, e.g.,* Comments of the Waters Advocacy Coalition on the Environmental Protection Agency's and U.S. Army Corps of Engineers' Proposed Rule to Define "Waters of the United States" Under the Clean Water Act EPA-HQ-OW-2011-0880 (November 13, 2014) at 7 - 11. Docket ID: EPA–HQ–OW–2011–0880–14568, available at https://www.regulations.gov/document?D=EPA-HQ-OW-2011-0880-14568.

regimes and other constraints, though the states' responses are difficult to predict. The agencies expect some states could reduce the scope of their programs to align with a change in federal jurisdiction because of these constraints. In states with legal constraints, the agencies would expect both avoided costs and forgone benefits from the change in the definition as certain waters are no longer jurisdictional. The agencies expect that some states may choose not to change state programs following this final rule. In states that regulate waters, including wetlands, more broadly than the CWA, the agencies would expect little to no direct effect on costs or benefits. Many, if not most, states are likely to fall in between these two ends of the continuum (*see* below for more discussion of this point). And while most states have been authorized to administer at least some, if not all, parts of the NPDES program, states that are not authorized (or not authorized for a given part) may have different responses. The agencies also analyzed a scenario that assumes no change in state regulatory regime in response to the final rule (Scenario 0), although the agencies anticipate that such a scenario may be the least likely outcome to arise as a result of the rule.

II.A.3.1 Regulation of Dredged and Fill Material

The environmental federalism literature review (Fredriksson, 2018) identified the variables most commonly used in the federalism literature that are useful in anticipating how states could respond to the final definition of "waters of the United States." An available subset of these variables is used to characterize potential state responses regarding dredged or fill permitting and perform sensitivity analyses on the results. The reports on state responses and the data on which they are based indicate that the following variables will have the strongest bearing on the way states are likely to respond:[46]

- *State-level dredged and fill program:* Thirty-three states have such permitting programs for inland wetlands or other waters. While none of the reports referenced above evaluate the extent of state-level dredged and fill permitting programs, their existence serves as an indication that they are more likely to regulate some wetlands and other waters that will not be subject to the federal CWA section 404 program following this final rule.
- *Regulate waters more broadly than CWA:* Twenty-five states have chosen to regulate waters of the state that are not subject to federal regulation under the CWA.[47] These states either explicitly cover non-federally jurisdictional waters in the text of their regulations or apply their broad regulatory authority in a way that would also capture some waters that are no longer considered

[46] State enforcement capabilities would also possibly be important in determining state responses, however no measure of enforcement capability was available for use in this analysis. Following Circular A-4, in situations where full information is not available the appropriate treatment is to assume full compliance. The agencies do not believe including enforcement would change the analysis.

[47] These numbers were compiled from research that was primarily conducted prior to 2015. While some states clearly regulate at least some waters more broadly than the CWA, the agencies cannot at this time determine whether all states that regulated beyond *Rapanos* Guidance practice also regulate beyond the scope of 2019 Rule (which restored the *Rapanos* Guidance practices).

"waters of the United States."[48] In those states, it is likely that states will continue to regulate or address some wetlands and/or other waters that will not be jurisdictional under the final rule.

- *Legal limitations:* While state legislatures may be able to change applicable legal restrictions, if a state prohibits or requires additional justification for a state rule that imposes requirements beyond a corresponding federal law, those restrictions are a useful indicator that states are unlikely to regulate wetlands and other waters beyond those identified in their existing programs, which were typically developed prior to the 2015 Rule. Although the State Snapshots presented in Appendix A of the RPA (and other data sources) document several types of legal provisions, for the purposes of clarity within this analysis, the agencies treated such legal provisions as a binary variable.

The agencies used the criteria noted above[49] to place states in one of three likely response categories, recognizing that any categorization must rely on simplifying assumptions given the variation and complexity of state laws and programs (Table II-1).[50]

Table II-1: Dredged/fill categorization criteria

Category	State regulatory indicators	Potential Response
1	State has broad legal limitations on regulating aquatic resources OR does not have a state-level dredged and fill program and relies on CWA section 401 certification to address dredged and fill activities.	Unlikely to increase state regulatory practices to address changes in federal jurisdiction.
2	Has a state-level dredged and fill program that does not regulate waters of the state more broadly than CWA AND does not have broad legal limitations on regulating aquatic resources	Likely to continue the state's current permitting practices and may choose to change state programs to provide some regulatory coverage of waters that would no longer be "waters of the United States."
3	Has a state-level dredged and fill program AND regulates "waters of the state" more broadly than CWA	Likely to continue the state's current dredged/fill permitting practices, which already regulate beyond some areas of2019 Rule.

Table II-2 reports the criteria for each state in columns 2 through 4 using '0' to indicate a negative and '1' to indicate the affirmative. Column 5 reports the resulting likely-response category.

[48] These states have been determined by the agencies to regulate beyond the CWA based on the findings of studies mentioned in the economic analysis prepared in support of the 2019 Rule and this analysis, as well as independent research conducted by the agencies. For more information regarding the sources these findings were based on, *see* the State Snapshots in Appendix A of the RPA (U.S. EPA and Department of the Army, 2020).

[49] It has also been suggested that the quantity of water resources found in a state may help determine their response, but no clear pattern was discernable in scoping exercises. A breakdown of the quantity of water resources by state can be found in Appendix A.

[50] The number of categories changed from four to three between the proposal of the rule and this final analysis due to comments from States and based on additional research into existing state programs and laws.

Table II-2: Dredged/fill regulation criteria and likely-response category

State	Has a State dredged and fill program (inland)	Regulates waters more broadly than the CWA requires	Does not have broad legal limitations	Likely-response category
Alabama	0	0	1	1
Alaska	0	0	1	1
Arizona	0	0	0	1
Arkansas	0	0	1	1
California	1	1	1	3
Colorado	0	0	1	1
Connecticut	1	1	1	3
Delaware	1	0	1	2
Florida	1	1	1	3
Georgia	0	0	1	2
Hawaii	1	0	1	2
Idaho	1	0	0	1
Illinois	1	1	1	3
Indiana	1	1	1	3
Iowa	1	0	1	2
Kansas	1	0	1	2
Kentucky	1	0	0	1
Louisiana	0	0	1	1
Maine	1	1	1	3
Maryland	1	1	1	3
Massachusetts	1	1	1	3
Michigan	1	1	1	3
Minnesota	1	1	1	3
Mississippi	0	0	0	1
Missouri	0	0	1	1
Montana	1	0	1	2
Nebraska	0	0	1	1
Nevada	0	0	1	1
New Hampshire	1	1	1	3
New Jersey	1	1	1	3
New Mexico	0	0	1	1
New York	1	1	1	3
North Carolina[1]	1	1	0	2
North Dakota	0	0	1	1
Ohio	1	1	1	3
Oklahoma	0	0	1	1
Oregon	1	1	1	3
Pennsylvania	1	1	1	3
Rhode Island	1	1	1	3
South Carolina	0	0	1	1
South Dakota	0	0	0	1
Tennessee	1	1	1	3
Texas	0	0	1	1
Utah	1	0	1	2
Vermont	1	1	1	3
Virginia	1	1	1	3

Table II-2: Dredged/fill regulation criteria and likely-response category				
State	Has a State dredged and fill program (inland)	Regulates waters more broadly than the CWA requires	Does not have broad legal limitations	Likely-response category
Washington	1	1	1	3
West Virginia	1	1	1	3
Wisconsin[1]	1	1	0	2
Wyoming	1	1	1	3

[1] The existence of a legal limitation on state authority to regulate beyond the scope of the CWA does not always prohibit a state from regulating waters beyond those regulated under the CWA. See Appendix A of the RPA for additional detail (U.S. EPA and Department of the Army, 2020). Rather the existence of these limitations presents an additional factor for states to address. This in turn may make it more difficult for states with such a limitation to readjust their regulation of state waters following the final rule, at least in the short-term. For purposes of this analysis, any state with such a limitation that has not already expanded its regulation of state waters beyond the scope of the CWA was assumed to not do so under any change to the definition of "waters of the United States," and was accordingly placed in response category 1. Any states that have already expanded their regulatory scope, specifically North Carolina and Wisconsin, were assumed to continue such practices. Thus, for purposes of this analysis, North Carolina and Wisconsin were placed in category 2 to reflect both their current broader scope and the existence of legal limitations that may affect any future attempts to increase regulation of state waters compared to a federal baseline.

II.A.3.2 Categorizing State Responses: Surface Waters Discharge Permitting

Like the study of dredged and fill regulation, a subset of variables that were most informative was used to characterize potential state responses related to regulation of surface waters and perform sensitivity analyses on the results. Reviewing the reports on state responses and the data on which they are based, the following variables likely have the strongest bearing on how states could respond.[51]

- *State authorization*:[52] A critical determinant of potential state responses to a change in the definition of "waters of the United States" is whether those states are authorized to administer NPDES programs for surface waters under the CWA. At the time the agencies completed this analysis, three states (Massachusetts, New Hampshire, and New Mexico), the District of Columbia, and every U.S. Territory except the U.S. Virgin Islands, were not authorized to administer the CWA section 402 program under the CWA. All remaining states and the U.S. Virgin Islands are authorized to implement at least parts of the NPDES program and issue permits. The agencies assumed that states without authorized programs will not regulate additional waters beyond those that are defined as a "waters of the United States" following this final rule.

[51] State enforcement capabilities would also possibly be important in determining state responses, however no measure of enforcement capability was available for use in this analysis. Following Circular A-4, in situations where full information is not available the appropriate treatment is to assume full compliance. The agencies do not believe including enforcement would change this analysis.

[52] Source: https://www.epa.gov/npdes/npdes-state-program-information.

- *Legal limitations:* If a state prohibits or requires additional justification for a state rule that imposes requirements beyond a corresponding federal law, it was assumed that state would be less likely to create the programs necessary to continue permitting discharge activities under state authority on waters that will no longer be jurisdictional. Although the State Snapshots presented in Appendix A of the RPA (and other data sources) document several types of legal provisions, for the purposes of this analysis, the agencies treated such legal provisions as a binary variable.

Table II-4 presents a summary of this information for the 50 states plus the District of Columbia. The states (plus the District of Columbia) without NPDES authorization are less experienced in regulating point source discharges into waters and are assumed to be unlikely to regulate waters that are not subject to federal jurisdiction. The remaining states can be classified based on the absence of broad legal restrictions. States with both NPDES authorization and an absence of broad legal restrictions can be interpreted as being more likely to continue to regulate waters that will no longer be jurisdictional under the final rule.[53]

The agencies used the criteria noted above to place states in one of two likely response categories (Table II-3).[54]

Table II-3: Surface water discharge permitting categorization criteria

Category	State regulatory indicators	Potential Response
1	State does not have NPDES authorization OR has broad legal limitations on regulating aquatic resources.	State programs are likely to reduce scope following a narrowing of federal jurisdiction.[55]
2	NPDES-authorized state that ALSO does not have broad legal limitations on regulating aquatic resources.	States are likely to continue their current regulatory practices, which may provide partial regulatory coverage of waters that are no longer "waters of the United States."

Table II-4 reports the criteria for each state in columns 2 through 3 using '0' to indicate a negative and '1' to indicate the affirmative. Column 4 reports the resulting likely-response category.

Table II-4: Surface water regulation criteria and potential-response category

State	NPDES Authorization	Does not have broad legal limitations	Potential response
Alabama	1	1	2
Alaska	1	1	2
Arizona	1	0	1
Arkansas	1	1	2

[53] In the Economic Analysis for the Proposed Revised Definition of "Waters of the United States," the agencies previously considered whether states regulated surface water discharges more broadly than the CWA based on state definitions of "waters of the state." However, the agencies have determined that for the purpose of this analysis the agencies did not currently have enough information to determine whether a state implements their surface water discharge program more broadly than the CWA based solely on their definition of "waters of the state."

[54] The number of categories changed from three to two between the proposal of the rule and this final analysis due to comments from States and based on additional research into existing state programs and laws.

[55] Where the EPA implements the programs, the scope will change consistent with the federal changes.

Table II-4: Surface water regulation criteria and potential-response category

State	NPDES Authorization	Does not have broad legal limitations	Potential response
California	1	1	2
Colorado	1	1	2
Connecticut	1	1	2
Delaware	1	1	2
District of Columbia	0	1	1
Florida	1	1	2
Georgia	1	1	2
Hawaii	1	1	2
Idaho	1	0	1
Illinois	1	1	2
Indiana	1	1	2
Iowa	1	1	2
Kansas	1	1	2
Kentucky	1	0	1
Louisiana	1	1	2
Maine	1	1	2
Maryland	1	1	2
Massachusetts	0	1	1
Michigan	1	1	2
Minnesota	1	1	2
Mississippi	1	0	1
Missouri	1	1	2
Montana	1	1	2
Nebraska	1	1	2
Nevada	1	1	2
New Hampshire	0	1	1
New Jersey	1	1	2
New Mexico	0	1	1
New York	1	1	2
North Carolina	1	0	1
North Dakota	1	1	2
Ohio	1	1	2
Oklahoma	1	1	2
Oregon	1	1	2
Pennsylvania	1	1	2
Rhode Island	1	1	2
South Carolina	1	1	2
South Dakota	1	0	1
Tennessee	1	1	2
Texas	1	1	2
Utah	1	1	2
Vermont	1	1	2
Virginia	1	1	2
Washington	1	1	2
West Virginia	1	1	2
Wisconsin	1	0	1
Wyoming	1	1	2

II.A.3.3 Caveats to State Categorization

The potential responses described above are intended to provide insight to whether and how states may regulate waters that are no longer jurisdictional based on the revised definition of "waters of the United States." There are, however, several caveats to that characterization that deserve mention.

- *Stringency limitations:* Some states that currently have legal limitations may remove or modify those limitations following a revised definition of "waters of the United States" so that the difference in regulation created by a new definition could be filled either partially or completely by state-level regulation.
- *Trans-boundary benefits:* While it is possible that states operating with better information on the potential benefits and costs would regulate more efficiently for their own constituents, they are also less likely to consider benefits that accrue outside of their borders. This could include cases where waters flow out of the state. Another situation where this is relevant is where non-use benefits accrue to residents of other states.
- *Limited state resources and political influences:* Some states could develop new programs or expand existing ones to address waters that will no longer be jurisdictional based on the revised definition of "waters of the United States." Not all states will have the resources to staff and manage the new or expanded programs and may not be able to conduct quality benefit-cost analyses as a result. As the literature review (Fredriksson, 2010, as cited in Fredriksson, 2018) pointed out, decentralized programs are also more likely to be swayed by political influences which could alter established regulatory frameworks.

The cumulative direction of these caveats with regard to potentially addressing non-jurisdictional waters and the resulting potential impacts is ambiguous. So, rather than bounding the potential effect on one side, they combine to increase the uncertainty surrounding potential state responses. As such, the base case of the categorization of states was based on the current regulatory regime at the state level and sensitivity analyses were used to explore the range of possible state responses on potential benefits and costs of the change in CWA jurisdiction based on the final rule.

II.A.4 Incorporation of State Responses in Economic Analysis

As described in Section II.A.2, there are number of possible ways that states could respond to changes in CWA jurisdiction. States may adjust their regulatory programs to match any changes in federal CWA jurisdiction. As CWA jurisdiction is reduced and states follow suit, states and regulated entities would avoid costs and the public would forgo water quality and wetland benefits. At the other end of the continuum, state-level baseline regulations may be broader than the federal requirements. In this case, as CWA jurisdiction is reduced at the federal level, states may simply maintain their broader, baseline regulations. It is also possible that as CWA jurisdiction is reduced at the federal level, a state could choose to revise its current state laws and programs to continue the baseline actions required by the federal government. In the latter two cases, state requirements would fill any regulatory gap in the wake of a change in the definition of "water of the United States." This state "gap-filling" would result in no change in compliance costs to the regulated community and no change in environmental benefits (that is,

neither avoided costs nor forgone benefits would occur), suggesting no net impact in the long run. The agencies emphasize, however, that if states make regulatory changes to maintain the previous federal baseline level of CWA jurisdiction then they will likely incur some transition costs in the short run, and some of the cost of implementing programs will be transferred from the federal government to the states. The cost to states could be more or less than the costs to the federal government.

Another potential outcome is a federalism scenario. In this scenario, when requirements imposed by the federal government are altered, state and local governments may be able to find more efficient ways of managing local resources, consistent with the theory of "fiscal federalism." States are more likely to be knowledgeable about which waters their local constituents value and may more efficiently manage them. States can choose to allocate more resources to manage high-valued waters and wetlands and reduce regulation on less valued waters and wetlands. Depending on whether a newly characterized non-jurisdictional water is highly or lowly valued, states may choose to regulate or not regulate it, and the compliance costs could increase or decrease, respectively. And in turn, the corresponding environmental benefits could increase or decrease. In either case, however, net benefits will increase, assuming a state can more efficiently allocate resources towards environmental protection due to local knowledge of amenities and constituent preferences (*see* Section II.A.2 for details).

In short, state responses to a change in the definition of a "water of the United States" fall along a continuum and depend on legal and other constraints. States that have laws defining "waters of the state" to be no broader than "waters of the United States" cannot currently regulate past the federal definition. Cost savings and forgone benefits from these states should be included in the costs and benefits of this final action. In contrast, states that have regulations of waters, including wetlands, that are as broad or broader than the 2019 Rule would not be affected by this final action. Therefore, no cost savings or forgone benefits should be assumed for these. States that fall between these two ends of the continuum can be evaluated by either including or excluding them from the estimates of cost savings and forgone benefits.

States' water quality and dredged and fill programs can work independently and both must therefore be considered. Furthermore, states' responses may differ for surface water programs and dredged/fill permit programs. Section II.A.2 discussed how the agencies categorized state regulations of dredged and fill permitting programs and surface waters discharge permitting programs. These categorizations can be used to evaluate possible state responses to the revised definition of "waters of the United States." State regulation of dredged and fill activities is assumed to affect the costs and benefits of CWA section 404 permitting and CWA section 404 wetland and stream mitigation. State regulation of surface water discharges is assumed to affect the costs and benefits of CWA section 402 Concentrated Animal Feeding Operation (CAFO), stormwater, and pesticide regulation; as well as CWA section 311 compliance. Costs and benefits associated with the administration of CWA section 401 depend on the degree to which states assume responsibilities for issuing permits that would otherwise be subject to state certification when issued by federal agencies.

State responses to dredged and fill regulation were classified into one of three categories:

- *Category 1* – States unlikely to increase state dredged and fill permitting practices or do not have inland dredged/fill permitting programs. The costs and benefits from CWA section 404 permitting and wetland mitigation are included in this analysis.

- *Category 2* – States likely to continue the states' current dredged and fill permitting practices and may choose to change state programs to provide partial regulatory coverage of waters that will no longer be "waters of the United States." The costs and benefits from CWA section 404 permitting and wetland and stream mitigation for these states are assessed using a sensitivity analysis by either including or excluding them from the analysis.
- *Category 3* – States likely to continue the states' current dredged and fill permitting practices, which may already regulate beyond some areas covered under the 2019 Rule. The costs and benefits from CWA section 404 permitting and wetland and stream mitigation for these states are excluded from this analysis.

State responses to surface water regulation were classified into one of two categories for NPDES-authorized states:

- *Category 1*– States that have broad legal restrictions are likely to reduce the scope of their regulatory coverage following a narrowing of federal jurisdiction. The costs and benefits from CWA sections 402, 311, and 401 are included in this analysis.
- *Category 2* – States that do not have broad legal restrictions are likely to continue their current regulatory practices, which may provide partial regulatory coverage of waters that will no longer be "waters of the United States." The costs and benefits from CWA sections 402, 311, and 401 are excluded from this analysis.

The agencies assumed that states without NPDES authorization would not regulate discharges to waters that will no longer be jurisdictional, regardless of the category they would otherwise be placed in, so they were always placed in Category 1.

For dredged and fill programs, states classified as Category 1 are the most unlikely to increase their current regulatory practices in response to the final rule. For surface water programs, states classified as Category 1 are the most likely to reduce the scope of their regulatory coverage following the final rule. Impacts in the Category 1 states for both dredged and fill and surface water programs were always included in the estimate of cost savings and forgone benefits. States classified as Category 3 for dredged and fill regulation and as Category 2 for surface water regulation were most likely to continue their current regulatory practices to regulate beyond the CWA in response to the final rule. Impacts from these states were always excluded from cost savings and forgone benefits estimates. States classified as Category 2 for dredged and fill regulation fall in between these two ends of the continuum; they are likely to continue their current regulatory practices but may increase their regulatory practices to provide regulatory coverage of some waters that are no longer "waters of the United States." These states were included or excluded from the cost savings and forgone benefits estimates in a sensitivity analysis.

The various combinations of possible state responses are detailed in Table II-5 below. Scenario 0 includes all states in the estimate of cost savings and forgone benefits, regardless of the agencies' categorization of the states' regulations.[56] The sensitivity analysis evaluated three additional scenarios. Scenario 1 is the

[56] Hawaii and the District of Columbia were included in the state categorization exercise but were not included in the estimate of avoided costs and forgone benefits due to a lack of data in the case of Hawaii and a lack of impacts in the case of the District of Columbia. These states were also excluded from the analyses for the 2015 Rule and 2019 Rule.

broadest and includes the cost savings and forgone benefits for all states except those that are likely to continue their baseline dredged and fill practices regardless of federal action. Scenario 2 narrows the number of states used in the estimate by excluding states that are likely to continue both their dredged and fill and surface water practices.[57] Scenario 3 is the most limited in that it only included states that are likely to reduce their baseline dredged and fill and surface water practices to match the federal level. The avoided cost and forgone benefit estimates based on a range of state responses are presented in Section III.C.

Table II-5: Treatment of the effect of state response in the analysis of costs and benefits of a change in the definition of "waters of the United States"

	Scenario 0	Scenario 1	Scenario 2	Scenario 3
Change in baseline dredged and fill practices (affects CWA section 404 programs)[1]				
1 - Unlikely to increase (18)	Included	Included	Included	Included
2 - May increase (9)	Included	Included	Included	Excluded
3 - Likely continue (23)	Included	Excluded	Excluded	Excluded
Change in baseline surface water practices (affects CWA sections 402, 311, and 401 programs)				
1 - Likely reduce (11)	Included	Included	Included	Included
2 - Likely continue (39)	Included	Included	Excluded	Excluded

[1]Scenarios 1 and 2 are the same for the CWA section 404 program.

II.B Response of Regulated Entities

The generic tree diagram in Figure II-1 illustrates potential effects of the final rule on regulated entities (*i.e.*, facilities, permit or plan holders) and affected water resources. The potential responses of regulated entities are likely to vary across CWA programs and depend on the type of permit or regulatory requirement, the industry sector or activity, attributes of the affected waters — notably whether the waters would fall outside of CWA jurisdiction — the range of likely state responses, as well as industry standards, recommended practices, and a regulated entity's decision on pollution prevention measures it voluntarily implements.

It is possible for an entity to decide to continue its current compliance practices, perhaps because compliance mainly entails fixed costs that were already incurred or because reducing current abatement activities is costlier than simply continuing current abatement activities. Fear of future liability and goodwill with local citizens may also be factors. While such circumstances may be less likely given the cost implications, if an entity voluntarily continues baseline compliance practices, then there would be no change in cost or environmental outcomes, and the net effect would be zero.

Perhaps more common for practices that have ongoing costs, an entity could decide to reduce its costs by reducing or potentially eliminating any baseline compliance practices. Doing so would result in cost-savings to the regulated entity and forgone environmental benefits to society more broadly. Whether the net effect is positive or negative from society's standpoint depends on whether the resulting cost-savings are greater than the absolute value of the forgone environmental benefits.

[57] Scenario 1 and 2 are the same for the dredged and fill practices (Section 404 programs).

Section III of this document presents program-specific tree diagrams for the three major CWA programs analyzed: sections 402, 404, and 311 programs. The diagrams illustrate the range of potential outcomes depending on regulated entities' responses to each of these programs. There may be gradations within each general category of entity response. The number of determining factors and outcomes highlight the uncertainties inherent in trying to quantify these potential impacts. Ideally, the analysis would quantify the frequency, costs, and benefits of the outcomes corresponding to each branch in the diagram, but that is not possible at every level of the tree diagram for all three programs due to data limitations.

II.C Data and Analytic Uncertainties

In addition to uncertainty in the response of states and regulated entities to changes in CWA jurisdiction, limitations of the available data affected the agencies' ability to conduct national level analyses regarding the potential effect of the final rule and contributed to uncertainty in results presented in the following sections.

- *High-resolution NHD*: For the proposed rule, the agencies attempted to use the U.S. Geological Survey's (USGS) NHD at high resolution and the U.S. Fish and Wildlife Service's (U.S. FWS) NWI to estimate the potential effect of the proposed rule on certain water types across the country. The datasets represent the best national datasets of the potential location and extent of streams, rivers, lakes, ponds, and wetlands of which the agencies are aware. The high-resolution NHD represents the water drainage network of the United States as mapped at a scale of 1:24,000 or better (1:63,360 or better in Alaska). The data are maintained in partnership with states and other stewards. The NHD is not a regulatory dataset and does not indicate whether streams and other features are jurisdictional for CWA purposes. While the high-resolution NHD is the most comprehensive nationally-consistent representation of the hydrographic network, it has been demonstrated to under-represent the upstream-downstream extent of channel networks.[58] It does not map all surface waters and sometimes maps streams that do not exist or no longer exist on the ground (*i.e.*, it has errors of omission and commission). In addition, smaller features would generally not be included in the NHD. The dataset also has positional inaccuracies. At high resolution, 90 percent of well-defined features are within 40 feet of their true geographic position. The NHD does not distinguish intermittent from ephemeral streams at a national level, and a designation of perennial, intermittent, or ephemeral in the NHD does not guarantee an accurate depiction of on-the-ground flow conditions. For example, a study comparing the field-verified flow classification (*i.e.*, perennial, intermittent, or ephemeral) of 105 headwater stream reaches in nine mesic forests across the contiguous United States and 178 headwater stream reaches in Oregon to the flow classification documented in various mapping resources found that high resolution NHD misclassified the flow classification 44.8 percent of the time across the mesic forest headwater reaches and 57.9 percent of the time across the Oregon headwater reaches.[59] While the USGS conducted some on-the-ground field inspection 30 to 60 years ago when creating the topographic maps from which the NHD was created, the resulting hydrographic

[58] *See, e.g.,* Fritz, Ken M., *et al.* 2013. "Comparing the Extent and Permanence of Headwater Streams from Two Field Surveys to Values from Hydrographic Databases and Maps. *Journal of the American Water Resources Association* 49(4) 867-882.

[59] *Id.*

classifications do not necessarily represent current hydrographic conditions. Misclassifications of NHD stream permanence are known to occur among flow regime types, including field-verified perennial streams identified as ephemeral and field-verified ephemeral streams identified as perennial.[60] Misclassifications can occur for a variety of reasons, from changes in land use and/or climate, observational errors, errors in data transcription (from the paper files to digital files), changes in data standards and definitions, inconsistent mapping techniques, differences in source material for creating the original topographic maps, or for cartographic reasons.

- A summary of High Resolution NHD mapping by state is presented in Appendix A. However, for the reasons discussed here and in the RPA for the final rule, the agencies were not able to accurately identify waters that could change jurisdictional status under the final rule using the NHD. Given the nature of the data and these analyses, these limitations would result in inaccurate estimation of the potential effects of the final rule on the scope of CWA jurisdiction and therefore render the data unsuited for use in evaluating the effects of this rule.

- *National Wetlands Inventory (NWI)*: The agencies attempted to rely on a combination of the NWI and high-resolution NHD to identify wetlands that may change jurisdictional status under the proposed rule. Like the NHD, while the NWI is the best national dataset of the potential extent of wetlands across the country of which the agencies are aware, it has limitations; therefore, the agencies did not use the NWI to assess the change in jurisdictional status of waters under the final rule. The NWI does not map all wetlands and sometimes maps wetlands that do not exist on the ground. At its best, NWI only approximates the location and boundaries of a Cowardin wetland type (Cowardin *et al*., 1979). The NWI was not intended or designed for regulatory purposes. NWI uses the Cowardin wetland classification system, which is broader in scope than wetlands that meet the agencies' regulatory definition of wetland. For CWA regulatory purposes, a water must have three specific factors under normal conditions to be classified as a wetland: hydric soils, hydrophytic vegetation, and hydrology. Specifically, the longstanding regulations and the final rule both define wetlands as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."[61] That definition has not changed under the final rule. Also, the wetland boundaries as mapped in NWI do not equate to wetland delineation boundaries per the 1987 Corps wetland delineation manual[62] and its regional supplements. To properly apply the delineation manual for CWA purposes, one must conduct on-the-ground inspection. Wetlands that meet the regulatory definition of "wetland" would also need to meet additional regulatory requirements (such as the conditions for applying the term "adjacent wetlands") before they would be considered "waters of the United States." The limitations of the data make it unsuitable for use in evaluating the effects of this rule. For more

[60] *See, e.g., id*.

[61] 33 CFR 328.3(b) and 40 CFR 232.2.

[62] U.S. Army Corps of Engineers. 1987. Corps of Engineers Wetlands Delineation Manual. Wetlands Research Program Technical Report Y-87-1. Department of the Army, Vicksburg, VA. *Available at* https://el.erdc.dren.mil/elpubs/pdf/wlman87.pdf.

information on the limitations of the NWI for determining the scope of "waters of the United States," *see* the RPA.

- *Jurisdictional status of certain waters under the 2019 Rule*: In addition to the limitations of the NHD and NWI datasets, the agencies face the confounding factor of not being able to map under the 2019 Rule the jurisdictional status of certain waters as a category, including:

  - Non-navigable tributaries that are not relatively permanent;
  - Wetlands adjacent to non-navigable tributaries that are not relatively permanent; and
  - Wetlands adjacent to but that do not directly abut a relatively permanent non-navigable tributary.

- According to the *Rapanos* Guidance utilized under the 2019 Rule, such waters are not categorically jurisdictional. Rather, the agencies must conduct a case-specific significant nexus analysis to determine their jurisdictional status. It is not possible for the agencies to perform a comprehensive national-scale significant nexus analysis for purposes of this EA. As a result, the agencies did not find a reasonable way to identify the universe of federally regulated waters under the 2019 Rule in order to establish a comparative baseline of jurisdictional waters.

- *Tribal programs*: This analysis does not consider how the 573 federally recognized tribes might react to a change in CWA jurisdiction, nor does it include tribes in its calculations of costs and benefits. However, the agencies' analysis of potential impacts of Case Study 3 did include a review of affected facilities, permitted activities, and waters located on tribal lands (*see* Section III.B.4). Currently, 62 tribes have been found eligible to administer a CWA section 303(c) water quality standards program, and the EPA has approved WQS for 45 of these tribes. The EPA has promulgated federal water quality standards for one additional tribe, and a few tribes have water quality standards that are not current federally approved. Sixty-one tribes have the authority to administer a CWA section 401 water quality certification program. Many tribes may lack the capacity to administer a water quality standards program or a certification program. Other tribes may rely on the federal government for enforcement of water quality standards, particularly for enforcement of non-tribal members. Currently, no tribes have obtained treatment in a manner similar to a state (TAS) status to administer either the CWA section 402 or 404 programs. The agencies (or with a few exceptions for CWA section 402, the state) generally issue CWA sections 402 and 404 permits on tribal lands. A few tribes have some type of permitting program for discharges of dredged or fill material into "waters of the tribe." Many tribes may lack the capacity to administer either the CWA section 402 or the 404 programs, to create permitting programs for discharges, or to expand permitting programs that currently exist. Further, some tribes have stated during tribal consultation and engagement on the proposed rule that they are not interested in seeking TAS for CWA programs like water quality standards and CWA sections 402 and 404 if the federal government reduces the scope of the CWA jurisdiction. In addition, this economic analysis does not account for potential effects related to subsistence fishing, rice growing, or cultural uses of water that are unique to tribes and their reliance on waters that will no longer be considered jurisdictional under the final rule. This analysis also does not account for which tribes regulate waters more broadly than the CWA or have legal frameworks that permit them to regulate "waters of the tribe" more broadly.

- *Universe of regulated facilities and activities*: Data on the universe of regulated facilities and activities varies in the level of detail and coverage. For example, data on facilities or activities subject to general permits or facilities with minor status under the CWA section 402 program are limited to the permit information included in the EPA's Integrated Compliance Information System National Pollutant Discharge Elimination System (ICIS-NPDES) database. Some industrial facilities or activities subject to CWA section 402 requirements may be underrepresented in the database if states did not provide relevant permit information. Permit data maintained in the ORM2 database by the Corps under the CWA section 404 program provide high-level characteristics of the projects such as the type of project and permitted impacts in acres or linear feet. However, the affected waters are not always described in a manner sufficient to determine how the changes in the "waters of the United States" definition will (counterfactually) change the requirements in previously issued CWA section 404 permits without in fact doing additional analyses of jurisdiction. As discussed in Section III.A.3, there is no universal reporting requirement for the CWA section 311 Spill Prevention, Control, and Countermeasure (SPCC) program, and the agencies therefore rely on estimates related to prior SPCC rulemakings and imputed data for a subset of facilities that have been inspected to characterize SPCC-regulated facilities. The agencies also have detailed information on facilities required to submit a Facility Response Plan (FRP) to the EPA.

- *Facility and activity coordinates*: The analyses are limited by the availability and accuracy of geographical coordinates to relate program impacts to streams and wetlands. First, some facilities or activities have missing or invalid coordinates. For permitted CWA section 402 dischargers, available coordinates can be those of the facility and not necessarily the outfall. This contributes to potential errors when determining the receiving waterbody. Some impacts, such as oil spills, can potentially affect different waterbodies depending on the location where the spill originates and the size of the spill.

- *Locations of future permitted facilities or activities*: Data on existing facilities and activities may not accurately represent the distribution of future facilities or activities. For example, construction and development activity accounts for an estimated sixteen percent of permitted discharges under the CWA section 402 program and the majority of activities covered under the CWA section 404 program. The location of future construction and development activities can only be estimated to scale too coarsely to be useful in analyzing the potential effects of this final rule (even if the agencies had accurate maps of affected streams and wetlands).

These data issues limit the agencies' ability to conduct a national-level analysis to evaluate 1) waters changing jurisdictional status; 2) the relationship between these waters and facilities and activities covered under the CWA; and 3) the potential impacts of changes in the level of regulation of jurisdictional and non-jurisdictional waters. With hundreds of thousands of facilities or permitted activities covered under CWA programs, it is not possible to review and analyze characteristics of individual facilities or activities contained in permits to assess how their particular requirements will change under a revised "waters of the United States" definition.

The agencies received numerous comments on the data sources, assumptions, qualitative and quantitative analyses in the proposed rule EA, and the limitations the agencies faced in conducting national-level

analyses. Some commenters expressed concern that, although the EA and RPA provided a qualitative analysis that fewer waters would be subject to the CWA under the proposed rule than are subject to regulation under the 2015 Rule or prior regulations, the agencies did not quantify the reduction in jurisdictional waters. Commenters also stated that the agencies' analysis was inadequate to evaluate the full costs and benefits of the proposed rule across the entire country. Some commenters stated generally that the RPA and EA thoroughly addressed the potential impacts of the proposed rule, and correctly acknowledged the technical limitations of the analysis and datasets.

The agencies note that there are currently no comprehensive datasets through which the agencies can depict the universe of federally-regulated waters under the CWA, and due to the various data limitations discussed here, the agencies relied on qualitative descriptions, case studies, and a national analysis of the CWA 404 program for this final rule EA just as they did for the proposed rule EA. See the agencies' response to comments for further information.[63]

[63] U.S. Environmental Protection Agency and U.S. Department of the Army (U.S. EPA and Army). 2020. Response to Comments for Navigable Waters Protection Rule: Definition of "Waters of the United States."

III. Analysis of CWA Jurisdictional Change from 2019 Rule to the Final Rule

This section focuses on the analysis of potential effects of this final rule, that is, the potential effects associated with going from implementation of the 2019 Rule, which recodified the agencies' pre-2015 regulations, to the final revised definition of "waters of the United States." Following the approach used for the proposed rule (U.S. EPA and Department of the Army, 2018b), the economic analysis consists of a series of qualitative analyses and three detailed case studies and a national analysis related to the CWA section 404 program. The purpose of the qualitative analysis is to provide a national assessment of the potential effects of this final rule without providing quantitative assessment. As stated, the agencies currently lack the datasets to quantitatively assess the potential effects of the final rule. The qualitative analysis is intended to provide information on the potential direction of the effects based on the best professional judgment of the agencies. In addition, the agencies conducted three case studies in three major watersheds to provide more detailed information on the potential quantitative assessment of the effects. The case studies have considered potential ecological effects, and their accompanying economic effects. The case studies highlight the complexity of the potential decision matrices and the depth of data and modeling requirements. The case studies conclude that the potential effects of provisions going beyond the 2019 Rule baseline are modest regardless of the level of state engagement in water resource protection as modeled in Scenarios 1 through 3. Under Scenario 0, the anticipated combined case study cost savings range from $10.66 million to $37.46 million (2018$), and the estimated forgone benefits range from $0.83 million to $5.47 million (2018$, 3 percent discount rate). Finally, the agencies conducted a national analysis of the changes in CWA jurisdiction under the final rule on the CWA section 404 program. Nationally the CWA jurisdictional changes under Scenario 0 are estimated to result in $244.5 million to $512.7 million in avoided costs and between $6.9 and $46.8 million in forgone benefits.

III.A Qualitative Assessment of Potential Effects on CWA Programs

This section focuses on the potential effects associated with the change from the 2019 Rule as implemented (*i.e.*, *Rapanos* Guidance practice) to the final revised definition of "waters of the United States." The first three subsections describe the potential effects on the CWA section 402, section 404, and the section 311 programs, respectively. The fourth subsection covers other CWA programs.

III.A.1 CWA Section 402: National Pollutant Discharge Elimination System

Section 402 of the CWA establishes the NPDES program to authorize the discharge of pollutants from point sources to "waters of the United States," in compliance with applicable requirements and conditions. NPDES permits may incorporate different statutory and regulatory requirements depending on the source type, volume of discharge, receiving waterbody, and state/tribal water quality standards. CWA section 402 regulates discharges of the following categories of pollutants:

- Conventional pollutants: BOD, TSS, oil and grease, fecal coliform, and pH
- Toxic pollutants: 126 "Priority Pollutants" (40 CFR part 423), which include metals (*e.g.*, Cu, Pb, Hg) and organic compounds (*e.g.*, PCBs, dioxin)
- Non-conventional pollutants: all other pollutants (*e.g.*, chlorine, ammonia, nitrogen, phosphorus)

As discussed earlier, the NPDES permit program is administered by authorized states or the EPA. The EPA issues some NPDES permits for discharges from federal facilities,[64] most of the tribal reservation lands,[65] and U.S. Territories (except the U.S. Virgin Islands) as well as all permits in the three states that have not been authorized to administer the program (Massachusetts, New Hampshire, and New Mexico) and for certain activities in states with only partial authority. The EPA has authorized most (47) states to operate all or portions of the CWA section 402 permitting program, and states assert jurisdiction over "waters of the state" which must be as inclusive as "waters of the United States" but may be more expansive.

III.A.1.1 Overview

The CWA requires a permit for discharges of pollutants to "waters of the United States" from point sources, defined in the act as any discernable, confined, and discrete conveyances (*e.g.*, pipes, ditches, channels, or concentrated animal feeding operations). Typically, the compliance point for NPDES permits is the location where the effluent is being discharged from the facility. *See* NPDES Permit Writers' Manual at pages 8-1 to 8-5. Agencies may issue individual or general permits. Individual permits may be issued when site-specific limits, management practices, monitoring and reporting, or other facility-specific permit conditions are needed. One individual permit is issued per one applicant; the individual permit may cover several outfall points. General permits are issued when multiple dischargers require permit coverage, sources and discharges are similar, and permit conditions are relatively uniform. One general permit is issued for multiple dischargers. The permit identifies coverage area, sources covered, and administrative processes for dischargers to identify that they intend to be covered (*e.g.*, whether the applicant must submit a Notice of Intent (NOI) to seek coverage under the general permit).

The EPA's ICIS-NPDES database includes 250,040 unique permit numbers, including individual and general permits.[66] Some facilities may have more than one permit (*e.g.*, an individual permit for process wastewater and a general permit for stormwater).[67] Table III-1 summarizes the NPDES permits by EPA Region and permit type. The majority (49,908) of the NPDES permits potentially affected by the final rule are general permits (including stormwater). Section III.A.1.2 discusses the potential effects of changes to the "waters of the United States" definition on the CWA section 402 program.

[64] In general, federal facilities are defined as buildings, installations, structures, land, public works, equipment, aircraft, vessels, other vehicles, and property, owned, constructed or manufactured for leasing to the federal government. (https://www.epa.gov/enforcement/enforcement-and-compliance-federal-facilities)

[65] The state of Maine has authority to issue NPDES permits on the territory of two tribes.

[66] This estimate includes both active and expired permits in ICIS-NPDES since facilities with expired permits can still operate with administratively continued permits. It excludes "terminated" permits that are no longer binding. It also excludes permits that did not have valid latitude/longitude coordinates or were not truly NPDES permits.

[67] In this section, "facility" refers to plants, construction sites, or other types of point source dischargers.

Table III-1: Estimated number of NPDES permits by EPA region

EPA Region	All NPDES Permits[1]	All Individual Permits[1]	All General Permits[1]
1	7,030	1,240	5,790
2	17,152	4,895	12,257
3	30,015	9,096	20,919
4	81,883	8,621	73,262
5	17,207	10,042	7,165
6	26,173	5,573	20,600
7	22,467	6,394	16,073
8	15,180	1,968	13,212
9	20,560	986	19,574
10	11,472	1,153	10,319
Other[2]	901	255	646
Total	**250,040**	**50,223**	**199,817**

[1] *Source: EPA's ICIS-NPDES data, 2017*. The facility permits included in the spatial analysis are limited to those for which the ICIS-NPDES database includes latitude/longitude coordinates. The number of NPDES permits is likely to overstate the number of affected entities since each permit holder may have more than one NPDES permit (*e.g.*, industrial discharge and stormwater permits).

[2] Includes U.S. territories and tribal lands.

The EPA and state NPDES permitting agencies develop technology-based effluent limits (TBEL) for all applicable pollutants of concern. TBELs are based on national technology based effluent limitations and standards (*i.e.*, effluent limitations guidelines and standards) that are developed to establish minimum levels of pollutant controls for most direct and indirect dischargers for conventional pollutants, non-conventional pollutants, and toxic pollutants and provide equity among dischargers within categories. In the absence of national limitations and standards, TBELs are developed on a case-by-case, best professional judgment (BPJ) basis. Instead of this effluent guidelines approach, the statute provides for the EPA to establish secondary treatment standards for publicly-owned treatment works.

If TBELs are not adequate to protect water quality to meet applicable water quality standards, the CWA requires the permitting authority to include water quality-based effluent limits (WQBEL) as necessary to meet applicable state or tribal water quality standards and that are consistent with any EPA-established or EPA-approved TMDLs that may apply to the discharge. Currently, all states have state water quality standards under CWA section 303, as well as listed impaired waters and TMDLs for those impaired waters under CWA section 303(d). If a TMDL has been developed for the receiving waterbody, states (or EPA regions) assign a waste load allocation to each point source discharge and a load allocation to nonpoint sources such that predicted receiving water concentrations do not exceed water quality criteria. States and tribes may develop standards for non-jurisdictional waters under state or tribal law, but these criteria are not enforceable under the CWA.[68]

[68] CWA section 402(p)(3)(B)(iii) provides for a unique standard to be used for controls of municipal separate storm sewer systems (MS4s).

III.A.1.2 Potential Effects of the Final Rule on CWA Section 402 Program

Facilities that currently have a NPDES permit under CWA section 402 or a state permit under an authorized state program can be assumed to either discharge to a "water of the United States" as defined under the 2019 Rule or to waters designated to be "waters of the state" by the authorized state in which they are located. The final regulation could result in a jurisdictional change to a discharger's receiving water or downstream water, and thus could result in a potential change to the discharger's permit. This is more likely the case if the state does not currently consider these receiving waters to be "waters of the state" and/or if they do not extend this status to these waters in response to a change in the definition of "waters of the United States." Facilities that consider their receiving water's status to have potentially changed can opt to: continue with their existing permit (*status quo*); formally request a permit modification;[69] or formally request to have their permit terminated, subject to anti-backsliding permit requirements.

When evaluating potential impacts from removing CWA jurisdiction on certain waters, the agencies considered potential state-level and facility responses, as shown in Figure III-1. This figure illustrates the variety of potential outcomes that could result for any single facility, and in turn the numerous complexities that would have to be addressed to quantitatively estimate the impacts of the final rule. The revised definition will reduce the number of jurisdictional waters (i.e., certain ephemeral streams), which could lead to some facilities no longer being required to obtain NPDES coverage where there is a jurisdictional change in the water to which they discharge and the pollutants discharged from the point source is not conveyed to a "water of the United States." This may be more likely to happen in arid areas of the country where the agencies anticipate that there may be a greater change in the number of jurisdictional waters. After the 2006 *Rapanos* decision, several NPDES permit holders in the Western United States asserted they no longer required a permit because of the potential non-jurisdictional status of a receiving water. The agencies are aware that in some cases such inquiries have resulted in a permitting authority determining that a discharger no longer needed a permit. There are several potential explanations for this, related to the nature of the permitted activity, state requirements, and facility-level incentives.

First, the nature of a traditional discharge permit where a facility is seeking to discharge wastewater is different from a CWA section 404 permit (described in Section IIII.A.2 below) where a developer or landowner is, for example, seeking to fill a portion of a "water of the United States." There are instances for a CWA section 402-permitted discharger to contribute to creating a perennial or intermittent water feature where there once was an ephemeral stream because of continuous discharge (*i.e.*, an "effluent-dependent" or "effluent-dominated" water). In these cases, the final rule would not affect jurisdiction if the water meets the conditions of the "tributary" definition.

Second, the EPA has authorized most (47) states to administer portions or all of the CWA section 402 permitting program. In addition, some states assert state law jurisdiction over "waters of the state" which is inclusive of "waters of the United States" but may be more expansive. These state law programs can, and in some cases already do, cover waters that are not considered "waters of the United States." With the final rule, states may respond in different ways. As discussed in Section II.A, state programs may choose

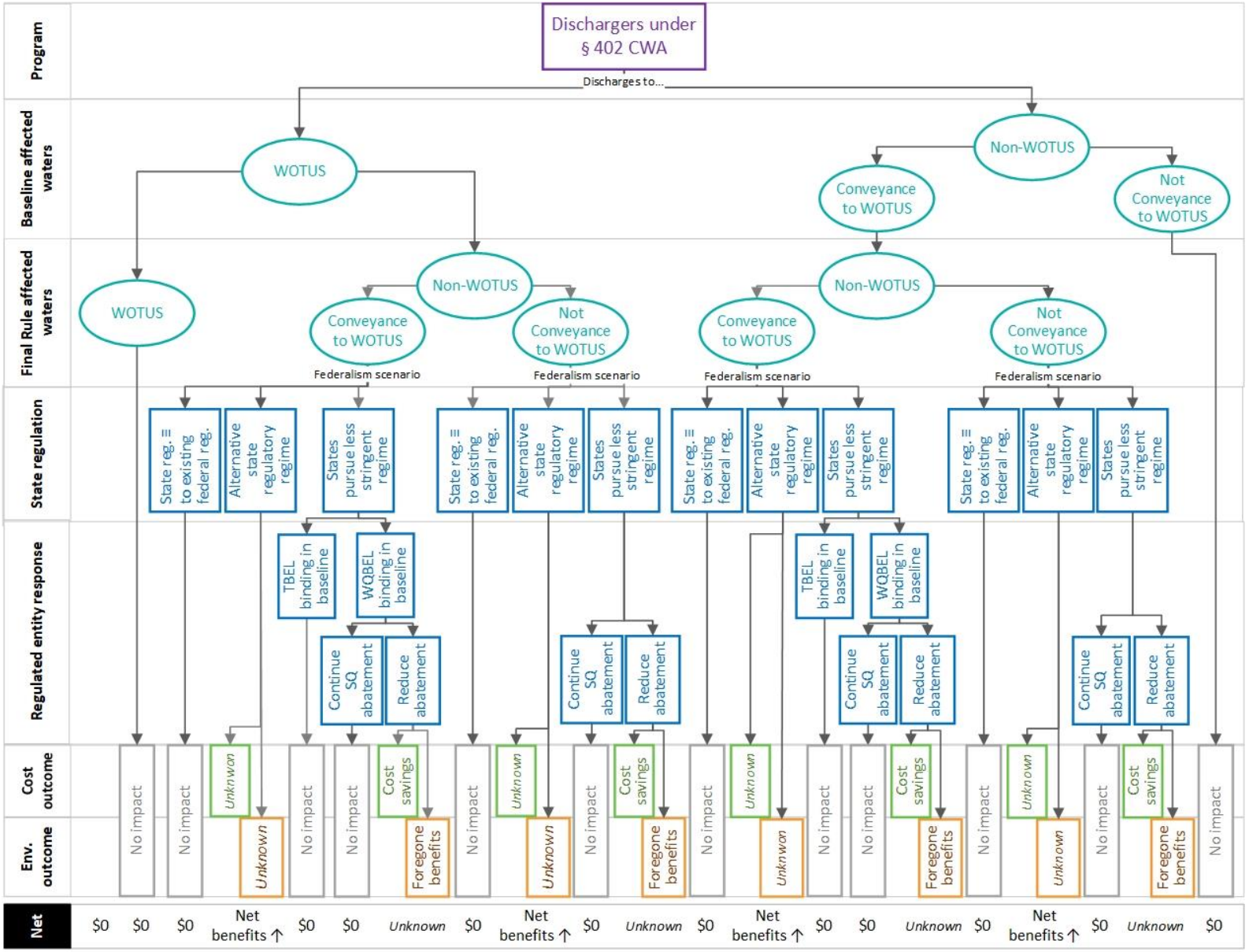
[69] This request could happen before or during their permit reissuance process.

to issue permits for non-federally regulated waters solely based on state authority. States may also revise WQBELs to reflect attenuation or additional dilution farther downstream (to a water subject to the CWA) from the source of the pollutant if the discharge point is no longer into a "water of the United States," subject to applicable anti-backsliding permit requirements. Some states (*e.g.*, California, Connecticut, Maryland, New York, and several others) have enacted or amended laws to regulate state water resources that have lost federal oversight, or whose coverage by federal law is now uncertain.[70]

Additionally, existing facilities may have made the capital investments in wastewater treatment systems that discharge to receiving waters that will no longer be jurisdictional and may willingly continue operating under their permit and see no need to challenge jurisdictional status of the receiving waters. Depending on the individual organization, industry standards or recommended practices, the facility may implement treatment technologies or best management practices voluntarily but could still save on some compliance costs. The following subsections discuss in greater detail potential permittee's responses by permit type potentially affected by a change in the definition of "waters of the United States."

[70] *See* Appendix A of the RPA for the Navigable Waters Protection Rule: Definition of 'Waters of the United States' Final Rule (U.S. EPA and Department of the Army, 2020).

Figure III-1: Potential effects of the final rule on CWA section 402 program.



III.A.1.3 Potential Effects of Final Rule on Individual NPDES Permits

As outlined in Figure III-1, the potential cost savings and forgone benefits of the final rule affecting industries or entities with CWA section 402 permits to discharge to non-jurisdictional receiving waters will depend on multiple factors. These factors include: the state decision on whether to continue regulating newly non-jurisdictional waters to the same level as federal regulations (*see* Section II.A for detail), the basis for the NPDES permit (TBEL vs. WQBEL), the potential applicability of anti-backsliding permit requirements, whether the facility's discharge conveys to a "water of the United States" downstream from the non-jurisdictional receiving reach, and the facility's decision to continue voluntarily implementing controls.

Individual permit holders may already have treatment technologies in place and may willingly continue operating under the conditions set in their existing permit even though they may not require a NPDES permit in the future. New permit holders with no existing capital investments in treatment systems may make different decisions. Thus, new establishments in the affected industrial categories that would have been subject to effluent limitations are more likely to request that their permitting agency determine if a permit is required to reduce both capital and operational costs unless the state continues a similar level of regulation of the receiving waters or restricts permit modification under applicable anti-backsliding requirements. Reducing controls on effluent discharging to non-jurisdictional waters may have adverse water quality impacts on the receiving waters.

A permittee currently discharging to a jurisdictional water that is not attaining water quality standards is subject to more stringent limits based on a WQBEL which must also be consistent with any applicable wasteload allocations in a TMDL. If the receiving water becomes non-jurisdictional under the definitional change of "waters of the United States," but eventually conveys pollutants from a discharger to a "water of the United States" through a channelized non-jurisdictional feature, the permittee could request a jurisdictional determination and revision of its WQBEL to account for potential dilution or attenuation of the pollutant(s) occurring between end-of-pipe and the point where the effluent enters jurisdictional waters, depending on the applicability of anti-backsliding permit requirements. Under this scenario, if allowed, the permittee may realize cost savings as compared to meeting the previous permit limits. Less stringent effluent limitations may have a negative impact on water quality in the receiving non-jurisdictional streams. Under the final rule, state water quality standards could continue to apply to the now non-jurisdictional receiving waters if state regulations apply more broadly, but these standards would not be federally enforceable and water quality monitoring would not be required by the CWA within these waters.

III.A.1.4 General Permits

As noted above, NPDES general permits cover dischargers with similar characteristics (*e.g.*, within the same industry) within a given geographical location. In most cases, a permittee is required to complete and submit a NOI and comply with the terms of the general permit. Each permittee receives a unique NPDES number. Because a large number of facilities can be covered under a single general permit, general permits may offer a cost-effective option for permitting agencies. Nearly 60 percent of the general permits the agencies analyzed are stormwater permits, and these are discussed in Section III.A.1.5.

III.A.1.5 CWA Section 402 Stormwater Permitting

Stormwater runoff is generated when precipitation from rain and snowmelt flows over land or impervious surfaces instead of percolating into the ground. As the runoff travels (especially over paved streets, parking lots, and building rooftops), it can accumulate debris, chemicals, sediment, and/or other pollutants that may be detrimental to stream water quality; runoff can also gain velocity and be directed towards waterbodies, thus increasing the probability of these pollutants reaching a stream. Polluted stormwater runoff can harm or kill fish and other wildlife. Excess sedimentation can impair aquatic habitat, and high volumes of runoff can cause stream bank erosion. Debris can clog waterways and potentially reach the ocean where it can harm marine wildlife and degrade habitats.

Some stormwater discharges have been designated by statute, regulations, or on a case-by-case basis and require coverage under a NPDES permit. Under CWA section 402(p), the EPA implemented the stormwater program in two phases, with the Phase I rule issued in 1990 and the Phase II rule issued in 1999. The stormwater program regulates stormwater from some construction sites (*i.e.*, those disturbing one or more acres of land, or disturbing less than one acre but part of a common plan of development or sale that will disturb one or more acres), specific industrial sectors specified in the Phase I rule, and discharges from some municipal separate storm sewer systems (MS4s). The EPA's ICIS-NPDES data used by the agencies includes 120,989 stormwater permits, including individual and general permits. Over 20 percent of the permitted dischargers analyzed (26,366) are for stormwater discharges from construction and development activities. Dischargers with unknown industry classification (missing SIC code) and in "other" categories account for 51 and 21 percent of the total stormwater permits respectively. Industrial facilities covered under an industrial stormwater permit, such as the EPA's Multi-Sector General Permit (MSGP) account for approximately five percent of stormwater permit holders. MS4s account for less than one percent of all permittees covered under the stormwater program.

III.A.1.5.1 Construction Stormwater

In general, the NPDES stormwater program requires permits for discharges from construction activities that disturb one or more acres, and discharges from smaller sites that are part of a larger common plan of development or sale. The Construction and Development (C&D) effluent limitations guidelines (ELGs) apply to permits for stormwater discharges from all construction activities including clearing, grading, and excavation, except operations that result in the disturbance of less than one acre of land area, unless they are part of a common plan of development or sale that disturbs more than one acre (40 CFR 122.26(b)(14)(x) and 40 CFR 122.26(b)(15)). Under 40 CFR part 450 (the C&D ELGs), all covered entities must: (1) design, install, and maintain erosion and sediment controls; (2) initiate soil stabilization in disturbed areas immediately whenever any clearing, grading, excavating, or other earth disturbing activities have ceased; (3) design, install, and maintain pollution prevention measures to minimize the discharge of pollutants to surface waters; (4) prevent the discharge of the wastewater, fuels, oils, or other pollutants used in vehicle and equipment operations and maintenance and equipment washing; and (5) implement other BMPs to minimize adverse effects on surface water.

The agencies considered the potential effect of the revised definition of "waters of the United States" on the issuance of CWA section 402 permits for stormwater from construction and development sites. As suggested by Figure III-1, due to data limitations and the lack of a strong basis for the necessary analytical assumptions, it is not feasible to rigorously estimate the potential avoided costs to the

construction industry and corresponding forgone benefits of no longer needing a CWA section 402 permit for stormwater discharges from construction sites to non-jurisdictional waters. The agencies, however, believe that both potential cost savings to the industry and the potential environmental impacts from construction activities due to a change to the definition of "waters of the United States" would likely to be modest in the areas where construction activities have a potential to affect both non-jurisdictional and jurisdictional waters. First, projects disturbing at least one acre of land, and which in turn require NPDES permit coverage, are presumed to be large enough to generate stormwater runoff that could reach a jurisdictional water, either directly or through a conveyance such as a municipal storm sewer, and so would be required to obtain permit coverage. Procedures typically required by construction stormwater general permits have been widely adopted as normal practices in the construction industry and are frequently required by local ordinances. As a result, the requirements are not usually considered to impose a significant burden. A reduction in jurisdictional waters is not likely to change these circumstances for most areas of the country. The exception may be for stormwater discharges from construction sites in arid states where many streams are ephemeral (*e.g.*, Arizona, Nevada, and New Mexico).

Second, states and eligible tribes may develop standards for non-jurisdictional waters under state or tribal law. Potential state and tribal responses are discussed in detail in Section II.A. Third, many states and tribes have specific designated uses and water quality criteria for ephemeral streams in their state or tribal WQS, which could be implemented at their discretion for waters that are not "waters of the United States." Unless a state or tribe changes their WQS to downgrade these uses, WQBEL-based NPDES permits will still be applicable if the discharge reaches state waters. Finally, even if not required by federal law, developers may implement stormwater BMPs for a variety of reasons, including the need to comply with local erosion and sediment control requirements and/or to operate in a manner consistent with industry standards, the additional time required for obtaining an exemption from CWA section 402 permit requirements, or concerns about the public perception of operating without a permit. The agencies expect minor change to compliance costs or adverse water quality impacts from construction stormwater pollution control measures required to comply with equivalent state regulations[71] or those voluntarily implemented by developers. Construction sites located in arid states that, as a result of the revised definition of "waters of the United States," may not be required to obtain NPDES permit coverage are most likely to realize cost savings and affect environmental quality.

III.A.1.5.2 Industrial Stormwater

Available data are not sufficiently detailed to develop quantitative estimates of the potential cost savings and environmental impacts from stormwater discharges from regulated industrial facilities discharging to waters whose jurisdictional status will change under the final rule. However, qualitative analysis suggest that potential impacts may be limited. Most industrial sectors regulated under the Phase I stormwater rule are located in urbanized areas. Any permitted entity that is currently discharging to an ephemeral feature would still be required to have an NPDES permit if their discharge conveys to a jurisdictional water. However, they may request to adjust their effluent limitations to account for potential dilution or attenuation of pollutants that occurs before the discharge reaches a jurisdictional water, subject to applicable anti-backsliding permit requirements. Regulated industrial sectors that are likely located near

[71] Section II.A provides detail on existing state programs and potential state responses to CWA jurisdictional changes.

ephemeral streams represent a minority of the regulated industrial stormwater universe. Additionally, these types of facilities are generally large and due to their scale may be more likely to discharge into perennial streams (outside of the arid West). Therefore, the agencies expect that industrial facilities with stormwater discharges regulated under the Phase I rule likely would continue with existing stormwater management practices, meaning there would likely be no cost savings or foregone benefits due to the final rule.

III.A.1.5.3 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, and being discharged from, an MS4, certain MS4s are required by law to obtain NPDES permit coverage and develop a stormwater management program (SWMP). The Stormwater Phase I rule, promulgated in 1990, requires operators of medium and large MS4s serving populations of 100,000 or more to obtain NPDES permit coverage for their stormwater discharges. The Stormwater Phase II rule, promulgated in 1999, requires regulated most small MS4s serving populations between 10,000 and 100,000 in urbanized areas, as well as small MS4s outside the urbanized areas that are designated by EPA or the state, 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 general permits. MS4 permits include terms and conditions that are adequate to meet the MS4 standard of reducing pollutant discharges from the MS4 to the "maximum extent practicable" (MEP), eliminating non-stormwater discharges to the MS4, and including other such conditions that the permitting authority deems appropriate to protect water quality.

An MS4 may have many different outfalls within its service area, some of which may discharge to waters no longer federally jurisdictional as a result of the final rule. However, MS4s often implement their SWMPs uniformly across their area without regard to the receiving water of a specific outfall. Thus, a change in jurisdictional status of some receiving waters is not expected to have a noteworthy effect in terms of costs or benefits, unless the final rule would mean that every outfall of a particular MS4 discharges to a non-jurisdictional water and that pollutants never reach a jurisdictional water. Therefore, the agencies expect minor change to compliance costs or adverse water quality impacts from MS4s regulated under the EPA Phase I and Phase II stormwater rules.

III.A.1.6 Potential Effects of the Final Rule on State Programs

As discussed in Section II.A.3, some states may choose to take on the responsibilities and costs of regulating waters that become non-jurisdictional while others would continue current practices of regulating more or less broadly than the CWA. States could take on current federal responsibilities by expanding their existing NPDES programs or pursuing authorization of additional NPDES components. The NPDES program comprises five components: the NPDES permit program, authority to regulate federal facilities, state pretreatment program, general permits program, and biosolids program (U.S. EPA, 2019). Forty-seven states are currently authorized for the NPDES permit program and the general permits program. Thirty-seven states are partially authorized for three or four components, and eight states are fully authorized for all components. Only three states and the District of Columbia are not authorized for any NPDES components. The potential options that states could choose in response to the final rule are:

- Continue broad regulations of affected waters.
- Pursue authorization of additional NPDES components.
- Expand existing state NPDES programs.
- Reduce existing state NPDES programs.
- Continue narrow regulations of affected waters.

Depending on which option states choose in response to the final rule, they could incur a certain set of costs. Initial costs could include application costs for pursuing authorization of additional NPDES components, hiring, training, information technology infrastructure, and administrative revision of statutes or programs. Recurring costs could include staffing and legal costs. Table III-2 shows which costs states would potentially incur according to potential response options. States that continue current practices could experience no change in costs if they already run their own fully authorized NPDES programs and regulate waters more broadly than the CWA. Other states that continue current practices could experience net cost savings from conducting fewer CWA section 401 water quality certification reviews of EPA-issued 402 permits. In all cases except where states will continue to regulate more broadly than required by the CWA, a smaller number of permits issued by federal agencies will reduce state costs associated with certification under CWA section 401.

Table III-2: State 402 costs incurred by scenario

	Initial Costs					Recurring Costs/Cost Savings		
Scenario	Application	Hiring	Training	Information Technology	Admin. Revision	Permit Review	401 Certification Review	Legal
No change, continue broad regulations	–	–	–	–	–	–	–	–
Pursue partial authorization	Yes	Yes	Yes	Yes	Uncertain	Yes	Cost savings	Yes
Expand existing state NPDES programs		Yes	Yes	Yes	Uncertain	Yes	Cost savings	Yes
Reduce existing state NPDES program	–	–	–	–	Yes	Cost savings	Cost savings	–
No change, continue narrow regulations	–	–	–	–	–	–	Cost savings	–

There is limited information on resources required for states to regulate waters that will become non-jurisdictional under the final rule. However, the agencies provide qualitative descriptions of resources required for each cost category below.

- **CWA Section 402 Authorization Application/Investigation Costs** – In order to be authorized for any NPDES program component, states must submit a primacy application to EPA. A primacy application includes a letter from the governor requesting review and approval, a

Memorandum of Agreement, a program description, a statement of legal authority, and the underlying state laws and regulations (U.S. EPA 2019b). While no specific information was found on costs or number of staff to complete a primacy application, for reference, the timespan between when state legislatures directed state environmental departments to seek EPA authorization until when the state submitted the primacy application was two years for Idaho and three years for Alaska (Alaska Department of Environmental Conservation, 2008; Idaho Department of Environmental Quality, 2019).

- **Hiring Costs** – No sources were found that discussed hiring costs for NPDES programs, but a 2016 Society for Human Resource Management Survey found that the average cost-per-hire (sum of internal and external recruiting costs divided by the number of hires) for companies is $4,129 (SHRM, 2016). This value provides a benchmark of expected hiring burden for each position.

- **Training Costs** – If states decide to assume new NPDES program components or expand existing state NPDES programs, they will need to train additional staff. A report by Alaska describing training activities required for assuming all NPDES components except for biosolids provide a general idea of potential training costs for states that decide to assume additional NPDES components. Beginning in 2006, two years prior to adopting NPDES programs, Alaska Department of Environmental Conservation (ADEC) provided direct training for staff, hired loaner staff from NPDES-authorized states, and participated in a work share agreement with EPA for ADEC to draft several NPDES permits. Until Alaska obtained full authorization, an unspecified number of staff completed 3-day training courses required to conduct inspections (Alaska Department of Environmental Conservation, 2008). The agencies expect that resources required for training staff for expanding state NPDES programs would be similar.

- **Information Technology Costs** – There is no information on the cost of new information technology (IT) infrastructure for states to administer CWA section 402 programs, but a few state feasibility studies on CWA section 404 assumption indicate that the cost can be significant. Minnesota estimated that they would incur a one-time cost of $3 million to set up an online permitting and reporting system (Minnesota DNR and BWSR, 2017). Virginia estimated that upgrading the state's databases and IT infrastructure to enable the 404 permitting program would cost about $2 million the first year, about $1 million the second year, and $0.5 million the third year, or roughly $3.5 million in total initial IT costs (Virginia Department of Environmental Quality, 2012). Both states already have a state-level wetland dredged and fill program.

- **Administrative Revision Costs** – Some states may spend time and resources on administrative rulemaking and amending statutes whether they expand or reduce state programs. However, no sources were found describing the resources required to revise 402 programs.

- **Staffing Costs** – While states that take on additional responsibilities of regulating non-jurisdictional waters will need to hire additional staff, the agencies do not consider this as a cost, as it is a transfer from the federal government to states. However, the agencies do consider cost savings from reduced staffing resulting from reduced CWA section 401 reviews of EPA-issued 402 permits.

- **Legal Costs** – It is unclear whether states would incur additional legal costs if they were to pursue NPDES authorization or expand existing NPDES programs. Alaska indicated that legal staffing costs (2 FTEs) would remain the same before and after obtaining NPDES authorization. No other sources were found regarding legal staffing costs from other states.

The agencies do not expect many states to pursue authorization of additional NPDES program components, which would require the most upfront costs. The agencies expect that some states would expand their existing NPDES programs, which would result in these states incurring costs for hiring and training staff, installing and updating information technology infrastructure, and revising statutes or programs.

States that would experience net cost savings as a result of reduced 401 reviews on EPA-issued 402 permits would be 1) states with no authorized NPDES programs and 2) states with NPDES programs that are not authorized for all components of the NPDES program and decide to continue current practices. Massachusetts, New Hampshire, and New Mexico are the only three states without NPDES programs. Massachusetts conducted a feasibility study on pursuing NPDES authorization and concluded that the state did not have sufficient resources to run its own program (Massachusetts Department of Environmental Protection, 2013). As New Hampshire is less likely to regulate waters affected by the final rule, according to the federalism analysis in Section II.A.3, the agencies assume that New Hampshire is also not likely to pursue NPDES authorization. New Mexico has expressed interest in pursuing NPDES authorization while also expressing concern over program costs (New Mexico Environment Department, 2019). It is uncertain how many states with NPDES programs do not cover non-jurisdictional waters and will decide to continue current practices, but the percentage of 401 reviews devoted to EPA-issued 402 permits is quite low, as the vast majority of 401 reviews are for Corps-issued 404 permits. As a result, the agencies expect total 401 cost savings resulting from changes to the 402 program to be minimal.

III.A.1.7 Uncertainty and Limitations

There are multiple sources of uncertainty inherent in the analysis of the potential impacts of the revised definition of "waters of the United States" on the CWA section 402 program. First, there is significant uncertainty in the universe of entities that would be affected by a change in jurisdictional scope. The analysis presented in this report is based on the existing CWA section 402 permits included in the EPA's ICIS-NPDES database. The database is based on states' reporting and may not account for all existing facilities and activities that may affect waters whose jurisdictional status might change under the final rule. It also does not necessarily represent all future activities that could have adverse impacts on such waters. In particular, specific locations of future construction activities as well as the potential for their stormwater discharges to affect ephemeral streams is unknown. Similarly, demand for industrial domestic wastewater treatment is driven by land development, and locations of future industrial domestic wastewater treatment facilities are not known. Second, it is impossible to predict with certainty whether states would enact new or keep existing regulations in place to regulate waters that will no longer be jurisdictional under this final rule (*see* Section II.A for detail). Third, entities that are likely to affect non-jurisdictional waters may have incentives to continue voluntarily using technologies and best management practices or to implement them in the future in the case of new activities. These incentives include, but are not limited to, industry standards, public relations, sustainability and related policies, and the time required for obtaining exemption from CWA section 402 requirements. However, new permittees

motivated by potential cost savings that are likely larger than for existing permit holders may be more likely to seek jurisdictional determinations and, as a result, lead to greater realization of avoided costs and forgone benefits due to potential avoidance of CWA section 402 requirements.

III.A.2 CWA Section 404: Discharge of Dredged or Fill Material

Unless the activity is statutorily exempted,[72] the CWA prohibits discharges of dredged or fill material from a point source into "waters of the United States," including wetlands, without a permit. Such discharges are regulated under CWA section 404, which is administered by the U.S. Army Corps of Engineers with oversight by the EPA. In addition, the states of Michigan and New Jersey have assumed administration of the CWA section 404 permitting program for certain waters within their borders.

This section describes requirements of the CWA section 404 program and discusses potential impacts resulting from the revised definition of "waters of the United States."

III.A.2.1 Overview

For a project to be permitted under the 404 program, the permittee must demonstrate that, to the extent practicable, the permittee has taken steps to avoid impacts to wetlands and other aquatic resources, minimized potential impacts, and compensated for remaining unavoidable impacts if required. *See, e.g.*, 33 U.S.C 1344(b)(1). This process, commonly referred to as the mitigation sequence, applies the following mitigation steps in sequential order:

- **Avoidance:** Mitigating an aquatic resource impact by selecting the least-damaging project type, spatial location, and extent compatible with achieving the purpose of the project. Avoidance is achieved through an analysis of appropriate and practicable alternatives and a consideration of impact footprint.
- **Minimization:** Mitigating an aquatic resource impact by managing the severity of a project's impact on resources at the selected site. Minimization is achieved through the incorporation of appropriate and practicable design and risk avoidance measures.
- **Compensatory Mitigation:** Mitigating an aquatic resource impact by replacing or providing substitute aquatic resources for impacts that remain after avoidance and minimization measures have been applied. Compensatory mitigation is achieved through appropriate and practicable restoration, establishment, enhancement, or preservation of aquatic resource functions and services.

Avoidance and minimization steps assure that only projects that are the least environmentally damaging practicable alternative (LEDPA) will receive legal authority to discharge. The Corps may only permit the

[72] The statutory exemptions to CWA Section 404 are set forth in subsection (f)(1). The first and most significant 404(f)(1) exemption is for normal and ongoing farming, silviculture and ranching activities. Other examples of statutory exemptions are for maintenance, including emergency repair of recently damaged, currently serviceable structures, and for construction or maintenance of farm ponds, irrigation ditches, farm or forest roads, and temporary roads for moving mining equipment. These statutory exemptions may not apply in certain limited circumstances if the otherwise exempted activity brings an area subject to jurisdiction into a use to which it was not previously subject, where the flow or circulation of navigable waters may be impaired or the reach or waters reduced (CWA Section 404(f)(2)).

LEDPA (40 CFR 230.10(a)). While this sounds straightforward, there are many variables at play and they multiply in complexity depending on the type of project, the local market, the geographic context, and the type, functionality, and local importance of the aquatic resources involved.

Compensatory mitigation may be required to replace the loss of wetland and aquatic resource functions by offsetting unavoidable adverse impacts which remain after appropriate and practicable avoidance and minimization has been achieved. There are three mechanisms for providing compensatory mitigation (listed below in order of most-to-least preferred, as established by the regulations[73]):

- **Mitigation bank:** A site, or suite of sites, where aquatic resources are restored, established, enhanced, or preserved for the purpose of providing compensatory mitigation for impacts authorized by Department of the Army permits. Mitigation banks sell compensatory mitigation credits to permittees with regulatory requirements to offset aquatic resource impacts. The purchase of credits transfers liability for compensation from the permittee to the mitigation bank. Large compensatory mitigation banks generally provide compensation for multiple, smaller impacts.

- **In-lieu fee program:** A program involving the restoration, establishment, enhancement, or preservation of aquatic resources through funds paid to a "governmental or non-profit natural resources management entity" to satisfy compensatory mitigation requirements for Department of the Army permits. The fund payment transfers responsibility for compensation from the permittee to the in-lieu program operator. In-lieu fee programs identify and initiate projects across their service area within set timeframes from when funds are collected.

- **Permittee-responsible mitigation:** Aquatic resource restoration, establishment, enhancement, or preservation activity undertaken by the permittee (or an authorized agent or contractor) to provide compensatory mitigation for which the permittee retains full responsibility.

The agencies generally consider banks and in-lieu fee programs preferable to permittee-responsible mitigation because they consolidate compensatory mitigation projects where ecologically appropriate, use a watershed approach, provide a greater level of financial planning and scientific expertise, reduce temporal losses of ecological functions, increase economic efficiency, and reduce uncertainty over project success.

Two types of permits are available through the 404 program: individual permits and general permits. Individual permits are required for potentially significant impacts. The Corps evaluates potential environmental and socioeconomic effects of the proposed activity and issues a public notice that describes the proposed project. The Corps reviews all comments received and makes a final permit decision. Alternatively, letters of permission, a type of individual permit, may be used when the district engineer determines that the proposed work would be minor, would not have significant individual or cumulative impacts on the environment, and would encounter little to no public opposition.

[73] *See* 40 CFR 230-91-230.98 and 33 CFR 332.1-332.8.

General permits are suitable for activities that will have only minimal adverse effects individually or cumulatively. General permits authorize activities the Corps has identified as being substantially similar in nature and causing only minimal individual and cumulative environmental impacts. General permits may authorize activities in a limited geographic area (*e.g.*, county or state), a particular region of the country (*e.g.*, group of contiguous states), or the nation. The general permit process eliminates individual review and allows certain activities (*e.g.*, minor road maintenance, utility line backfill) to proceed with little or no delay, provided that the conditions for the general permit are met.

III.A.2.2 Potential Effects of the Final Rule on the CWA Section 404 Program

Under the final rule, the following features, among others, would not be jurisdictional: wetlands that are not adjacent to otherwise jurisdictional waters; rivers and streams that do not contribute surface water flow to traditional navigable waters or the territorial seas in a typical year; ephemeral features, including ephemeral streams, isolated lakes, ponds, and impoundments; and certain ditches. The final rule also codifies twelve exclusions. The final rule affects where project proponents need to obtain 404 permits for certain activities in waters whose jurisdictional status has changed, and for permittees to mitigate unavoidable impacts from those activities, where applicable. Absent any state, tribal, or local programs regulating these waters under their own dredged/fill programs, developers and other project proponents affecting these non-jurisdictional waters may not take the same steps to avoid impacts to wetlands and other aquatic resources, as compared to activities requiring a 404 permit in the baseline, nor would they need to demonstrate that they have minimized potential impacts to the maximum extent practicable. Further, the amount of mitigation required to offset impacts of activities changes under the final rule, in the absence of any similar state, tribal, or local requirements. It is not possible to assess the potential impacts of removing the minimization requirements on the types of activities that developers may pursue in the future, or on project specifications.

Data from Corps permits issued under the 404 program in fiscal years 2011 to 2015[74] indicate the amount of wetlands, streambanks, and shorelines affected by dredged or fill activities and the extent of mitigated impacts under the 404 permitting process. During this timeframe, 248,688 permits were issued under the 404 program. Permits are divided into ten different general project types: agriculture, aquaculture, development, dredging, energy generation, mining and drilling, mitigation, structure, transportation, and an "other" type. Table III-3 provides authorized permanent impacts, temporary impacts, and mitigation requirements for each project type.

Table III-3: Authorized impact area of CWA section 404 permits issued in 2011-2015, by project type

Project Type	Permanent Impacts		Temporary Impacts (Per Year)		Mitigation Required (Per Year)		
	Acres	Length Feet	Acres	Length Feet	Acres	Length Feet	Permits Using Credits[1]
Agriculture	583	966,813	99	73,963	311	47,383	8
Aquaculture	13,758	16,603	6,599	581	2	49	0
Development	19,099	2,563,048	275	108,992	9,859	278,370	990

[74] Calendar year 2015 was the most recent complete year available at the time the agencies accessed data for use in this analysis.

Table III-3: Authorized impact area of CWA section 404 permits issued in 2011-2015, by project type

Project Type	Permanent Impacts		Temporary Impacts (Per Year)		Mitigation Required (Per Year)		
	Acres	Length Feet	Acres	Length Feet	Acres	Length Feet	Permits Using Credits[1]
Dredging	4,997	932,081	2,272	523,532	294	24,269	19
Energy Generation	2,320	741,194	166	93,718	676	235,181	57
Mining and Drilling	6,187	2,992,779	508	1,731,983	2,648	679,215	146
Mitigation	14,063	15,418,091	1,064	530,120	869	97,926	13
Structure	7,000	3,237,833	1,242	568,435	898	177,000	330
Transportation	13,224	5,932,043	1,994	796,314	4,592	231,032	1,546
Other	3,463	6,772,584	626	543,839	3,911	227,144	53
Total	**84,694**	**39,573,069**	**14,844**	**4,971,478**	**24,060**	**1,997,569**	**3,163**

[1] Mitigation credits are the trading medium that is used to represent the ecological gains at mitigation bank sites. The number of credits available from a mitigation bank depends on the quantity and quality of the resources that are restored, created, enhanced, or preserved. The number of acres or linear feet per credit varies among and within U.S. Army Corps Districts. This variability makes summing credits across regions inappropriate, so the number of permits utilizing mitigation credits is provided instead of total mitigation credits.

Figure III-2 presents potential effects of the final rule on the CWA section 404 program. Without CWA coverage for certain wetlands, ephemeral streams, and other waters whose jurisdictional status has changed, the decision to regulate these waters will solely reside with states and tribes.[75] States and tribes could respond in the following ways (*see* "State Regulations & Review" and "Responses to regulation" in Figure III-2):

- Regulate these waters above the levels previously required at the federal level, for example by prohibiting certain activities altogether or requiring more comprehensive mitigation actions. Some states and tribes may need to establish their own review, permitting, and verification program to ensure equivalent regulation of these waters (*see* Section II.A).
- Continue regulating non-adjacent wetlands, ephemeral streams, and other waters not jurisdictional under the final rule at levels equivalent to previous federal requirements. Some states and tribes may need to establish their own review, permitting, and verification program to ensure equivalent regulation of these waters (*see* Section II.A).
- Provide some regulation of these waters but at a lower level than previously required at the federal level.
- Provide no regulation of these waters once federal jurisdiction is removed.

[75] The agencies note that many of these features, including ephemeral streams, are not categorically jurisdictional under the 2019 Rule and according to the *Rapanos* Guidance would have to satisfy a significant nexus analysis to be determined jurisdictional under the CWA.

Each state and tribe's response to the revised definition will affect total potential impacts of the final rule. On the one hand, for states and tribes that choose to continue the same level of regulation as previously required under the CWA, the agencies assume that the annual average number of mitigation acres would remain unchanged in future years. On the other hand, for states and tribes that choose to provide no regulation beyond the new federal scope, there could be no mitigation of impacts. Impacts in states and on tribal reservations with stricter or more lenient requirements are difficult to predict since the agencies do not know how changes will affect the mitigation procedure.

Without knowing each state's and tribe's likely response to changes to the definition of "waters of the United States," the agencies can only identify states that *could* have potentially large impacts based on the authorized impact areas of 404 permits. The final rule is likely to have a significant effect in states with large impact areas and large mitigation areas in non-coastal waters. Table III-4 shows authorized impact areas and mitigation requirements from non-coastal 404 permits issued in 2011-2015 for each EPA region (*see* Appendix B for a breakdown by state). The states of Florida, Louisiana, Alaska, and Texas had the largest areas of authorized permanent impacts for permitted activities on non-ocean and non-tidal water resources. States with large mitigation requirements, whether in terms of acres, linear feet or credits—including Florida, South Carolina, Texas, Louisiana, and Indiana—may experience greater impacts from the "waters of the United States" definitional changes if the states do not require similar mitigation following the change. Permits utilizing mitigation credits are presented instead of total credits because the number of acres or linear feet per credit varies among and within U.S. Army Corps Districts. Summing mitigation credits thus would not provide meaningful results.

Table III-4: Authorized impact area of CWA section 404 permits issued in 2011-2015, excluding mitigation type permits and permits affecting resources categorized as "ocean" or "tidal"

EPA Region	Permanent Impacts[1]		Temporary Impacts[1] (Per Year)		Mitigation Required[1] (Per Year)		
	Acres	Length Feet	Acres	Length Feet	Acres	Length Feet	Permits Using Credits[2]
1	687	392,280	175	65,712	1,656	5,038	30
2	401	546,025	79	55,851	364	13,202	18
3	5,111	2,406,621	819	509,094	459	305,507	140
4	18,229	3,842,185	682	319,864	12,317	335,565	1,066
5	5,738	5,289,594	510	409,753	1,373	488,018	419
6	11,208	2,183,522	1,909	610,310	3,149	368,462	684
7	1,662	2,963,411	114	1,629,274	313	88,826	130
8	1,478	1,507,359	235	146,724	274	94,709	74
9	3,349	986,347	284	189,385	925	105,071	323
10	5,154	1,687,844	371	163,967	644	79,697	134
Total	**53,017**	**21,805,188**	**5,178**	**4,099,934**	**21,474**	**1,884,095**	**3,018**

Source: Analysis of U.S. Army Corps of Engineers' ORM2 data.

[1] The estimated impact area does not include projects from New Jersey and Michigan.

[2] Mitigation credits are the trading medium that is used to represent the ecological gains at mitigation bank sites. The number of credits available from a mitigation bank depends on the quantity and quality of the resources that are restored, created, enhanced, or preserved. The number of acres or linear feet per credit varies among and within U.S. Army Corps Districts. This variability makes summing credits across regions inappropriate, so the number of permits utilizing mitigation credits is provided instead of total mitigation credits.

Several potential overall effects on the CWA section 404 permit program are possible based on the change in CWA jurisdiction:

- **Transfers:** Projects may shift away from areas containing waters that require 404 permits to areas with waters that would not be jurisdictional under the final rule (*e.g.*, non-adjacent wetlands and ephemeral features; *see* "Final Rule affected waters" in Figure III-2). All else being constant, profit-maximizing entities will aim to avoid regulatory requirements and the associated costs. Therefore, the agencies expect that following the revised definition of "waters of the United States," projects affecting "waters of the United States" to decrease and projects that affect only waters that are non-jurisdictional to increase. The potential change in the number of projects affecting both jurisdictional and non-jurisdictional waters is uncertain. As described above and depending on state, tribal, or local requirements, in cases where the project would not be subject to a federal permit, the developer may elect to not go through the same steps to minimize impacts and the length or acres of affected non-jurisdictional waters could increase as compared to the baseline. Further, as a result of projects shifting to non-jurisdictional waters, the number of projects requiring avoidance measures would decrease. However, developers may still practice avoidance measures for projects for which such actions are in the developer's best interest. The net change in impact area reductions resulting from avoidance measures is thus uncertain.

- **Lower permit and administrative costs:** Several possible scenarios would result in reduced permit costs. When projects involve only non-jurisdictional waters and no state or tribal permits are required, permit burden (including any construction delays) would be reduced at the federal level, for regulated entities, and for states and tribes in terms of reduced CWA section 401 certification reviews. Permit burden would also be reduced when states or tribes implement less protective regulations for waters that are not "waters of the United States." For projects where the area of jurisdictional waters would be reduced as a result of the change in the definition of "waters of the United States," permit burden may also be reduced because of a shift from individual permits to general permits, and fewer individual permits that may receive public hearings (*see* "Response to regulation" in Figure III-2). The agencies anticipate that the Corps would generally incur reduced administrative actions under the final rule associated with the decreased permitting workload. States and tribes would thereby also experience a decrease in workload from conducting fewer CWA section 401 certification reviews on Corps-issued permits. In addition, the regulated community would see reduced workload in not needing to go through the permit process. The agencies are unable to predict if the workload associated with issuing AJDs would increase or decrease as a result of a change in the definition of "waters of the United States," for the reasons discussed before.

  The Corps is usually the permitting authority for CWA section 404 permits. The states of Michigan and New Jersey have assumed administration of the CWA section 404 permitting program for certain waters and may experience similar changes, or if they maintain regulation of waters whose status as a "water of the United States" would change under their programs there may be no changes in their administrative costs. Specific changes in Corps administrative costs would include: responding to a change in the number of requests for AJDs; an overall decrease in workload-related tasks such as permit actions, consultations, and compliance and enforcement actions; improved efficiency in issuing AJDs due to the revised definition of "waters of the

United States;" including no longer performing significant nexus analyses (*see* "Federal regulations" in Figure III-2). The change in the number of AJDs is uncertain; the Corps may experience an increase in AJDs if applicants request the certainty associated with an AJD, as opposed to a preliminary jurisdictional determination (PJD), or a decrease in the number of AJDs as applicants may be able to estimate jurisdiction more readily. However, the agencies would also likely need to provide program management, training, and compliance oversight associated with administering changes to the program, especially in the near term.

- **Forgone benefits:** Establishing non-adjacent wetlands, ephemeral features, certain ditches, and certain lakes and ponds, for example, as non-jurisdictional, places any potential regulation of these features solely in the hands of state and tribal governments. States that currently do not regulate these waters or choose to reduce or eliminate regulation of these waters could see larger impact areas from projects (from eliminating the minimization requirements), fewer mitigation measures, and greater wetlands acreage losses than they currently experience under federal regulations. Additionally, potential impacts of the definitional changes on the types of 404 permits issued (*i.e.*, higher likelihood for general permits; likely fewer individual permits with public hearings and more individual permits with letters of permission) could result in decreased regulation of projects affecting non-jurisdictional waters. The impacts to these waters without avoidance, minimization, or compensation would result in forgone benefits over time, including habitat support, recreation, and aesthetic benefits.

III.A.2.3 Uncertainty and Limitations

The likely response of states to definitional changes is uncertain. Past environmental policies and current state regulations offer some indication of potential final rule responses, but actual responses may differ from the agencies' projections in this analysis. Differing state responses makes quantifying impacts to potential newly non-jurisdictional waters difficult.

In addition to uncertainties regarding state responses, the analysis is limited by the precision of the datasets available for determining water classification types. For example, as noted earlier, the high resolution NHD used in an attempt to map streams for this analysis does not differentiate between intermittent and ephemeral streams nationwide, the NHD and the NWI were analyzed using 30-meter grid cells, and the NWI does not indicate whether a feature it identifies as a wetland satisfies all three criteria to meet the regulatory definition of "wetlands" (*i.e.*, hydric soils, hydrophytic vegetation, hydrology), further complicating the task of modeling the potential effects of the final rule.[76]

Beyond the inherent limitations of the NHD and NWI datasets, the agencies face the confounding factor of the 2019 Rule requiring a significant nexus analysis in order to determine the jurisdictional status for certain categories of water, including: non-navigable tributaries that are not relatively permanent; wetlands adjacent to non-navigable tributaries that are not relatively permanent; and wetlands adjacent to but that do not directly abut a relatively permanent non-navigable tributary. According to the *Rapanos* Guidance, such features are not categorically jurisdictional. As a result, the agencies cannot identify the universe of federally regulated waters under the 2019 Rule to establish a comparative baseline of

[76] *See* the RPA Chapter II for additional details.

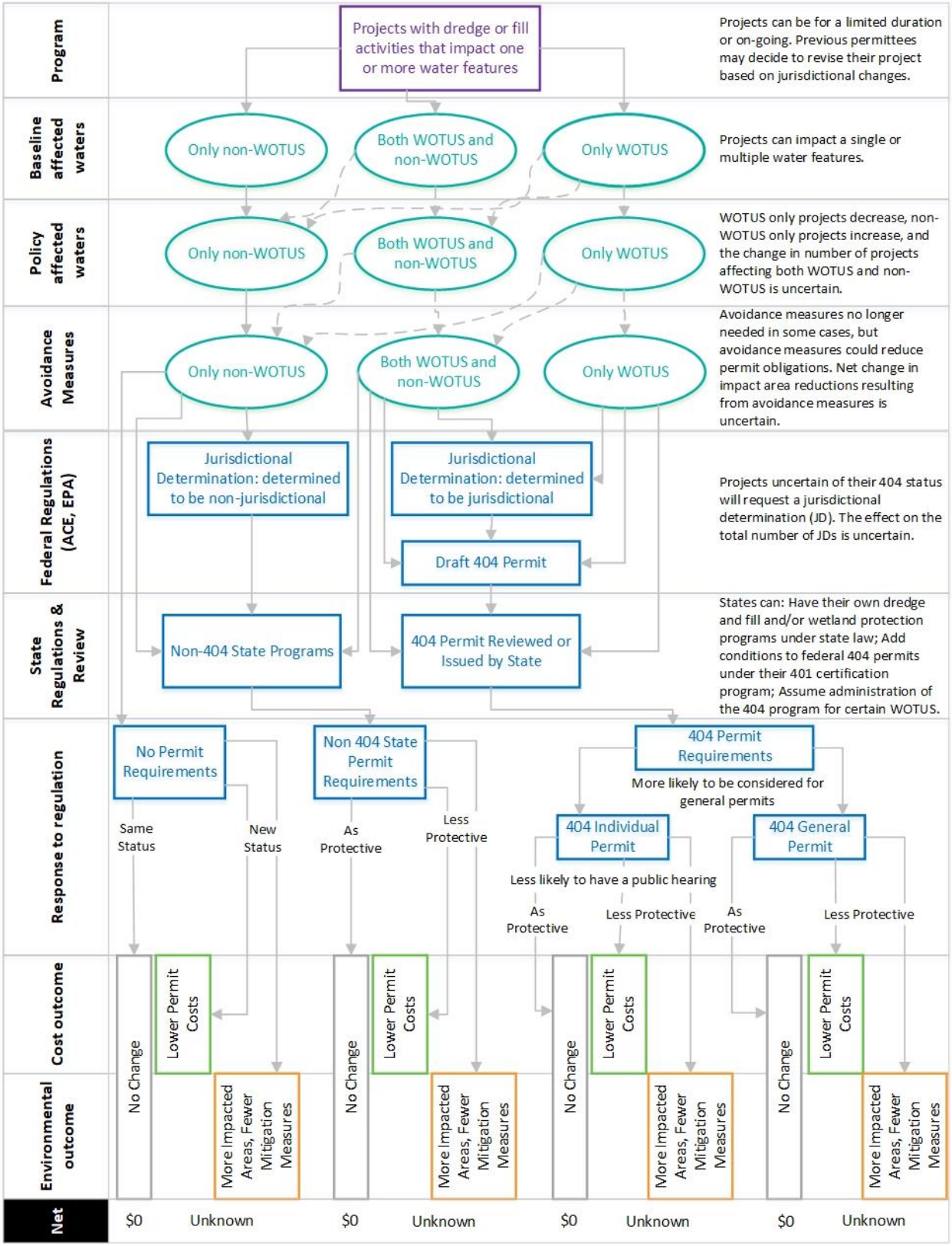
jurisdictional waters. Due to these limitations and confounders, the methodology used in this analysis only provides a description of the potential effects of the final rule on the CWA section 404 permitting program.

Mitigation credits complicate efforts to quantify the amount of mitigation that would be required under the final rule. This is because the number of acres or linear feet per credit varies among and within U.S. Army Corps districts depending on assessment practices. Converting the number of mitigation credits into a consistent unit of measure for a national analysis is thus difficult without consulting individual permits. To avoid conversion errors, the agencies summarized mitigation credit impacts separately from acre and linear feet impacts.

The response of regulated entities to the revised definition of "waters of the United States" is also uncertain. For instance, regulated entities may continue using a protocol that avoids and minimizes impacts to non-jurisdictional waters—regardless of state-level regulations—for example, to standardize their protocol across states. Using standardized project specifications that minimize impacts on waters may also enable developers to accelerate project approval for projects for which they are uncertain as to whether the affected resources are within CWA jurisdiction. The response of regulated entities in states with less stringent requirements would likely depend on the type of work, the stage of work (*e.g.*, planning, active, completed, an on-going basis), local permitting requirements, and the stringency of permit requirements that the entity faces in other areas.

The potential effect of the revised definition on permit costs is also uncertain. Reduced permit burden for non-404 projects, a shift from individual permits to general permits, and fewer individual permits requiring public hearings would all result in cost savings. The amount of cost savings depends on many factors, including state or tribal response and regulated entity response to the changes. Additionally, in the other direction, the revised definition could increase the number of jurisdictional determinations requested by applicants wanting confirmation that their impacted water features are excluded and increase burden and construction delays. The agencies believe, however, that the final rule provides clearer definitions for "tributary" and "adjacent wetland" and eliminates the case-specific significant nexus analysis needed for many waters under the 2019 Rule, thereby reducing uncertainty regarding the scope of CWA jurisdiction.

Figure III-2. Potential effects of the final rule on CWA section 404 program.



III.A.3 CWA Section 311: Oil Spill Prevention, Preparedness, Reporting and Response

CWA section 311 includes two main components that address the risk and harm from oil spills:

- Spill prevention and preparedness, which has been addressed in the EPA's SPCC and FRP regulations for non-transportation related facilities and in United States Coast Guard and Department of Transportation regulations for vessels and transportation-related facilities.
- Spill notification and removal, as described under the National Contingency Plan.

This section describes each part of the program and discusses the potential impacts of the change in waters subject to CWA jurisdiction.

III.A.3.1 Overview

Under the authority of CWA section 311, the EPA requires certain non-transportation-related facilities to prepare SPCC plans if they have a reasonable potential to have a discharge of oil to navigable waters or adjoining shorelines and meet other applicability criteria including aggregate oil storage capacity (*see* SPCC rule at 40 CFR 112). Specifically, the SPCC rule applies to facilities "engaged in drilling, producing, gathering, storing, processing, refining, transferring, distributing, using, and consuming oils and oil products, which due to its location, could reasonably be expected to discharge oil in quantities that may be harmful, as described in part 110 of this chapter, into or upon the navigable waters of the United States or adjoining shorelines..." [40 CFF 112.1(b)] where "navigable waters" (as opposed to "navigable waters of the United States") are defined at 40 CFR112.2 as "waters of the United States, including the territorial seas."[77] Facilities in a broad spectrum of industry sectors are currently subject to the SPCC rule, including farms, oil production facilities, industrial sites, manufacturing plants, and retail establishments.

The agencies estimate that approximately 540,000 facilities are subject to SPCC requirements and must prepare, implement, and maintain their SPCC Plan (U.S. EPA, 2016a). Approximately 40 percent of these facilities (230,000) are in the oil production sector (Table III-5), which includes production, drilling, and workover.[78] Other industry sectors with a significant share of facilities include electric utilities (including distribution substations), real estate rental and leasing, and farms. On an ongoing basis, approximately three percent of the universe of SPCC-regulated facilities are new facilities that must develop an SPCC Plan and implement the spill prevention measures required by the regulation (*e.g.*, sized secondary containment, overfill prevention, and employee training) before they start operating and handling oil. The remaining facilities must maintain their existing plan. They must amend their Plan when there is a change

[77] The CWA [33 U.S.C. 1321(b)] sets as national policy that there "should be no discharges of oil or hazardous substances into or upon the navigable waters of the United States, adjoining shorelines, or into or upon the waters of the contiguous zone, or in connection with activities under the Outer Continental Shelf Lands Act [43 U.S.C. 1331 et seq.] or the Deepwater Port Act of 1974 [33 U.S.C. 1501 et seq.], or which may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the United States (including resources under the Magnuson-Stevens Fishery Conservation and Management Act [16 U.S.C. 1801 et seq.])." While CWA section 311 uses the phrase "navigable waters of the United States," which traditionally means waters subject to jurisdiction under the RHA, EPA has historically interpreted it to have the same breadth as the phrase "navigable waters" used elsewhere in section 311, and in other sections of the CWA.

[78] Workover refers to various interventions or maintenance activities on oil or gas wells such as replacing the production tubing.

in operations that materially affects the risk of a discharge and review their Plan at least once every five years.

Table III-5: Estimated number of facilities subject to SPCC in 2016.

Sector	Number of Facilities
Oil Production	230,405
Electric Utility[1]	64,919
Real Estate Rental and Leasing	30,395
Farms[2]	21,864
Other Commercial	18,764
Retail Trade	18,158
Contract Construction	17,327
Transportation	15,846
Other Manufacturing	15,781
Arts Entertainment & Recreation	15,054
Wholesale Trade	14,883
Education	9,317
Manufacturing Facilities Using and Storing AFVOs	7,859
Other Services (Except Public Administration)	7,493
Hospitals & Other Health Care	7,239
Accommodation and Food Services	5,330
Information Finance and Insurance	4,596
Petroleum Bulk Stations and Terminals	4,405
Fuel Oil Dealers	4,225
Gasoline stations	3,715
Food Manufacturing	3,684
Warehousing and Storage	3,545
Mining	3,145
Metal Manufacturing	2,828
Chemical Manufacturing	2,654
Petroleum Refining and Related Industries	2,075
Religious Organizations	1,563
Military Installations	789
Pipelines	647
Government	613
Total	539,118

[1] Electric utility includes generation plants, distribution substations, and other types of facilities

[2] Reflects changes in SPCC applicability to farms due to the Water Resources Reform and Development Act of 2014

AFVOs: animal fat and vegetable oils

Source: U.S. EPA (2016b)

Additionally, under the FRP rule at 40 CFR 112.20 *et seq.*, the EPA requires a subset of SPCC facilities that could, because of their location, reasonably be expected to cause substantial harm to the environment by discharging oil into or on the navigable waters or adjoining shorelines to prepare and submit an FRP to the EPA Regional Administrator for the state where the facility is located. The EPA maintains an internal database on FRP facilities, including their locations and characteristics. Table III-6 summarizes the number of active FRP facilities by EPA Region.

Table III-6: Number of active FRP facilities by EPA region

EPA Region	Number of Facilities
1	133
2	203
3	283
4	531
5	527
6	956
7	259
8	225
9	278
10	407
Total	3,802

Source: U.S. EPA, Emergency Management-Oil Database, 2018

Section III.A.3.2 discusses the potential impacts of the change in waters subject to CWA jurisdiction on the SPCC and FRP programs.

Spill preparedness requirements also exist for onshore transportation-related facilities such as pipelines and railcars. These programs derive their authority from CWA section 311 as amended by OPA of 1990 and therefore are affected by changes in the scope of jurisdictional waters. Under 49 CFR 194, the operator of an onshore oil pipeline that, because of its location, could reasonably be expected to cause substantial harm or significant and substantial harm to the environment by discharging oil into or on any navigable waters of the United States or adjoining shorelines must submit an oil spill response plan to Pipeline and Hazardous Materials Safety Administration (PHMSA) of the Department of Transportation. The worst-case discharge for planning purposes is the largest foreseeable discharge of oil (*e.g.*, from a pipeline rupture, fire or explosion) in adverse weather conditions *(e.g.*, rain, currents, cold temperatures). The pipeline operator needs to identify resources necessary to respond to a worst-case discharge in operator-defined response zones.[79] PHMSA has approximately 530 oil spill response plans from pipeline operators (PHMSA, personal communication, as of April 30, 2018). Section III.A.3.2.2 discusses the potential effect of changes in the waters subject to CWA jurisdiction on the pipeline spill preparedness program.

Under 49 CFR 130, railroad owners or operators must prepare oil spill response plans to cover tank car shipments of petroleum oils. Among other requirements, the basic written plan must describe the manner of response to discharges that may occur during transportation; take into account the maximum potential discharge of the contents from the packaging; and identify private personnel and equipment available to respond to a discharge.

[79] 49 CFR 194.5 defines a "response zone" as a "geographic area along a length of pipeline or including multiple pipelines, containing one or more adjacent line sections, for which the operator must plan for the deployment of, and provide, spill response capabilities. The size of the zone is determined by the operator after considering available capability, resources, and geographic characteristics."

Under OPA, states may impose additional requirements for facility response plans as long as these requirements are at least as stringent as the federal standards. For example, both Alaska and Washington State have regulations requiring facility response plans or comprehensive contingency plans for certain large facilities such as refineries, refueling terminals, and pipelines. Both states further require public participation in the planning process to ensure that the plans appropriately reflect community concerns and priorities.

Section 311(c) of the CWA as amended by OPA of 1990 authorizes response to discharges or threats of discharges of oil. The CWA provides that the President shall ensure effective and immediate removal of a discharge or substantial threat of discharge (1) into or on navigable waters of the United States, (2) on the adjoining shorelines to such waters, (3) into or on the waters of the exclusive economic zone, or (4) that may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the United States. The CWA requires that oil discharges and releases of reportable quantities of hazardous substances be reported to the National Response Center (NRC), which in turn notifies the relevant federal on-scene coordinators (FOSC). FOSCs have the authority to conduct, direct and coordinate response efforts to protect the environment, public health, and worker safety and health under CWA sections 311(c) and (e). Most oil and chemical incidents are addressed by the state, local, or tribal governments and/or by responsible parties. The FOSC determines the need for federal involvement under the CWA and the National Contingency Plan.

Liability for response and cleanup costs falls to the responsible party if one can be identified. The OSLTF provides funding to cover removal costs incurred by the U.S. Coast Guard and the EPA and by state and tribal governments. The OSLTF may pay for uncompensated removal costs and damages up to $1 billion per incident, of which no more than $500 million may be paid for natural resource damages. The National Pollution Funds Center (NPFC), which manages the OSLTF, seeks reimbursement from the responsible party for any response expenses, claims, and damage assessment initiation paid by the Fund. One of the key criteria[80] the NPFC applies when approving access to the OSLTF is whether the oil spill incident affected or substantially threatened a water subject to CWA jurisdiction. Changing the scope of jurisdictional waters could potentially affect the EPA's ability to access the OSLTF to oversee a responsible party's response to an oil spill or respond to an oil spill. *See* Section IIII.A.3.2.3 for further discussion of potential impacts to spill notification and response programs.

III.A.3.2 Potential Effects of the Final Rule on CWA Section 311 Programs

III.A.3.2.1 Potential Effects on Non-Transportation-Related Spill Prevention and Preparedness

III.A.3.2.1.1 SPCC Program

Figure III-3 illustrates the potential impacts of the final rule on the SPCC program. The agencies estimate that approximately 540,000 facilities are currently subject to SPCC requirements. This estimate is based on the number of establishments in each industry sector and oil storage capacities. The estimate does not explicitly account for the location of the facilities and reasonable potential for a discharge to a jurisdictional water. In determining whether a facility has a reasonable expectation of an oil discharge that

[80] Other criteria include whether the substance is an oil.

could reach a jurisdictional water, facility owners consider solely the geographical and locational aspects of the facility [40 CFR 112.1(d)(1)(i)]. As the EPA describes in its SPCC Guidance, "the owner or operator should consider the location of the facility in relation to a stream, ditch, gully, or storm sewer; the volume of material likely to be spilled; drainage patterns; and soil conditions. An owner or operator may not consider constructed features, such as dikes, equipment, or other manmade structures that prevent, contain, hinder, or restrain a discharge as described in section 112.1(b), when making this determination." (U.S. EPA (2013), page 2-34).[81]

Typically, natural conveyances or stream channels are principal spill pathways for impacts to aquatic resources in remote and undeveloped inland areas that lack engineered stormwater conveyance systems. Manufacturing facilities and other facilities located in developed areas may also affect streams through discharges to stormwater drains or other engineered conveyance systems. Given this, the agencies anticipate that owners or operators of facilities located in relatively less developed areas would be more likely to base their applicability determination on whether there is a reasonable potential for an oil discharge to reach waterbodies in the immediate proximity of the facility. Of the current universe of SPCC-regulated facilities, the agencies anticipate that the inland onshore oil production and farm sectors would be the most likely to be affected by changes to the scope of CWA jurisdiction given their locations.

Following the diagram in Figure III-3, jurisdictional changes for certain waters may result in a facility previously subject to the SPCC requirements in the baseline (because of reasonable potential for an oil discharge to reach waters that are currently jurisdictional) no longer being subject to 40 CFR part 112. Depending on the stringency of applicable state or local requirements and measures the facility may implement voluntarily (such as following industry standards or recommended practices), this change could lead some subset of these facilities to save compliance costs. A potential reduction in spill prevention measures could in turn increase the probability of the facility experiencing an incident that results in an oil discharge leaving the facility and causing environmental damage (also referred to as "oil spill risk" in further discussions).

At one end of the spectrum are facilities located in states with requirements equivalent to those of 40 CFR 112 for the type of facility and oil product. Some states limit the applicability of their spill prevention requirements based on aggregate storage volume, facility type (*e.g.*, farms, production, others), and type of oil (*e.g.*, petroleum oils, non-petroleum oils). Other states reference 40 CFR 112 explicitly. The agencies expect no change to compliance costs or spill risk for facilities required to comply with equivalent state or tribal regulations or that elect to voluntarily implement SPCC measures.

At the other end of the spectrum are facilities located in states without spill prevention requirements and that do not voluntarily follow industry standards or recommended practices. The compliance cost savings and spill risk would be larger for these facilities. The agencies anticipate that most facilities affected by the change in the scope of CWA jurisdiction would fall between these two ends of the continuum. For example, facilities may choose to implement *some* spill prevention measures that are considered good engineering practices for their industry, such as secondary containment, overfill prevention, practices to

[81] The agencies note that guidance cannot impose legally enforceable requirements.

ensure the safe transfer of oil to bulk storage containers, and visual inspections of bulk storage containers, even if they are not subject to 40 CFR 112.

Applying the federalism scenarios to the SPCC program is complicated by the fact that the factors considered in the state rankings do not necessarily reflect all baseline state or local regulatory programs pertinent to oil spill prevention, and the scope of these programs would also depend on the industry. In addition, while other federal regulations (*e.g.*, Department of Interior requirements for leases on federal land) and state regulations may fill some gaps, a 2007 EPA study of spill prevention regulations for oil production facilities concluded that, of 17 oil producing states the EPA reviewed, none of the states had requirements that were as stringent as the SPCC rule (U.S. EPA, 2007b). The EPA's regulatory impact analysis for the 2008 amendments to the SPCC regulation researched state regulations affecting the spectrum of facilities subject to the federal SPCC rule and identified some states with complete, substantial, or partial overlap with federal requirements. The degree of state overlap was somewhat higher for larger facilities (33 percent) as compared to smaller facilities (10 percent); overall across the regulated facility universe, the EPA determined that approximately 13 percent of the SPCC burden overlapped with some state requirements (U.S. EPA, 2008a; Exhibit 5-22). Accordingly, potential impacts of the revised definition of "waters of the United States" are expected to be less in states that have some overlapping requirements (*e.g.*, Alaska, California, Colorado, Delaware, Georgia, Hawaii) and which are likely to continue regulating ephemeral streams and other waters that will not be jurisdictional under the CWA.[82]

[82] Ephemeral streams are not categorically jurisdictional under the 2019 Rule. According to the *Rapanos* Guidance, the agencies conduct a significant nexus analysis for certain types of waters referred to as "non-relatively permanent waters," which includes ephemeral features and some intermittent streams. *See Rapanos* Guidance at 7 ("'[R]elatively permanent' waters do not include ephemeral tributaries which flow only in response to precipitation and intermittent streams which do not typically flow year-round or have continuous flow at least seasonally. However, CWA jurisdiction over these waters will be evaluated under the significant nexus standard[.]").

Figure III-3: Potential effects of the final rule on CWA section 311 SPCC program.

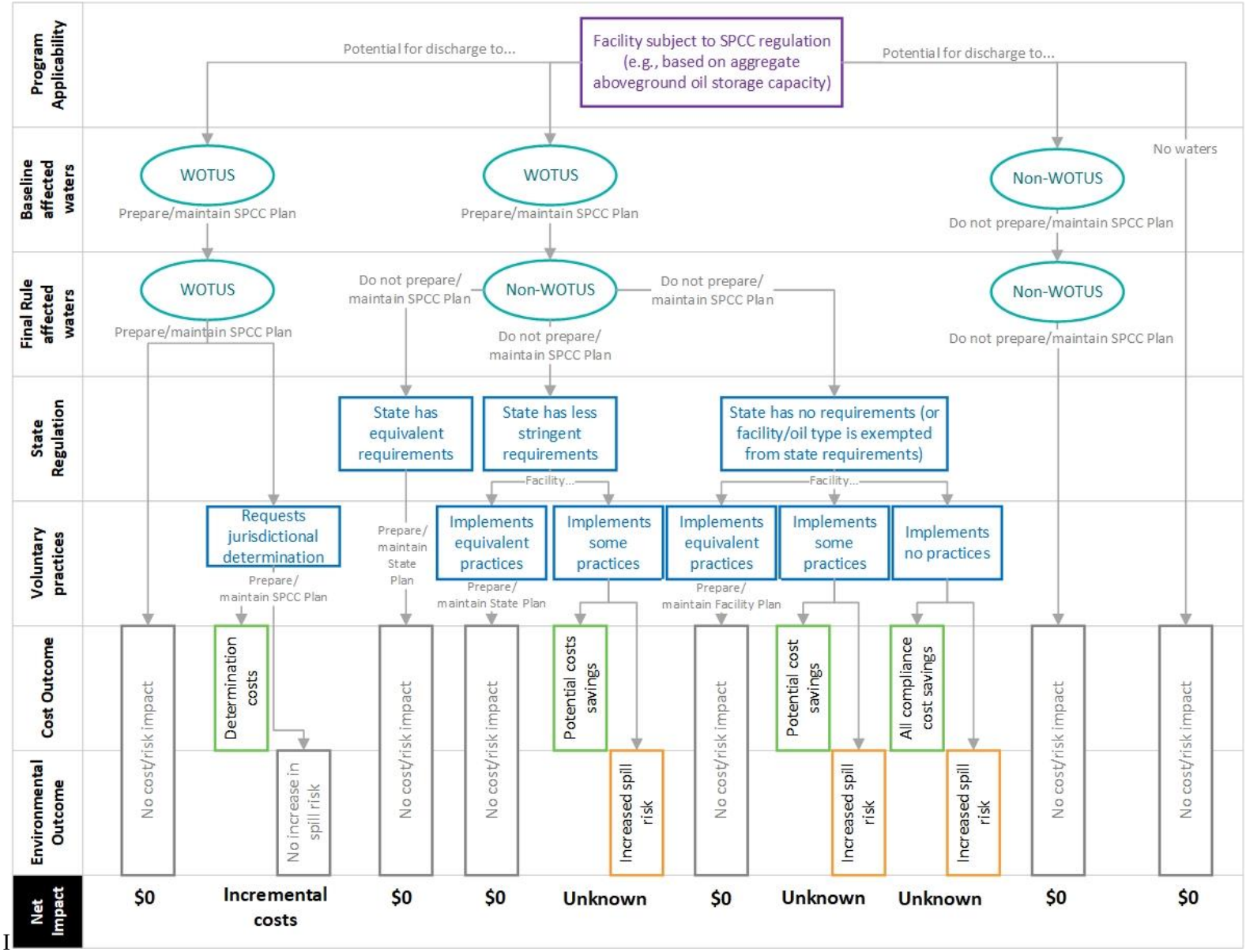


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Table III-7 provides estimates of SPCC compliance costs for various types of facilities. These costs represent average unit costs per facility for spill prevention measures required under the existing program. The magnitude of any compliance cost savings due to the final rule will depend in part on whether a facility already exists and complies with SPCC measures or is a new facility. As noted above, it will also depend on any existing state requirements. A facility that implements an SPCC Plan in the baseline is unlikely to remove existing structural controls, such as secondary containment or double-walled tanks, but may avoid some ongoing compliance expenses, such as Plan review and PE-certification, container inspections and integrity testing, and employee training. By contrast, the owner of a new facility not subject to SPCC under the revised definition could theoretically forgo structural spill prevention and control measures if not otherwise required under state, tribal, or local regulations. In practice, however, actual cost savings for new facilities may be similar to those of existing facilities, since the measures required by the SPCC rule are by now widely accepted and represent good engineering practice. For example, the agencies expect that sized secondary containment for aboveground storage tanks – a major share of capital costs attributed to the SPCC regulation – would still be part of the design of new oil-handling facilities even without an SPCC Plan requirement, since secondary containment is typically required by the Uniform Fire Code, which has generally been adopted by states. As such, cost savings for new facilities may consist mainly of the costs related to the preparation of the actual Plan (*e.g.*, documentation of the measures, Professional Engineer-certification).

Table III-7: Estimated annualized per-facility SPCC compliance costs, by facility type and size (2018$)

Item	Storage Facilities[1, 2]				Production Facilities[1, 2]			
	I	II	III	IV	I	II	III	IV
New Facility								
Plan preparation	$6,388	$16,793	$24,211	$35,338	$5,563	$9,994	$19,472	$29,157
Sized secondary containment	$35,358	$58,485	$177,304	$371,258	$25,799	$38,647	$141,123	$475,277
Inspections and tests	$3,812	$9,169	$24,933	$45,229	$2,473	$4,945	$9,788	$14,733
Other control measures	$47,289	$54,707	$158,352	$231,192	$5,770	$7,315	$7,624	$14,630
Training	$2,473	$4,636	$4,636	$4,636	$2,473	$4,636	$4,636	$4,636
Total	**$95,506**	**$143,826**	**$389,854**	**$688,529**	**$42,138**	**$65,525**	**$183,079**	**$539,552**
Existing Facility								
Plan maintenance	$515	$1,442	$1,958	$2,473	$515	$824	$1,133	$515
Inspections and tests	$4,533	$9,788	$25,654	$45,950	$2,473	$4,945	$9,788	$14,733
Other control measures	$206	$206	$824	$1,133	$927	$2,267	$2,267	$8,448
Training	$2,473	$4,636	$4,636	$4,636	$2,473	$4,636	$4,636	$4,636
Total	**$7,727**	**$16,072**	**$33,175**	**$54,192**	**$6,388**	**$12,672**	**$17,927**	**$28,332**

[1] Categories I-IV correspond to oil storage capacity ranges as follows: (I) less than 10,000 gallons; (II) 10,001 to 42,000 gallons; (III) 42,001 to 1 million gallons; and (IV) greater than 1 million gallons.

[2] *Source*: 2002 rule baseline costs minus cost savings from the 2008 rule amendments [U.S. EPA (2008a)]. Costs escalated from 2007 dollars to 2017 dollars using the employment cost index or construction cost index, depending on the type of compliance cost (*i.e.*, mostly labor or mostly constructed structures or materials).

In the analysis supporting its Information Collection Request (ICR) for the SPCC rule (U.S. EPA, 2016b), the EPA estimated the annual probability of a reportable discharge meeting the criteria at 40 CFR 112.4(a)[83] at an SPCC facility at approximately one incident per year per 670 facilities (0.15 percent annual spill probability).[84] That analysis was published in two separate Federal Register notices, as required by the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et *seq.*), and thus available for public comment. Forgoing SPCC prevention measures may increase the probability of a spill occurring, particularly as equipment ages and becomes more prone to failure. The increase in probability is likely greatest for facilities that are exempt from state requirements. The agencies do not have sufficient data to quantify the change, if any, in spill risk due to the change in CWA jurisdiction at this time.

Although data of past spills at FRP facilities are available from the Plans submitted to the EPA, this is only a subset of the relevant facilities covered under CWA section 311 (3,800 out of approximately 540,000 facilities or less than one percent of the overall affected universe).[85] The EPA conducted a detailed review of the NRC dataset for Fiscal Years 2009 through 2011, including an evaluation of the causes of the incidents, the amount of oil prevented from reaching jurisdictional waters, and the amount of oil that reached jurisdictional waters. For this time frame, FRP facilities experienced 52 oil discharge incidents whereby in 16 of the incidents, oil that was discharged reached jurisdictional waters. Of the amount of oil that was discharged in the 52 incidents, about 90 percent of the oil was prevented from reaching jurisdictional waters (*i.e.*, was retained in secondary containment).

To augment the prior analysis done by the EPA, the agencies also reviewed Pollution Reports for 1,064 emergency removal actions that EPA FOSCs responded to and documented during the period of 2001 through 2017.[86] The agencies reviewed descriptions of 60 incidents[87] involving non-transportation related facilities during the period of 2014 through 2016. The average volume of oil discharged in these incidents was approximately 6,500 gallons. It is unknown how the number of incidents or volume of oil discharged would change with a change in spill prevention requirements at certain facilities. Even facilities that implement some SPCC measures are not anticipated to exhibit a zero probability of an oil discharge.

Projecting baseline and final rule scenario spill risks for the broader SPCC universe would require making unsupported assumptions regarding the characteristics and distribution of activities (*e.g.*, the number and location of facilities entering and existing the market, and the volumes of oil handled at those facilities), as well as data to accurately project future industry practices and state and tribal responses to the final rule.

[83] A discharge of oil occurring within any 12-month period that triggers the 40 CFR 112.4 reporting requirements is: (1) A single discharge as described in section 112.1(b) of more than 1,000 U.S. gallons; or (2) Two or more discharges as described in section 112.1(b), each of which is over 42 U.S. gallons.

[84] For the 2002 rule ICR, EPA estimated that approximately 0.15 percent of all facilities would incur costs each year due to reporting requirements related to an oil discharge under 40 CFR 112.4(a).

[85] A review of the NRC database for Fiscal Years 2002 through 2011 done by EPA in support of the Program Assessment Rating Tool (PART) attempted to identify oil discharge incidents at FRP facilities, but the results for Fiscal Years 2005 and 2006 were substantially affected by hurricanes, making inferences from this dataset difficult.

[86] The Pollution Reports are available at https://response.epa.gov/.

[87] EPA selected incidents overseen by EPA FOSCs between 2014 and 2016 and excluded removals that addressed historical releases or abandoned facilities, or originated from a pipeline, truck, or other transportation-related source.

III.A.3.2.1.2 FRP Program

A subset of SPCC facilities are also subject to FRP preparedness and response requirements. Figure III-4 illustrates the potential impacts of the final rule on the FRP program. Similar to the anticipated effects on the SPCC program described above, the final rule could potentially affect FRP facilities primarily through changes in the applicability of requirements to the facilities, but with potential impacts occurring at two stages: 1) changes to the overall applicability of 40 CFR 112, and 2) changes to the FRP-specific self-identification applicability criteria at 40 CFR 112.20(f)(1).

Changes in CWA jurisdiction that would eliminate the need for an SPCC because the facility no longer has a reasonable potential of a discharge as described in 40 CFR 112.1(b) similarly would eliminate the FRP requirements. The second way a change in CWA jurisdiction could affect the FRP program is through FRP applicability factors. As defined in 40 CFR 112.20(f)(1), a non-transportation related onshore facility is required to prepare and implement an FRP if:

1. The facility transfers oil over water to or from vessels and has a total oil storage capacity greater than or equal to 42,000 U.S. gallons, or

2. The facility has a total oil storage capacity of one million U.S. gallons or more, and at least one of the following is true:

    a) The facility does not have secondary containment for each aboveground storage area sufficiently large enough to contain the capacity of the largest aboveground tank within each storage area plus sufficient freeboard for precipitation.
    b) The facility is located at a distance such that a discharge could cause injury to fish and wildlife and sensitive environments.
    c) The facility is located such that a discharge would shut down a public drinking water intake.
    d) The facility has had a reportable discharge greater than or equal to 10,000 U.S. gallons in the last five years.

The criteria related to reportable discharges (item 2d in the list above) and to distance to sensitive environments (2b) could be affected by a change in CWA jurisdiction.[88] For example, by changing the scope of waters that trigger the "reportable discharge" applicability criterion, some FRP planholders would no longer need to prepare or maintain an FRP on the basis of their spill history. To assess the potential significance of the effects, the agencies reviewed the data available for the current 3,802 FRP planholders and found only two that had FRP status solely because of reportable spill history (*i.e.*, no other applicability factor). Most of the 55 FRP planholders with histories of reportable discharges also triggered one or more of the other applicability criteria, such as transfers over water (39 facilities),

[88] The criterion related to transfers over water to or from vessels is not expected to be affected by changes in CWA jurisdiction because the involvement of vessels necessarily implies navigation and therefore federally regulated waters. The secondary containment criterion is unrelated to the scope of CWA jurisdiction. The criterion related to public drinking water intakes refers specifically to the potential for a discharge to shut down an intake. Public drinking water system intakes are generally expected to draw from perennial streams which will very likely remain within scope of CWA jurisdiction under the final rule.

inadequate secondary containment (8 facilities), or potential to affect drinking water intakes (28 facilities) or sensitive environments (47 facilities).

The potential effect of a change in CWA jurisdiction on sensitive environments is more difficult to assess *a priori*. The FRP regulation relies on a definition of "fish and wildlife and sensitive environments" at 40 CFR 112.2 during the applicability evaluation by a facility owner/operator and in the development of the FRP by the planholder (*e.g.*, development of the vulnerability analysis; *see* Appendix F, Section 1.4.2 of 40 CFR 112). As described in 40 CFR 112.2 and in Department of Commerce/NOAA Guidance (1994), "fish and wildlife and sensitive environments" may include wetlands, national and state parks, critical habitats for endangered/threatened species, wilderness and natural areas, marine sanctuaries and estuarine reserves, conservation areas, preserves, wildlife areas, wildlife refuges, wild and scenic rivers, recreational areas, national forests, public drinking water intakes, federal and state lands that are research natural areas, heritage program areas, land trust areas, and historical and archeological sites and parks. These areas may also include aquaculture sites, agricultural surface water intakes, and unique habitats, such as bird nesting areas, critical biological resource areas, designated migratory routes, and designated seasonal habitats. The Area Committee and the spill response Unified Command Structure may consult with the natural resource management agencies, to determine additional areas to be considered sensitive environments for the purposes of OPA. 40 CFR 112.20(g)(1) requires FRP to be consistent with the National Contingency Plan and with the applicable Area Contingency Plans. Thus, to the extent that Area Committees designated sensitive areas based on federally-regulated waters, it is possible that the changes to CWA jurisdiction could alter this factor and potentially FRP applicability. The agencies did not have sufficient information about the sensitive environments considered in determining FRP applicability to assess the significance of the change. A majority of FRP planholders (2,115 facilities) identify the potential to affect sensitive environments as a determinant of FRP applicability.

In cases where overall FRP applicability is unaffected and the facility still needs to prepare and submit an FRP, a change in CWA jurisdiction may affect the FRP harm designation assigned by the EPA Regional Administrators. The EPA Regional Administrators may categorize a facility that meets multiple criteria as higher risk, denoted as "significant and substantial harm." The EPA reviews all FRPs and must approve the FRP for facilities categorized as significant and substantial harm. The EPA's Emergency Management-Oil Database shows that, of the 55 FRP facilities with reportable discharge history, 52 FRP facilities are currently categorized as significant and substantial harm facilities. It is uncertain whether the EPA Regional Administrator would have categorized these facilities as lower risk (substantial harm) without the reportable spill history factor.

The change in CWA jurisdiction could lead some facilities to avoid FRP compliance costs. The magnitude of the savings depends on the stringency of any applicable state or local requirements and measures the facility may implement voluntarily in accordance with recommended industry practices. For example, FRP facility owners or operators may no longer need to maintain their FRP, maintain a contract with an oil spill removal organization (OSRO), or conduct periodic drills and exercises to maintain preparedness. Table III-8 summarizes FRP compliance costs for existing and new facilities. These costs are unit costs (per facility) for preparing, maintaining, or implementing an FRP where required under federal regulations.

Table III-8: Estimated per-facility FRP compliance costs (2018$)

Item	Basis	Costs
Plan preparation (new facility only)[1]	One-time	$20,600 to $41,100
Plan preparation (new facility only)[1]	Annualized[3]	$1,810 to $3,630
Plan maintenance[1]	Annual	$2,360 to $7,400
OSRO retainer[2]	Annual	$10,300
Drills and exercises[2]	Annual	$20,600

[1] *Source*: Supporting Statement for the Renewal of ICR 1630.13, OMB Control No. 2050-0135 (Docket ID EPA-HQ-OLEM-2018-0105)

2 Source: Email communication from Florida Power and Light on 5/21/18.

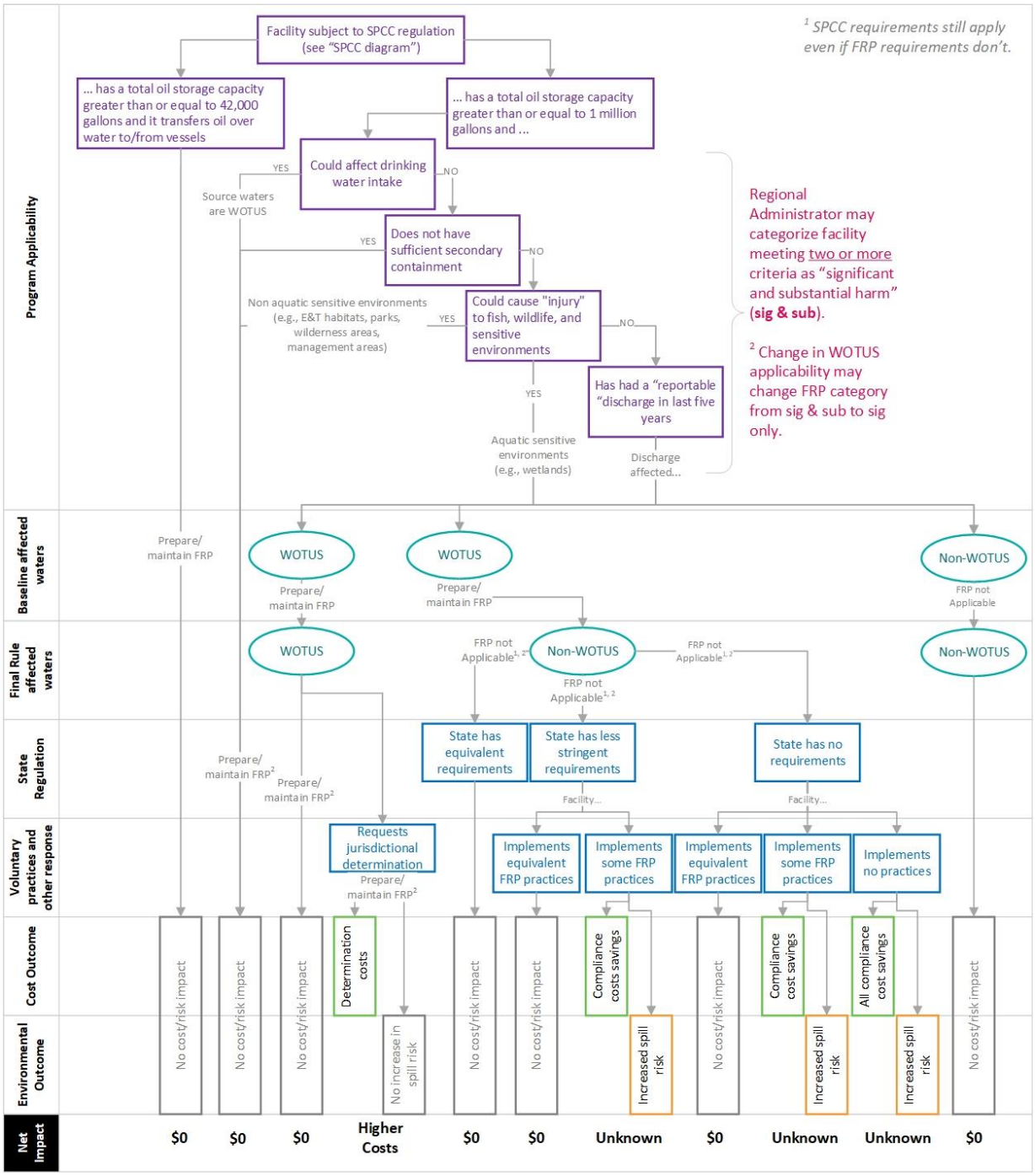
3 Annualized over 20 years using a 7 percent discount rate. For comparison purposes, annualized costs using a 3 percent discount rates range from $1,340 to $2,680.

EPA estimates the costs of developing an FRP at $20,557 to $41,114 per facility, depending on the size and complexity of operations. Costs for subsequent Plan maintenance are approximately $2,364 to $7,400 per year, costs for contracting with an OSRO are approximately $10,278 per year, and costs for drills and exercises are approximately $20,557 per year. As described in Figure III-4, the change in CWA jurisdiction could result in certain facilities avoiding FRP-related costs in cases where the facility no longer meets applicability criteria under 40 CFR 112.20 or where the facility changes risk category (*e.g.*, from significant and substantial harm to substantial harm). The cost savings will depend in part on the changes in facility status and on any state requirements.

While a facility that is no longer required to prepare or maintain an FRP would be saving some or all of the costs in Table III-8, forgoing these activities may reduce preparedness and potentially increase the potential harm associated with oil releases. Conversely, some facilities could elect to voluntarily maintain (or prepare) an FRP despite a change in their status and obligations under 40 CFR 112. Facility owner or operator responses to changes in CWA jurisdiction is unknown.

Available data are not sufficiently detailed to develop precise estimates of the cost savings and to quantify the associated changes in risk. The net outcome of the final rule is therefore uncertain. The case studies in Section III.B assess the potential impacts of changes in CWA jurisdiction on the FRP program by analyzing the proximity of FRP facilities to waters in three selected regions and considering scenarios about potential responses by FRP facility owners or operators to the changes.

Figure III-4: Potential effects of the final rule on CWA section 311 FRP program.



III.A.3.2.2 Potential Effects on Transportation-Related Spill Prevention and Preparedness

As described in Section III.A.3.1, the preparation of an FRP for a pipeline facility is based on the potential for a discharge to a jurisdictional water or adjoining shorelines. In a Report to Congress, PHMSA estimated that hazardous liquid pipelines cross inland waterbodies at 18,136 locations, and 5,110 of these crossings are estimated to be 100 feet or greater (PHMSA, 2013), but this count likely

understates the number of water crossings, since it was based on a relatively coarse hydrographic dataset that would not account for most perennial and intermittent streams. Because the existing regulation gives pipeline operators the flexibility to define planning areas, it is unknown how reducing the number of jurisdictional water crossings will affect the number of FRPs that pipeline operators may develop or their planned response resources.

Pipeline integrity management requirements such as pipeline burial depth and inspection of water crossings are specific to streams at least 100 feet wide and to commercially navigable waters[89]. Since these waters would remain jurisdictional under the final rule, the final rule will not affect these requirements.

III.A.3.2.3 Potential Effects on Spill Notification, Response, and Penalties

Figure III-5, at the end of this section, illustrates the potential impacts of a change in CWA jurisdiction on response programs. As noted above, impact or substantial threat to a jurisdictional water is one of the key criteria determining access to the OSLTF for removal costs and uncompensated damages, along with confirming that the substance involved in the discharge is an oil, as opposed to a hazardous substance (which would be addressed by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)).

The jurisdictional status of the water impacted or threatened by a discharge determines oversight authorities under the National Contingency Plan and what resources are available for removal or for compensating damages. For waters that remain within CWA jurisdiction under the final rule, the FOSC would continue to oversee the response and removal actions. For waters that would become non-jurisdictional, oversight would fall on the states and tribes, with removal requirements depending on the state or tribal requirements for the particular aquatic resource. More than 11,000 oil spills[90] were reported to the NRC during calendar year 2017 from sources other than offshore vessels or platforms. Of these incidents, more than 7,000 reportedly affected waters in general. The number of incidents that affected or threatened waters that currently are, or will no longer be, subject to federal regulation under the final rule is uncertain, since notifications to the NRC generally do not provide sufficient detail on the aquatic resources at risk to determine jurisdictional status.

The agencies expect the final rule will have a limited impact on the frequency of NRC notifications. While impact to waters is one of the criteria for notifying the NRC of an incident, the NRC also receives notifications for a wide range of incidents of public concern under CERCLA, Emergency Planning and Community Right-to-Know Act, and other environmental or safety regulations. Because there are potential penalties for failing to notify the NRC of a reportable incident but no adverse consequence from unnecessarily reporting an incident, NRC notification generally has become standard operating procedure for facility owners or operators.

[89] Commercially navigable waters as defined by 49 CFR 195.450.

[90] Count reflects NRC's Calendar Year 2017 incident data involving substances with names containing the terms "oil," "gasoline," or "diesel."

Changes in CWA jurisdiction could affect the response to reported incidents as responsibilities for overseeing the response to some incidents shift from the FOSC to state, local, or tribal governments. During the period of 2001-2017, EPA FOSCs oversaw emergency removal activities for 1,064 incidents involving the discharge of oil or substantial threat of a discharge to jurisdictional waters. The agencies reviewed Pollution Reports for each of these emergency oil removal actions.[91] These incidents either involved active oil discharges or substantial threat of a discharge to jurisdictional waters.

Under the current legal framework, the OSLTF is not available for removals or damages to non-jurisdictional waters. The final rule could affect the EPA's ability to access the OSLTF to oversee the RP's response to an oil spill or directly respond to an oil spill. It could also affect the availability of the Fund to states, tribes, and other parties. During the period of October 2012 through April 2018, NPFC paid a total of $52.8 million to cover expenses incurred by the EPA to respond to oil spills affecting inland waters and originating from facilities.[92] NPFC additionally paid claims for removal costs totaling $0.9 million to state and local governments and OSROs.

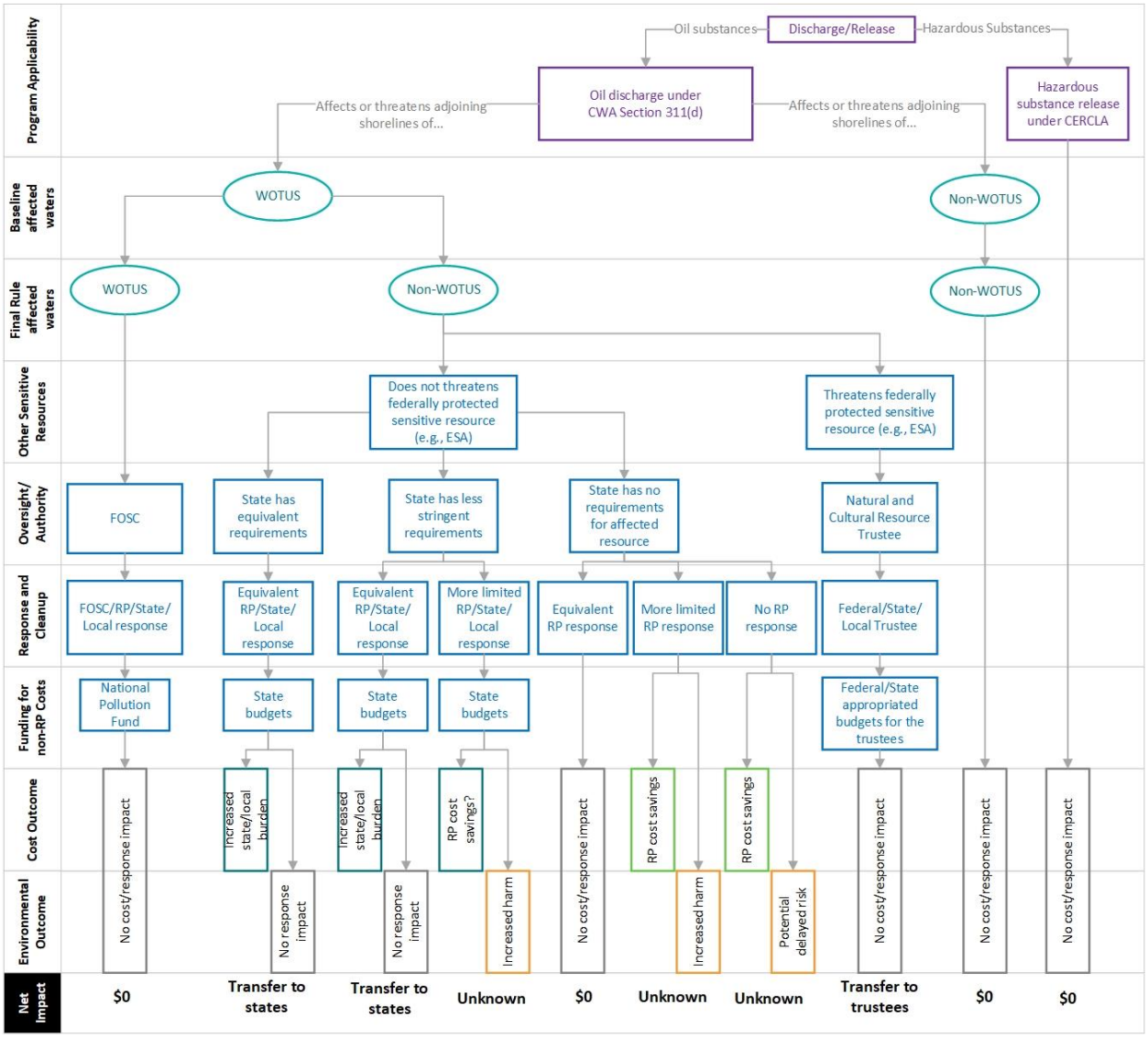
In some cases, non-jurisdictional waters may still be federally regulated in the event of an oil spill under other statutes, such as the Endangered Species Act (ESA), even if they are no longer subject to CWA jurisdiction. The natural and cultural resource trustee has oversight authority for the response. However, based on the authorities that established the OSLTF, the Fund would not be available to pay for response and removal of discharged oil if the waters are not jurisdictional. Funding would need to come from the relevant appropriated budgets for parties (states and/or tribes) involved in the response activities.

Figure III-5 highlights different possible outcomes of changes to the scope of CWA jurisdiction, including for oil spill incidents affecting potentially new non-jurisdictional waters. These outcomes depend on the state requirements and responsible party actions following the incident. They range from no change (in cases where the responsible party assumes full responsibility for response and cleanup), to the transfer of the response burden to the state or tribe (in cases where the OSLTF is no longer available), to reduced cleanup and environmental damages.

[91] The Pollution Reports are available at https://response.epa.gov/.

[92] Based on data from NPFC on EPA FOSC inland cases involving facilities (excludes vessels). Source: email communication from U.S. Coast Guard, National Pollution Funds Center, April 26, 2018.

Figure III-5: Potential effects of the final rule on CWA section 311 oil spill response and removals, funding sources, and other requirements.



The economic implications of these changes are uncertain since they depend on the location of the spill, the stringency of state and local requirements, and other factors. It is possible that a responsible party for a spill affecting non-jurisdictional resources would reduce response costs in cases where state requirements are less stringent than the baseline federal requirements. State regulations cover the discharge to state waters or land of any substance that may be detrimental to environmental quality and are generally similar to baseline oil discharge prohibition requirements under the CWA.

Whereas the federal regulations cover spills of non-petroleum oils such as animal fats and vegetable oils (AFVOs), some state requirements focus mainly on petroleum oils and requirements for non-petroleum oils may be less stringent or may not apply. For example, Georgia defines "oil" as "including but not limited to gasoline, crude oil, fuel oil, diesel oil, lubricating oil, sludge, oil refuse, oil mixed with wastes,

and another other *petroleum* related product." (Georgia Oil or Hazardous Material Spills or Releases Act (Official Code of Georgia Annotated, section12-14-1 [emphasis added]).[93] The definition does not explicitly include non-petroleum oils such as AFVOs. There may also be higher spill reporting requirement thresholds than provided by the CWA. For example, in New York, reporting is not needed when the spill involves less than a threshold amount of oil, is under control, has not reached the state's water or land,[94] and is cleaned up within two hours of discovery (New York Department of Environmental Conservation, 2018).

Accordingly, some discharges reportable under the baseline may no longer be reportable under state regulations, depending on the basis for the definition of "waters of the state." The lack of reporting requirements for certain incidents that fall outside both CWA and state requirements may increase environmental risks.

Another key difference, even where the state requirements are otherwise equivalent to those of the CWA, is the availability of resources to help defray removal costs or compensate affected parties for damages not reimbursed by the RP.

III.A.3.3 Uncertainty and Limitations for Assessing Potential Effects on CWA Section 311 Program

There is significant uncertainty in the universe of facilities that could be affected by the final rule. The SPCC rule does not require facility owners/operators to identify themselves to the EPA, unless these facilities are subject to the FRP rule, requiring submittal of an oil spill response plan to the EPA. Whereas owners or operators must comply with 40 CFR 112 and prepare and maintain an SPCC Plan, they do not submit this Plan, a NOI, or any similar notification to the EPA. No national, state, or industry inventory of SPCC facilities exists, although the EPA has developed estimates of the universe of facilities to support rulemaking and ICRs.

For some sectors, notably onshore oil production, detailed public data provide both the number and location of individual equipment or facility components (*e.g.*, oil wells). This information can be used to characterize the potential distribution of oil production equipment, but this does not necessarily lead to accurate identification of SPCC-regulated facility, since production tank batteries are not necessarily co-located with oil wells and are typically connected to multiple wells. For other sectors, including farms, manufacturing, and other facilities, publicly available data provide counts of facilities per county or state, but does not indicate the aggregate storage capacity to assess SPCC applicability. None of the datasets (except for inspected SPCC facilities and FRP-subject facilities) provide direct information to infer reasonable potential for a discharge.

[93] See https://law.justia.com/codes/georgia/2010/title-12/chapter-14/12-14-1/.

[94] New York does not consider paved surfaces (asphalt or concrete) as "land."

III.A.4 Other CWA Parts

III.A.4.1 CWA Section 303: Water Quality Standards and Total Maximum Daily Loads

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

States and tribes 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 for waters jurisdictional under the CWA are required to be consistent with the CWA, for example in terms of designating uses, criteria to protect those uses, and anti-degradation policies. If a feature is not jurisdictional under the CWA, states and authorized tribes are not required to develop water quality standards for it. There is also no federal requirement under CWA section 303(d) for states to assess "non-jurisdictional" waterbodies. Therefore, a change in the scope of CWA jurisdiction has the potential to increase the number of waters that are not assessed or otherwise identified as impaired pursuant to CWA section 303(d). As a result, states would not be required to develop TMDL restoration plans for waters that are impaired but have not been so identified.

The final rule may affect the number of waterbodies added to the impaired waters list (and subsequent TMDL development). States typically have a set budget for water quality monitoring and assessment and monitor only a subset of waters in any year. Since water quality sampling needs are often higher than budgets allow, this final rule, may reduce the number of waters that states choose to monitor. Under the final rule, states will have opportunities to reallocate monitoring resources currently dedicated to newly non-jurisdictional waters to collect data in waters that meet the new definition of "tributary," the definition of "lakes and ponds, and impoundments of jurisdictional waters," and revised definition of "adjacent wetlands." Under this scenario, states and tribes may be better able to allocate their resources toward waters of relatively higher environmental and social value. This is particularly true in the arid West where states have been required to assess water quality in dry washes and establish water quality standards protective of aquatic life in features without water absent rainfall.

The development and revision of water quality standards is typically an ongoing process often independent from changes to the definition of "waters of the United States"—although some states have developed standards for certain categories of waters (*e.g.*, ephemeral features) that are non-jurisdictional under the final rule. Absent CWA jurisdiction, states and tribes can still choose to regulate waters irrespective of federal mandates and can apply water quality standards to non-federal waters. The agencies do not project additional costs relating to development or revision of water quality standards as a consequence of this final rule.

Changes in CWA jurisdiction may in some circumstances lead to requests for changes in TMDL waste load allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and related margins of safety. TMDL revisions could shift additional pollutant reduction responsibility to those sources discharging to jurisdictional waters downstream. Given that there are currently more than 73,000

completed TMDLs nationwide, requests to revise even a small percentage of them may require significant resources to complete (U.S. EPA and U.S. Department of the Army 2018a).

III.A.4.2 CWA Section 401: State and Tribal Roles

Under section 401 of the CWA, states, authorized tribes, and interstate agencies have the authority to review and approve, condition, or deny any federal permits or licenses that may result in a discharge to "waters of the United States" within their borders, including wetlands. States, authorized tribes, and interstate agencies make their decisions to deny, certify, or condition permits or licenses primarily by ensuring the activity will comply with applicable water quality standards, effluent limitation guidelines, new source performance standards, toxic pollutants restrictions, and other appropriate water quality requirements of state or tribal law. CWA section 401 certification is commonly applied to CWA section 404 permits and Rivers and Harbors Act (RHA) section 10 permits issued by the U.S. Army Corps of Engineers, CWA section 402 permits in the states where the EPA issues NPDES permits, and Federal Energy Regulatory Commission licenses for non-federal hydroelectric dams. States, authorized tribes, and interstate agencies may choose to waive their CWA section 401 certification authority, either explicitly or through the passage of time (up to one year as mandated by section 401(a)(1)).

Under the final rule, the agencies estimate that the number of CWA section 404 permits will likely decrease since non-adjacent wetlands, ephemeral features, certain ditches, and certain lakes and ponds will not be jurisdictional under the CWA, whereas under the 2019 Rule as implemented some of these waters would be found to be jurisdictional based on a significant nexus analysis. A decline in 404 permits could result in costs savings to states and authorized tribes by reducing the number of 401 reviews and required staff time. The vast majority of states have been authorized to administer section 402 of the CWA, and any cost savings that would result from the final rule due to CWA section 402 permitting are discussed in Section III.A.1. States that have not been authorized to administer the CWA section 402 program and tribes authorized to administer CWA section 401 would continue to have the opportunity to complete CWA section 401 certification on EPA-issued 402 permits. Fewer EPA-issued 402 permits would reduce the number of 401 reviews and associated staff time.

Fewer 404 permits as a result of the final rule will affect a state or tribe's ability to review proposed impacts to non-adjacent wetland, ephemeral features, and certain lakes and ponds via CWA section 401. For waters whose jurisdictional status does not change under the final rule, states and authorized tribes can place additional restrictions on federally-issued permits through their CWA section 401 authority, enhancing environmental benefits and increasing costs to permittees. For instance, states may impose additional permit conditions on permits issued within watersheds of concern.

III.A.4.3 National Pretreatment Program

The EPA and authorized NPDES state pretreatment programs approve local municipalities to perform permitting, administrative, and enforcement tasks for discharges into the municipalities' publicly-owned treatment works (POTWs). The program is designed to protect POTW infrastructure and reduce conventional and toxic pollutant levels discharged by industries and other nondomestic wastewater sources into municipal sewer systems and subsequently into receiving waters. The agencies expect minimal impacts on the national pretreatment program from CWA jurisdictional changes since the program is primarily administered by municipalities and the main focus of the program is minimizing

effects of industrial and other nondomestic wastewater discharges on POTW infrastructure and processes and subsequent POTW discharges to receiving waters.

III.B Case Studies

To evaluate the potential effects of the revised definition of "waters of the United States," the agencies conducted analyses in three selected geographical areas. The analyses illustrate the potential impacts of the final rule on major program areas – notably on the number of facilities subject to CWA section 311 oil spill prevention and preparedness regulations, section 402 permits, and section 404 permits requiring mitigation – and on the potential resulting environmental effects and impacts on regulated entities. The case studies allow for more detailed evaluation of individual facilities, permits, hydrographic features, and other factors that would not be possible in a national analysis. As explained in Section I.B, the purpose of the case studies is to evaluate a range of scenarios that illustrate the potential outcomes from the revised definition of "waters of the United States" rather than develop conclusive quantitative estimates of the economic and environmental outcomes of the final rule.

The agencies analyzed the same case study locations presented in the analysis of the proposed rule (U.S. EPA and Department of the Army, 2018b). The agencies selected the case study locations to reflect a range of ecosystems, hydrographic characteristics, and regulatory contexts, considering data availability and quality, including the availability of relevant wetland valuation studies. Additional considerations in case study selection included the fraction of waters that may be affected by the final rule and potential state response described in Section II.A which suggested some regions with comparatively smaller potential for impacts (*see* Section II.A.3 for a detailed discussion of the agencies evaluation of potential state responses to CWA jurisdictional changes). Based on the agencies' analysis of potential state responses, the agencies estimate that 40 states are likely to continue regulating at least some non-jurisdictional[95] non-wetland surface waters and 10 states plus the District of Columbia may reduce regulation of such waters following the final rule. Reduced regulation could result in a potential increase in pollutant discharge to these waters. Twenty-three states are likely to continue regulating at least some non-jurisdictional wetlands, nine may continue, and 18 are not likely to regulate waters that are non-jurisdictional under the final rule, resulting in a reduction of regulated wetlands compared to the baseline level.[96]

Based on the results of the potential state response analysis, the agencies prioritized for illustrative purposes geographic locations where non-permanent streams represent a relatively large fraction of waters located within the state, as mapped by the high-resolution NHD.[97] The combination of factors meant that there were no case study candidates in the Northeast and along the Pacific coast. Figure III-6

[95] Non-jurisdictional in this context refers to waters that do not meet the definition of "waters of the United States."

[96] The agencies note that some states (*e.g.*, New York) may have limitations on the size of isolated wetlands they can regulate.

[97] When screening locations for case studies, the agencies initially considered the extent to which both intermittent and ephemeral waters have been delineated in the high-resolution National Hydrography Dataset since many parts of the country do not differentiate among these categories of streams, and some areas do not differentiate between ephemeral, intermittent, and perennial (*i.e.*, streams are unclassified for hydrographic category). Subsequent analyses focused on potential impacts to ephemeral streams more specifically since the revised definition of "waters of the United States" affects these waters more definitively by categorically excluding them from federal jurisdiction.

and Figure III-7 show selected case study watersheds, define by 4-digit hydrologic unit code (HUC) or HUC4, against the backdrop of predicted state responses.

Figure III-6: HUC4 case study locations compared to states potential responses to CWA jurisdictional changes – CWA section 402 program.

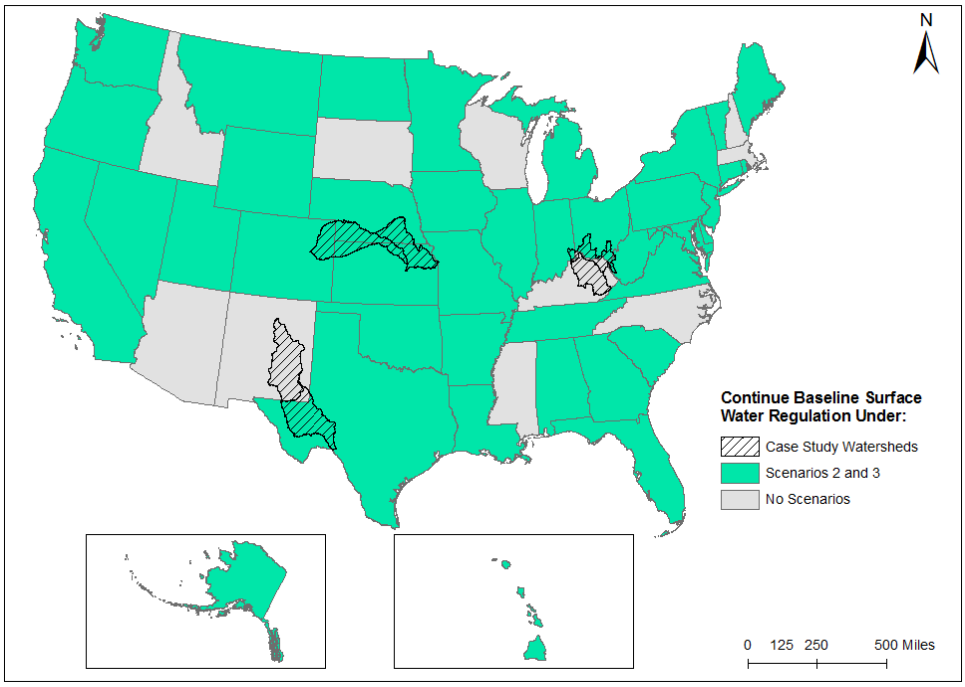
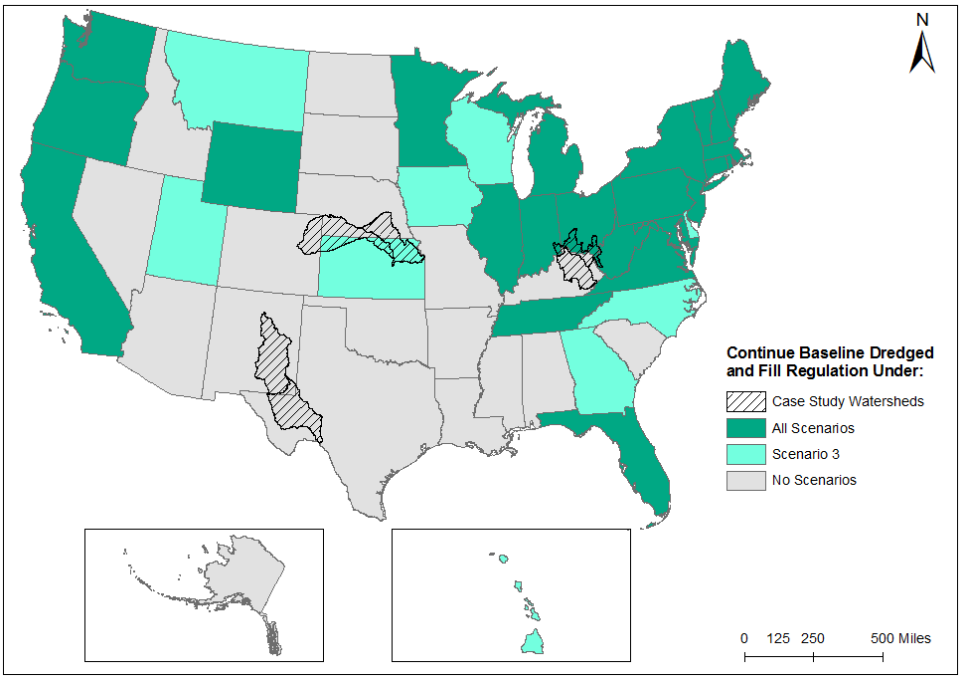


Figure III-7: HUC4 case study locations compared to states potential responses to CWA jurisdictional changes – CWA section 404 program.



The three case study areas, as shown in Figure III-6 and Figure III-7 are:

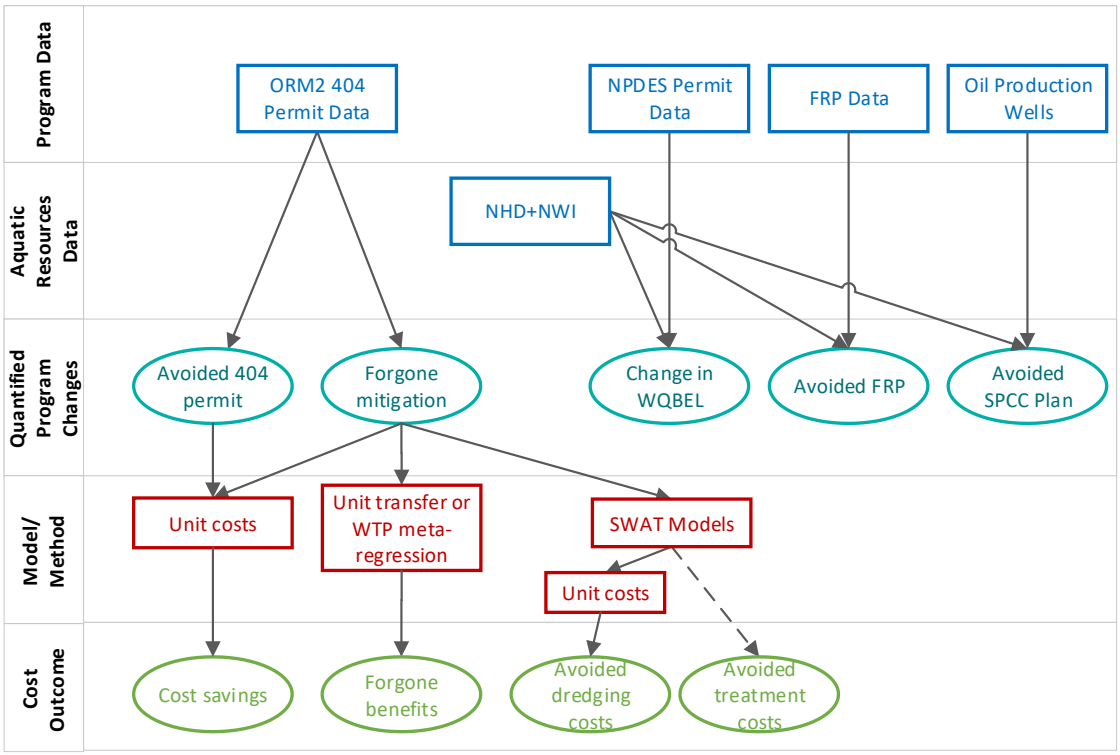
- In the Ohio River Basin:
  - HUC 0509 – Middle Ohio: The Ohio River Basin below the confluence with the Kanawha River Basin to the confluence with the Kentucky River Basin, excluding the Big Sandy, Great Miami, Guyandotte, Kentucky, Licking and Scioto River Basins. The watershed encompasses 8,850 mi^2 in Indiana, Kentucky, Ohio, and West Virginia.
  - HUC 0510 – Kentucky-Licking: The Licking and Kentucky River Basins. The watershed encompasses 10,500 mi^2 in Kentucky. The outlet of this watershed flows into watershed 0509.
- In the Lower Missouri River Basin:
  - HUC 1025 – Republican: The Republican River Basin. The watershed encompasses 24,700 mi^2 in Colorado, Kansas, Nebraska. The outlet of this watershed flows into watershed 1027.
  - HUC 1027 – Kansas: The Kansas River Basin, excluding the Republican and Smoky Hill River Basins. The watershed encompasses 15,000 mi^2 in Kansas, Nebraska, and Missouri.
- In the Rio Grande River Basin:
  - HUC 1306 – Upper Pecos: The Pecos River Basin to and excluding the Delaware River Basin. The watershed encompasses 23,500 mi^2 in New Mexico and Texas.
  - HUC 1307 – Lower Pecos: The Pecos River Basin from and including the Delaware River Basin to the confluence with the Rio Grande. The watershed encompasses 20,800 mi^2 in New Mexico and Texas.

III.B.1 Methods

III.B.1.1 Overview

The agencies estimated cost savings and forgone benefits based on the revised definition of "waters of the United States" in each case study area for each of the different federalism scenarios. Figure III-8 shows the major components of the case study analysis and the data and methods used.

Figure III-8: Case study analysis components and input data.



The agencies used program specific data (permits and other programmatic data) to describe the activity in each program. In the case of the CWA sections 402 and 311 programs, the agencies attempted to match program permit data to available water and wetland inventories. In most cases, data limitations resulted in qualitative descriptions of the potential effects on the programs. In the case of the CWA section 404 program, the agencies used the Corps' ORM2 section 404 permit data to estimate the number of permits that will no longer be required because they affect non-jurisdictional waters under the final rule as well as forgone mitigation of impacts that affect non-jurisdictional waters under the final rule. Cost savings related to the 404 program were defined as:

1) Reduced permit costs, including application costs, permitting time costs, and impact avoidance and minimization costs, for projects no longer affecting waters regulated under the CWA, and

2) Reduced compensatory mitigation costs when impacts occur on waters no longer regulated under the CWA.

Forgone benefits included the value of lost mitigation area, monetized using area resident willingness to pay (WTP) obtained from location appropriate studies estimating WTP or from the wetland WTP meta-regression discussed in Appendix D. The agencies also modeled selected environmental impacts resulting from the forgone mitigation using the Soil and Water Assessment Tool (SWAT) model (release 659) (Arnold et al., 2012; Neitsch et al., 2011). These modeled impacts include changes in water balance and nutrient and sediment loads and transport, which have the potential to increase drinking water treatment costs and the frequency of reservoir dredging. Estimated dredging costs resulting from regulatory changes were noted. Other modeled environmental impacts were not specifically monetized.

III.B.1.2 Relating Permits and Activities to Aquatic Resources Affected by the Final Rule

For each case study, the agencies first identified the facilities and activities covered under each of the three CWA programs under baseline conditions. The identified facilities and activities were then assessed to determine whether they would be affected by the changes to regulatory requirements under the final rule. As discussed in Section II.C, the high-resolution NHD and NWI data have significant gaps and limitations. These limitations impede the agencies' ability to categorically identify waters that will change jurisdictional status under the final rule in a large fraction of the United States. Therefore, where the available data were sufficiently detailed, the agencies identified affected facilities and activities using available data from the relevant program database(s) that describe the flow regime of the affected resources. These data most often reflect site-specific assessments that supported the issuance of the permit.

To assess potential impacts on activities permitted under the 404 program in each case study watershed, the agencies used information provided in the Corps ORM2 database. The ORM2 database records existing Corps-issued permits and associated aquatic resources determined to be jurisdictional at the time the permit was issued. The ORM2 database identifies certain tributaries as having an ephemeral flow regime (based on the code "R6-Riverine Ephemeral")[98] or wetlands that are adjacent to but that do not directly abut relatively permanent waters (based on the Water Type "RPWWN"). For purposes of this economic analysis, the agencies are assuming that all waters that had previously been found jurisdictional but that are classified as "R6" or were determined to be wetlands that are adjacent to but do not directly abut relatively permanent waters will no longer be jurisdictional under the final rule. The agencies acknowledge that such an assumption is imperfect, as, for example, there will be wetlands that do not directly abut a jurisdictional tributary that would meet the final rule's definition of adjacent wetlands because they are inundated by flooding from the tributary in a typical year, are separated from the tributary only by a natural barrier, or are separated from the tributary only by an artificial barrier that allows for a direct hydrologic surface connection between the wetland and the tributary in a typical year. While the information contained in the ORM2 database allows the agencies to identify a subset of waters that may no longer be jurisdictional under the final rule, and thereby the corresponding projects that would likely have a reduced 404 permit burden, this approach does not capture all 404 impacted waters that will change jurisdiction. Using these two categories to identify waters that have the potential to experience a jurisdictional change should not be construed as determining that all these waters will change jurisdiction under the final rule.

Data from the CWA sections 402 and 311 programs can be used to identify the waters that were likely considered jurisdictional during permit and plan development; however, this information is not sufficiently detailed to identify waters that will change jurisdiction under the final rule. The agencies supplemented the program databases with data from the NWI to identify facilities affecting waters that may change jurisdiction under the rule. For example, for CWA sections 311 and 402 programs, the agencies considered the proximity of each facility to receiving and downstream waters potentially changing jurisdiction under the revised definition based on NWI descriptors that may identify ephemeral

[98] *See* https://www.spa.usace.army.mil/Portals/16/docs/civilworks/regulatory/Bulk%20Upload/Bulk%20Data%20Cowardin.pdf.

waters.[99] Again, this is an imperfect analysis given the known data limitations, but the agencies performed the analysis for illustrative purposes.

The U.S. Fish and Wildlife Service (U.S. FWS) established the NWI program to conduct a nationwide inventory of wetlands to provide biologists and others with information on the distribution and type of wetlands to aid in conservation efforts.[100] Today, NWI is used for general mapping of wetlands and deepwater habitats and for data analyses and modeling. The NWI geospatial dataset is a mapping dataset that provides detailed information on the extent, characteristics, and distribution of wetlands and deepwater habitats across the United States. These data are primarily derived from manual aerial image interpretation. The NWI dataset is available as digital data at the 1:24,000-scale or higher throughout the country, except for large portions of Alaska (data in Alaska are at the 1:63,360-scale or higher). Digital data are currently not available for approximately 60 percent of Alaska. Additional information on the NWI is available in the RPA.

While the NWI is the most comprehensive national dataset of the potential extent of wetlands across the country, it has limitations. The NWI does not map all wetlands and sometimes maps wetlands that do not exist on the ground. At its best, NWI only approximates the location and boundaries of a Cowardin wetland type according to the Cowardin Classification System.[101] This classification framework was created to inventory wetlands and deepwater habitats of the United States. The five "Systems" that form the highest level of the classification hierarchy are Marine, Estuarine, Riverine, Lacustrine, and Palustrine. The primary objective of this classification is to impose boundaries on natural ecosystems for the purposes of inventory, evaluation, and management. Neither the Cowardin Classification System nor the NWI which relies on it for wetland and deepwater habitat mapping purposes were intended or designed for regulatory purposes. The Cowardin definition of "wetlands" differs from the agencies' regulatory definition of "wetlands."[102] No available datasets depict the jurisdictional extent of waters of the United States under the 2019 Rule as implemented, and all data carry unavoidable uncertainties and associated limitations. *See* RPA.

Aquatic habitat located on stream- and riverbeds is generally mapped as "Riverine" in the NWI according to the Cowardin Classification System (Cowardin *et al.*, 1979; Federal Geographic Data Committee, 2013). The Cowardin "Riverine System" includes all wetlands and deepwater habitats contained within a

[99] Discharges to non-jurisdictional waters may still be regulated if their downstream flow reaches a jurisdictional water.

[100] U.S. Fish and Wildlife Service. "NWI Program Overview." (U.S. FWS, 2018b) Available at https://www.fws.gov/wetlands/nwi/overview.html.

[101] Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service. FWS/OBS-79/31. Washington, DC. Available at: https://www.fws.gov/wetlands/Documents/Classification-of-Wetlands-and-Deepwater-Habitats-of-the-United-States.pdf.

[102] Cowardin *et al.* (1979) define "wetlands" as "lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year." The agencies' regulations define "wetlands" as requiring all three attributes, including "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." 33 CFR 328.3(b) and 40 CFR 232.2.

channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and (2) habitats with water containing ocean-derived salts in excess of 0.5 parts per trillion (ppt). A channel is "an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water" (Langbein and Iseri, 1960). Water is usually, but not always, flowing in the Riverine System (Cowardin *et al.*, 1979; Federal Geographic Data Committee, 2013).

The Riverine System is divided into four Subsystems: Tidal, Lower Perennial, Upper Perennial, and Intermittent. Each is defined in terms of water permanence, gradient, substrate, and the extent of floodplain development. All four Subsystems are not necessarily present in all stream or rivers. The Cowardin Classification System identifies the Riverine Subsystems as follows:

- ***Tidal* (R1).** This Subsystem extends from the upstream limit of tidal fluctuations down to the upper boundary of the Estuarine System, where the concentration of ocean-derived salts reaches 0.5 ppt during the period of average annual low flow. The gradient is low and water velocity fluctuates under tidal influence. The stream bottom is mainly mud with occasional patches of sand. Oxygen deficits may sometimes occur and the fauna is similar to that in the Lower Perennial Subsystem. The floodplain is typically well developed.

- ***Lower Perennial* (R2).** This Subsystem is characterized by a low gradient. There is no tidal influence, and some water flows all year, except during years of extreme drought. The substrate consists mainly of sand and mud. Oxygen deficits may sometimes occur. The fauna is composed mostly of species that reach their maximum abundance in still water, and true planktonic organisms are common. The gradient is lower than that of the Upper Perennial Subsystem and the floodplain is well developed.

- ***Upper Perennial* (R3).** This Subsystem is characterized by a high gradient. There is no tidal influence, and some water flows all year, except during years of extreme drought. The substrate consists of rock, cobbles, or gravel with occasional patches of sand. The natural dissolved oxygen concentration is normally near saturation. The fauna is characteristic of running water, and there are few or no planktonic forms. The gradient is high compared with that of the Lower Perennial Subsystem, and there is very little floodplain development.

- ***Intermittent* (R4).** This Subsystem includes channels that contain flowing water only part of the year. When the water is not flowing, it may remain in isolated pools or surface water may be absent.

The habitat that occurs in non-perennial streams that are mapped in the NWI is typically classified within the Riverine Intermittent (R4) subsystem. The Cowardin Classification System that the NWI uses does not have an "Ephemeral" subsystem.

Under the Cowardin Classification System, Water Regime Modifiers are used for all nontidal parts of the Riverine System. Water Regime Modifiers are defined as:

- ***Permanently Flooded.*** Water covers the substrate throughout the year in all years.

- ***Intermittently Exposed.*** Water covers the substrate throughout the year except in years of extreme drought.
- ***Semipermanently Flooded.*** Surface water persists throughout the growing season in most years. When surface water is absent, the water table is usually at or very near the land surface.
- ***Seasonally Flooded.*** Surface water is present for extended periods (generally for more than a month) during the growing season, but is absent by the end of the season in most years. When surface water is absent, the depth to substrate saturation may vary considerably among sites and among years.
- ***Seasonally Flooded-Saturated.*** Surface water is present for extended periods (generally for more than a month) during the growing season, but is absent by the end of the season in most years. When surface water is absent, the substrate typically remains saturated at or near the surface.
- ***Seasonally Saturated***. The substrate is saturated at or near the surface for extended periods during the growing season, but unsaturated conditions prevail by the end of the season in most years. Surface water is typically absent, but may occur for a few days after heavy rain and upland runoff.
- ***Continuously Saturated***. The substrate is saturated at or near the surface throughout the year in all, or most, years. Widespread surface inundation is rare, but water may be present in shallow depressions that intersect the groundwater table, particularly on a floating peat mat.
- ***Temporarily Flooded.*** Surface water is present for brief periods (from a few days to a few weeks) during the growing season, but the water table usually lies well below the ground surface for most of the season.
- ***Intermittently Flooded.*** The substrate is usually exposed, but surface water is present for variable periods without detectable seasonal periodicity. Weeks, months, or even years may intervene between periods of inundation. The dominant plant communities under this Water Regime may change as soil moisture conditions change. Some areas exhibiting this Water Regime do not fall within the Cowardin Classification System definition of wetland because they do not have hydric soils or support hydrophytes. This Water Regime is generally limited to the arid West.
- ***Artificially Flooded.*** The amount and duration of flooding are controlled by means of pumps or siphons in combination with dikes, berms, or dams. The vegetation growing on these areas cannot be considered a reliable indicator of Water Regime. Examples of Artificially Flooded wetlands are some agricultural lands managed under a rice-soybean rotation, and wildlife management areas where forests, crops, or pioneer plants may be flooded or dewatered to attract wetland wildlife. Neither wetlands within or resulting from leakage from man-made impoundments, nor irrigated pasture lands supplied by diversion ditches or artesian wells, are included under this Modifier. The Artificially Flooded Water Regime Modifier should not be used for impoundments or excavated wetlands unless both water inputs and outputs are controlled to achieve a specific depth and duration of flooding.

For Riverine Intermittent features, the NWI restricts the Water Regime Modifiers to "Temporarily Flooded," "Seasonally Flooded," and "Intermittently Flooded" which are identified by codes R4SBA (Riverine, Intermittent, Streambed, Temporarily Flooded), R4SBC (Riverine, Intermittent, Streambed, Seasonally Flooded), and R4SBJ (Riverine, Intermittent, Streambed, Intermittently Flooded), respectively.[103]

Neither the Cowardin Classification System nor the NWI were created to identify the flow regime of rivers and streams (*i.e.*, perennial, intermittent, or ephemeral). Nevertheless, the agencies have attempted to distinguish intermittent and ephemeral streams within the Riverine Intermittent classification using the Water Regime Modifiers given that they provide a description in general terms of riverine hydrologic characteristics. "Temporarily Flooded" is defined as when surface water is present for brief periods (from a few days to a few weeks) during the growing season, but the water table usually lies well below the ground surface for most of the season (Cowardin *et al.*, 1979; Federal Geographic Data Committee, 2013). "Intermittently Flooded" in NWI indicates that surface water is present for variable periods without detectable seasonal periodicity, and that weeks, months, or even years may intervene between periods of inundation (*Id.*). The "Intermittently Flooded" Water Regime Modifier is "generally limited to the arid West." (*Id.*) "Seasonally Flooded" means that surface water is present for extended periods (generally for more than a month) during the growing season, but is absent by the end of the growing season in most years; when surface water is absent, the depth to substrate saturation may vary considerably among sites and among years (*Id.*).

The agencies recognize that none of the Riverine Intermittent Water Regime Modifiers expressly describes ephemeral features, but believe that the modifiers may serve as proximates for use in identifying non-perennial flow regimes. Specifically, the agencies believe "Temporarily Flooded" (R4SBA) and "Intermittently Flooded" (R4SBJ) categories may represent ephemeral streams, and the "Seasonally Flooded" (R4SBC) category may represent intermittent streams. Photographs in Cowardin *et al.* (1979) of "Intermittently Flooded" streams, for example, appear to be ephemeral, with the description of one of the streams reading, "Streambeds such as this are common throughout the arid West. They carry water for brief periods after snowmelt and following rainstorms which are irregular and unpredictable in occurrence" (*See id.* at Plates 38 and 39). Based upon this interpretation, the agencies have used streambed habitat mapped as R4SBA (Riverine, Intermittent, Streambed, Temporarily Flooded) and R4SBJ (Riverine, Intermittent, Streambed, Intermittently Flooded) in the NWI as proximates for ephemeral streams for the CWA sections 311 and 402 analyses in the following Case Studies. Note that not all features are assigned a Water Regime Modifier.

The Corps does not use official Cowardin System Classification codes to identify ephemeral features for the purposes of 404 permit ORM2 data entry. Rather, in June 2009, the Corps added a non-Cowardin classification code "R6," entitled "Riverine, Ephemeral," to identify ephemeral aquatic resources.[104] The Corps created the R6 code to provide clarity to field staff when identifying ephemeral waters for entry into the ORM2 database. Because the Corps' ORM2 database categorizes ephemeral features explicitly

[103] *See* https://www.fws.gov/wetlands/documents/NWI_Water_Regime_Restriction_Table.pdf.

[104] *See* https://www.spa.usace.army.mil/Portals/16/docs/civilworks/regulatory/Bulk%20Upload/Bulk%20Data%20Cowardin.pdf.

using the R6 designation, the agencies used ORM2-identified R6 features to identify ephemeral streams for the CWA section 404 analyses within the Case Studies.

As discussed in Section II.C, the high resolution NHD maps ephemeral streams for several basins in the southwest region of the country, so for the Rio Grande Basin case study in Section III.B.4, the agencies also used the high-resolution NHD data to identify ephemeral streams potentially affected by the regulated facilities.

Table III-9 summarizes the criteria the agencies used to identify existing permits and plans that affect waters anticipated to change jurisdictional status under the final rule. For purposes of this EA, the agencies assumed that the waters closest to the permitted outfall under CWA section 402 or within a half mile of the FRP facility regulated under CWA section 311 are jurisdictional under the baseline. Similarly, the agencies assumed that if a CWA section 404 permit was issued for a particular water, that water is jurisdictional under the baseline. The agencies recognize that this assumption could create false positives, such as in cases where an applicant has opted for a preliminary jurisdictional determination from the Corps and thus all waters associated with the permit are presumed to be jurisdictional, but have determined that, based on available data, their assumption was the least flawed means of identifying waters jurisdictional under the baseline that could affect CWA programs.

Table III-9: Criteria used to identify waters affected by CWA program activities that may change jurisdictional status under the final rule

Basis for Determination	Criterion	Baseline Status	Potential Status under Revised Definition
402 Impacts (based on feature analyzed as receiving the permitted discharge)			
Based on NWI (Cowardin Code) of water feature closest to outfall			
Riverine[1]	R4SBA	Jurisdictional	Non-Jurisdictional
	R4SBJ	Jurisdictional	Non-Jurisdictional
	All Others	Jurisdictional	Jurisdictional (No change)
Non-tidal wetland	All	Varies (unable to determine categorically)[2]	Varies (unable to determine categorically)
Tidal wetland	All	Jurisdictional	Jurisdictional (No change)
404 impacts (based on affected aquatic resource requiring mitigation)			
Based on ORM2 Name Field[3]			
Stream	R6-Riverine, ephemeral[4]	Jurisdictional	Non-Jurisdictional[5]
	Others – perennial flow regimes	Jurisdictional	Jurisdictional (No change)
	Others – intermittent flow regimes	Jurisdictional	Varies (unable to determine categorically)[6]
	Others – Flow regime not specified	Jurisdictional	Varies (unable to determine categorically)[6]
Non-tidal wetland	All	Jurisdictional	Varies (unable to determine categorically)[6]
Tidal wetland	All	Jurisdictional	Jurisdictional (No change)

Table III-9: Criteria used to identify waters affected by CWA program activities that may change jurisdictional status under the final rule

Basis for Determination	Criterion	Baseline Status	Potential Status under Revised Definition
Based on ORM2 Water Type Field			
Wetland	RPWWN	Jurisdictional	Non-jurisdictional[7]
311 Impacts (based on features located within half mile of the facility)			
Based on NWI (Cowardin Code) of water features within a half-mile of the facility			
Riverine	R4SBA	Jurisdictional	Non-Jurisdictional
	R4SBJ	Jurisdictional	Non-Jurisdictional
	All Others	Jurisdictional	Jurisdictional (No change)
Non-tidal wetland	All	Varies (unable to determine categorically)	Varies (unable to determine categorically)
Tidal wetland	All	Jurisdictional	Jurisdictional (No change)
Based on high-resolution NHD where flow attributes are available			
Stream/river	Ephemeral	Jurisdictional	Non-Jurisdictional
	All Others	Jurisdictional	Jurisdictional

[1] The agencies have interpreted streambeds identified in the NWI with Cowardin codes R4SBA (Riverine, Intermittent, Streambed, Temporarily Flooded) or R4SBJ (Riverine, Intermittent, Streambed, Intermittently Flooded) as ephemeral, and streambeds with Cowardin code R4SBC (Riverine, Intermittent, Streambed, Seasonally Flooded) as intermittent.

[2] The CWA section 402 permit information only provides outfall coordinates but does not identify the type of water receiving the discharge or if it is a water of the United States. An outfall only needs to discharge to a feature that conveys to a water of the United States.

[3] All affected waters are presumed "Jurisdictional" in the baseline since the database includes only issued 404 permits, but these permits may be issued pursuant to PJDs, not AJDs.

[4] In June 2009, the Corps added a classification code to ORM2 – R6 (Riverine, Ephemeral) for ephemeral aquatic resources. This code is used to document the presence of ephemeral streams. This is not a class in the Cowardin Classification System but was added for Corps data entry purposes.

[5] This category includes some wetlands that directly abut non-RPWs, including ephemeral streams. For purposes of this analysis only, the agencies assumed that all waters classified as R6 were non-wetland waters that would be excluded under the final rule.

[6] The agencies may be understating or overstating the potential impacts of the final rule for these waters since available data are not sufficiently detailed to determine status categorically.

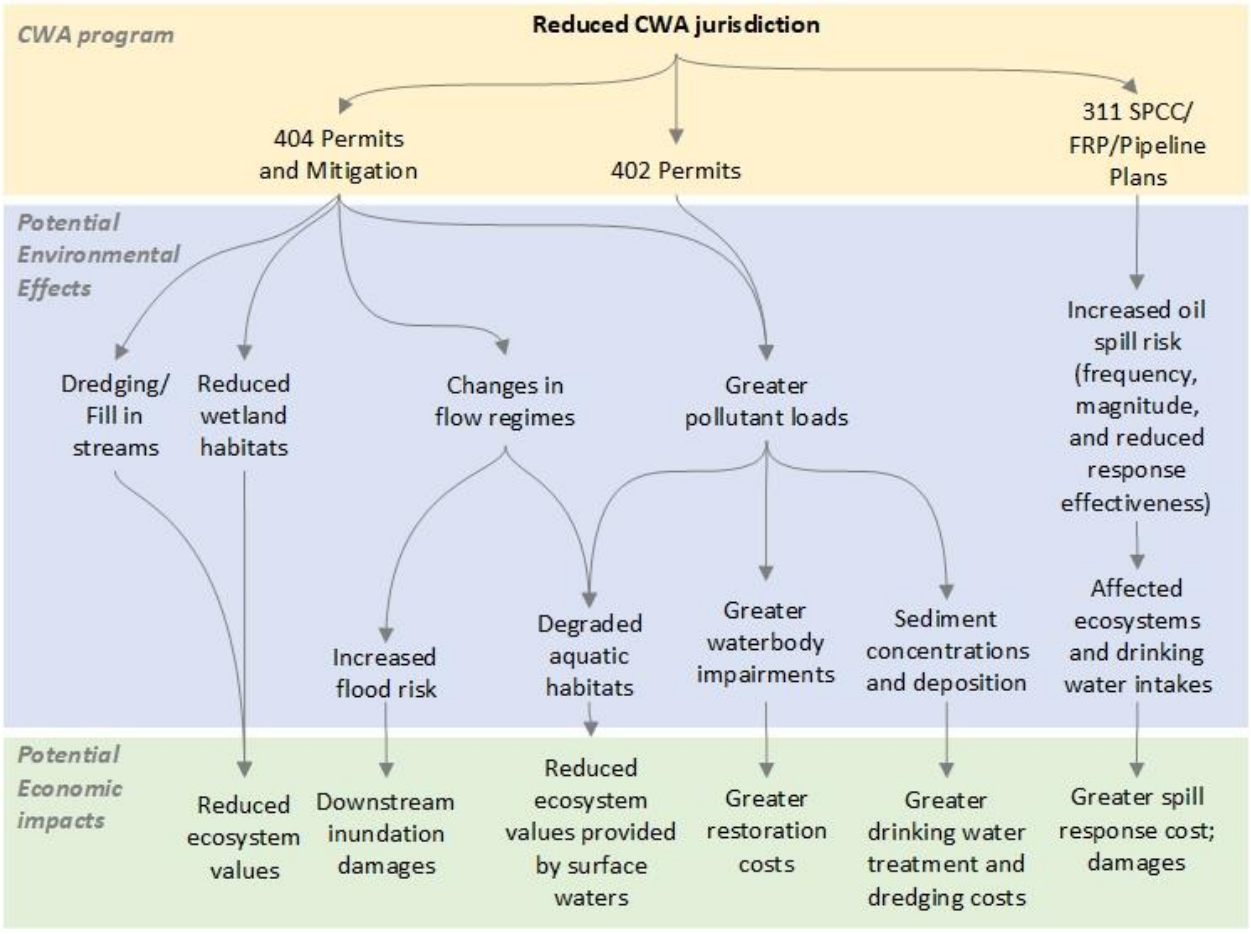
[7] The agencies may be overstating the potential impacts of the final rule for these waters since some wetlands that are non-abutting will still meet the final definition of adjacent if they are inundated by flooding from a jurisdictional water in a typical year, are physically separated from a jurisdictional water only by a natural berm or similar natural feature, or are physically separated from a jurisdictional water only by a man-made dike or similar artificial structure so long as that structure allows for a direct hydrologic surface connection between the wetlands and the jurisdictional water in a typical year, but available data are not sufficiently detailed to determine how often this occurs.

As noted in the rightmost column in Table III-9, available data are not sufficiently detailed for some waters to predict a change in jurisdictional status under the final rule. Because of this uncertainty, the agencies focused the primary analysis detailed in this section on those permits and facilities that could be identified with a higher degree of certainty as affected by the final rule based on program data.

III.B.1.3 Potential Costs and Environmental Effects of Jurisdictional Changes

The agencies then evaluated the potential impacts of these presumed jurisdictional changes on compliance costs, stream flows, water quality, drinking water treatment, endangered and threatened species habitats, and other ecosystem services. The agencies quantified and monetized the potential impacts where possible given the available data and methods. Figure III-9 illustrates the types of potential impacts resulting from changes in wetland and stream CWA jurisdiction, permitted pollutant discharges, and spill prevention and preparedness.

Figure III-9: Overview of potential environmental impacts to selected CWA programs from changes in CWA jurisdiction for certain waters.



Note: This figure assumes no state responses to changes in CWA jurisdiction. The analysis in Section II.A suggests that many states will continue to regulate newly non-jurisdictional waters, thereby reducing any potential impacts from the changes in CWA jurisdiction.

The final rule revising CWA jurisdiction may have a range of potential impacts on the ecosystem services provided by aquatic resources, including wildlife habitat, flood control, drinking water, and recreation. Potential impacts specific to each CWA program are briefly summarized below and discussed in more detail in each case study.

- Pollutants discharged to surface waters are known to have negative impacts on human health, wildlife habitat, and economic productivity. A change in scope of CWA jurisdiction may lead to less stringent limits for point sources under CWA section 402 if they discharge to newly non-jurisdictional waterbodies and are not subject to applicable anti-backsliding permit requirements.[105] This could result in reduced protection for aquatic ecosystems and public health and welfare in certain circumstances. The value of forgone benefits under CWA section 402 associated with a potential increase in pollutant loadings from point sources depends on the specific pollutants discharged (*e.g.*, toxic vs. conventional), the type of ecosystems services provided by the affected waterbodies (*e.g.*, drinking water source, fishing area, aquatic habitat), presence of substitute sites, and the public value of ecosystem services provided by water resources.

- Compensatory mitigation required under CWA section 404 offsets unavoidable negative impacts on wetlands and other aquatic resources from any dredging and filling projects. The anticipated decrease in the number of CWA section 404 permits or permittee obligations may reduce the required compensatory mitigation. As a result, water quality in rivers, streams, and lakes may degrade as a result of pollutant loading from newly non-jurisdictional waters; loss of wetlands and streams without corresponding mitigation; or loss of impact reduction, minimization, and other requirements provided under the CWA section 404 program. Water quality degradation may adversely affect species habitat (Findlay and Houlahan, 1997), costs of drinking water treatment and reservoir maintenance, as well as human uses of downstream water resources (*e.g.*, fishing). Loss of wetlands may influence the peak flows, timing, volume, and duration of floods (Acreman and Holden, 2013). To estimate potential flow and water quality changes downstream from affected activities, the agencies developed a series of watershed models for analysis using SWAT (Arnold et al., 2012, Neitsch et al., 2011). The SWAT model projections capture the impacts of potential changes in wetland acres, including riparian areas and wetlands abutting ephemeral streams and non-abutting wetlands, due to assumed reduced mitigation requirements under the CWA section 404 program.

- Oil spills present a risk to ecological and human health. Less stringent regulatory requirements for spill prevention and preparedness may lead to more frequent or larger oil spills and reduce the effectiveness of immediate response actions following a spill. Several oil components are toxic to humans. Consequences of an oil discharge include direct costs for cleanup and remediation and environmental damages such as loss of wildlife and habitats. These damages depend on the type of oil, size of the spill, prevailing conditions and spill circumstances, and affected environments.

- The agencies revised the state response categories in response to public comments, which affected cost savings and forgone benefit estimates for the case studies under the federalism scenarios.

[105] Discharges into non-jurisdictional waters will still be regulated if the discharges eventually flow to a jurisdictional water. In such cases discharge limits may become less stringent if the increased distance to a jurisdictional water allows for dissipation of some of the discharge, subject to applicable anti-backsliding permit requirements.

III.B.1.4 Ecosystem Services Provided by Wetlands and Ephemeral Streams

In reviewing the Draft Connectivity Report entitled "Connectivity of Streams and Wetlands to Downstream Waters: A Review of the Scientific Evidence,"[106] EPA's Science Advisory Board (SAB) found that "[t]he literature review provides strong scientific support for the conclusion that ephemeral, intermittent, and perennial streams exert a strong influence on the character and functioning of downstream waters and that tributary streams are connected to downstream waters."[107] But at the same time the SAB stressed that "the EPA should recognize that there is a gradient of connectivity."[108] The SAB recommended that "the interpretation of connectivity be revised to reflect a gradient approach that recognizes variation in the frequency, duration, magnitude, predictability, and *consequences* of physical, chemical, and biological connections."[109] The agencies recognize that waters within a watershed are connected along such a gradient and that the degree of connectivity among aquatic components varies along a continuum from highly connected to highly isolated (U.S. EPA 2015b).

Ephemeral streams and isolated wetlands can support various ecosystem services (U.S. EPA 2015b). For example, ephemeral streams, including dry channels, have a role in supporting biodiversity. Several amphibian species found in the Ohio River Basin case study area, for instance, such as the four-toed salamander, wood frog, and Ohio's state amphibian the spotted salamander, breed primarily in ephemeral wetlands not hydrologically connected to the stream network (or vernal pools), where there are fewer predators than in permanent waterbodies (Kern, et al., 2013; Semlitsch & Skelly, 2007). Ephemeral streams in the Middle Ohio (HUC 0509) and Kentucky-Licking (HUC 0510) watersheds may also provide habitat for state-listed threatened and endangered species, including streamside salamanders listed as endangered in West Virginia and red salamanders listed as endangered in Indiana (Schneider, 2010; IUCN SSC Amphibian Specialist Group, 2014; Niemiller, M.L., 2006). In the Lower Missouri River Basin case study area, amphibian species such as the eastern tiger salamander, smallmouth salamander, Great Plains toad, Woodhouse's toad, and Plains spadefoot toad may rely on ephemeral wetland habitats for reproduction (U.S. Army Corps of Engineers, Kansas City District, 2017).

In the Rio Grande River Basin case study area, the majority of streams are ephemeral, falling toward the more isolated end of the connectivity gradient (*see* Table III-48). Although these streams have different characteristics from generally more highly connected perennial and intermittent streams that are in wetter environments, they perform similar hydrological and ecological functions, including moving water, sediments, and nutrients, providing connectivity within the watershed and habitat to wildlife (Levick et al., 2008). Ephemeral streams in arid and semi-arid areas support a variety of ecosystem services (Levick et al., 2008). For example, ephemeral streams play an important role in replenishing groundwater in the arid West, which people in the study area heavily depend on for irrigation and drinking water supply (Levick et al., 2008). One of the major sources of regional groundwater in the Rio Grande, for instance, is

[106] U.S. EPA. *Connectivity of Streams and Wetlands to Downstream Waters: A Review and Synthesis of the Scientific Evidence (External Review Draft)*. U.S. Environmental Protection Agency, Washington, DC, EPA/600/R11/098B, September 2013.

[107] Letter to Gina McCarthy. October 17, 2014. SAB Review of the Draft EPA Report Connectivity of Streams and Wetlands to Downstream Waters: A Review and Synthesis of the Scientific Evidence. Page 3.

[108] *Id.*

[109] *Id.*

seepage from the Rio Grande, the Rio Puerco, and from the ephemeral Abo and Tijera Arroyos (U.S. EPA, 2015b).

Even during dry periods, water may be present below the ground in ephemeral streams and accessible to plant and animal life. In arid areas dry washes are recognizable by their dense corridor of vegetation that supports a higher biological diversity of desert environments relative to their total area (Warren and Anderson, 1985, as cited in Levick et al., 2008) and provide shade, breeding habitat, and other ecosystem services in these vegetated corridors. Ephemeral stream channels (washes) with shallow ground-water zones may be lined with trees including Fremont cottonwood, Arizona sycamore, Arizona ash, acacia, blue palo verde, or velvet mesquite and shrubs such as wolfberry or brickellbush (Hardy et al., 2004; Levick et al., 2008). Federally listed threatened plants such as Pecos sunflower also inhabit stream courses dependent on shallow groundwater (U.S. FWS, 2005).

The agencies recognize the importance and economic benefits of protecting water resources and do not dispute that streams, wetlands, and other waters serve a variety of important functions. As discussed in the preamble for this final rule, while the agencies' decisions are informed by science, science cannot dictate where to draw the line between Federal and State or Tribal waters, as those are legal distinctions that have been established within the overall framework and construct of the CWA. The definition of "waters of the United States" must be grounded in a legal analysis of the limits on CWA jurisdiction reflected in the statute and Supreme Court precedent.

III.B.2 Case Study 1: Ohio River Basin

This case study includes the middle portion of the Ohio River that runs along the border of Ohio, Kentucky, and Indiana. The Middle Ohio and Kentucky-Licking watersheds stretch across several ecoregions, primarily the Western Allegheny Plateau, Interior Plateau, and Eastern Corn Belt Plains. According to the Commission for Environmental Cooperation (CEC, 2011), these ecoregions are characterized by a mid-latitude, humid climate with hot summers and mild to cold winters. Annual precipitation ranges from 860 to 1470 mm (33.9 to 57.9 inches). Primary land uses include forests, cropland, and coal mining, with some urban development.

Figure III-10 and Figure III-11 show maps of the HUC 0509 and HUC 0510 case study watersheds, respectively. Note that the outlet of watershed HUC 0510 flows into watershed HUC 0509, along with the watersheds delineated by HUCs 0503 (which receives flows from HUCs 0501, 0502, and 0504), 0505, 0506, 0507, and 0508.

Figure III-10: Map of HUC 0509 – Middle portion of the Ohio River Basin showing high-resolution NHD water features and NWI wetlands in relation to state boundaries, major cities, and neighboring watersheds.

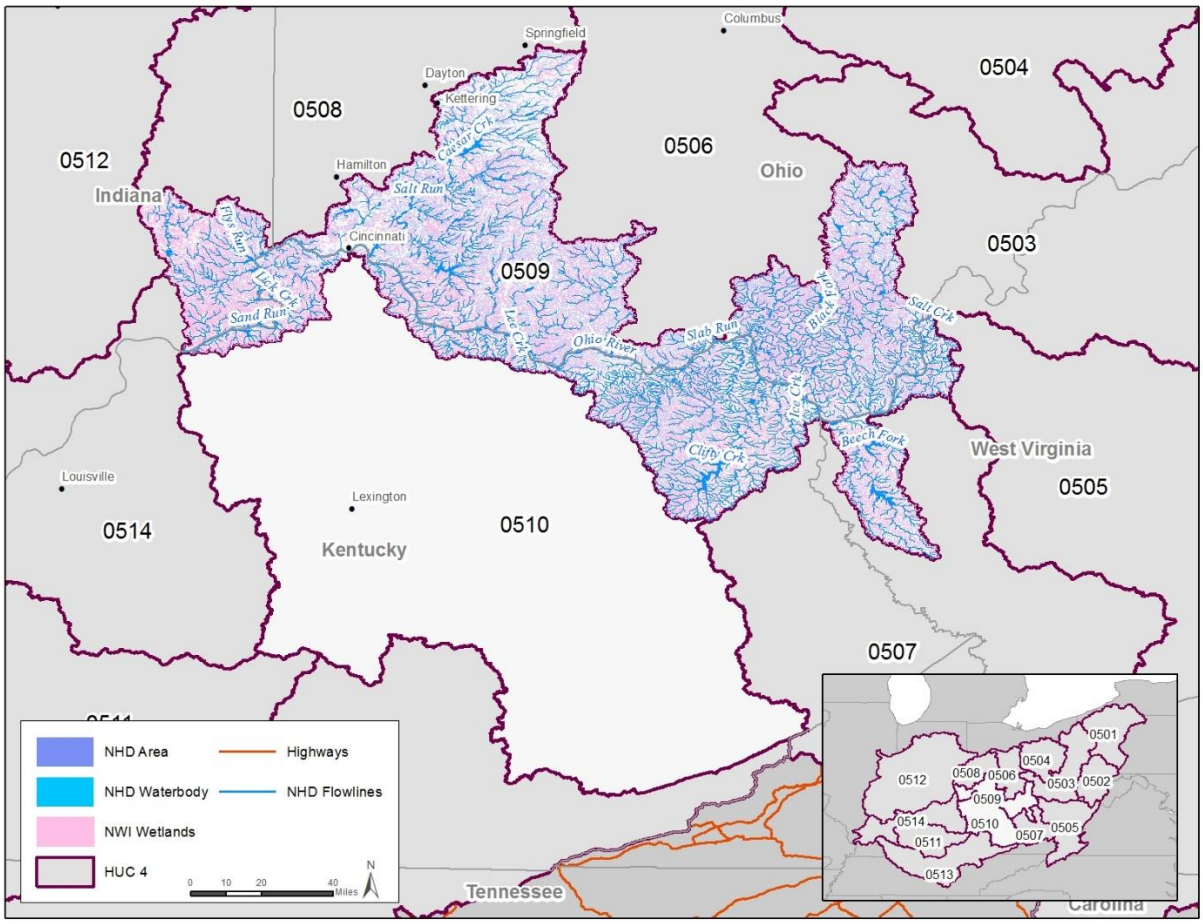
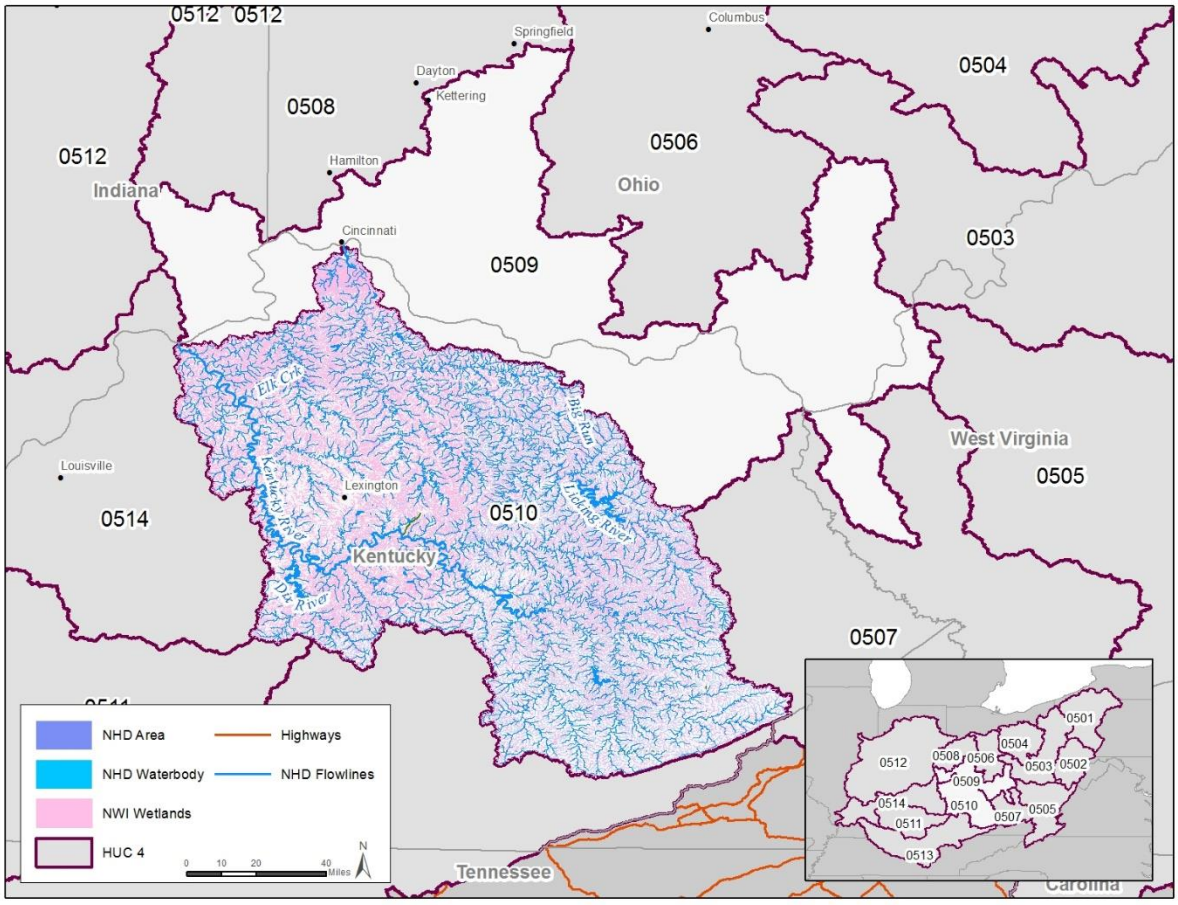


Figure III-11: Map of HUC 0510 – Licking and Kentucky River Basins showing high-resolution NHD water features and NWI wetlands in relation to state boundaries, major cities, and neighboring watersheds.



III.B.2.1 Aquatic Resources Characteristics

Table III-10 summarizes the hydrography within the case study watersheds in terms of the number of stream miles in each flow category and acres of non-abutting and abutting wetlands (as discussed below) as represented in the high resolution NHD and NWI data, respectively. As presented in the table, 54 to 62 percent of all stream miles within the two watersheds are either ephemeral or intermittent, and 19 percent to 22 percent of all wetland acres are non-abutting (*i.e.*, not touching or intersecting perennial, intermittent, or ephemeral NHD streams).

The small number of miles of ephemeral streams within the two watersheds (none in HUC 0510 and two miles in HUC 0509) is due to the lack of specific flow regime categorization in the high resolution NHD data rather than the absence of such streams. Wetlands were estimated to be either abutting or non-abutting based on analyzing the proximity of NWI wetland features to waters delineated in the high resolution NHD. Appendix A in the RPA for the proposed rule (Aquatic Resource Analysis) describes the approach the agencies used to determine adjacency (U.S. EPA and Department of the Army, 2018a). As mentioned in Section II.C, these estimates are only approximations, and the agencies did not consider the

data to be sufficiently accurate in this region to analyze the potential impacts of the final regulation and do not include wetlands that will satisfy the non-abutting jurisdictional tests for wetlands in the final rule.

Table III-10: Hydrographic profile of case study watersheds in the Ohio River Basin

Feature type	Feature attributes	HUC 0509		HUC 0510	
		Miles or Acres	Percent of total	Miles or Acres	Percent of total
NHD Streams (miles)	**Total Mapped**	38,277	100%	26,895	100%
	Perennial	7,627	20%	6,917	26%
	Intermittent	20,548	54%	16,547	62%
	Ephemeral	2	0%	-	0%
	Artificial path	3,351	9%	3,389	13%
	Other[1]	6,749	18%	42	0%
NWI Wetlands (acres)	**Total Mapped**	53,316	100%	15,824	100%
	Abutting	41,358	78%	12,793	81%
	Non-abutting	11,958	22%	3,031	19%

[1] Includes canals/ditches, aqueducts, and other features without attributes.

The values are based on the agencies' geospatial analysis of NHD and NWI data and reflect gaps in NHD stream attributes.

III.B.2.2 Program Changes

III.B.2.2.1 CWA Section 402

Table III-11 presents the number of NPDES permits[110] issued in the Ohio River Basin by the most common industry categories. The number of permits issued in the two case study watersheds includes 914 individual permits and 2,441 general permits. As mentioned in Section II.C, the agencies judged the NHD data as insufficient for estimating the jurisdictional status of waterways since the dataset does not map most ephemeral streams or classifies those that are mapped as intermittent in the case study watersheds.[111] To estimate those permitted discharges that might be affected by the final rule, the agencies relied on CWA section 402 permit locational information and the NWI data on the flow regime of the receiving waters.[112] The agencies used the Cowardin classification code (Cowardin *et al*. 1979; Federal Geographic Data Committee, 2013) assigned to the NWI resource closest to the coordinates of permitted outfalls to approximate the flow regime of the receiving waters. The Cowardin Classification System subdivides waters, which include but are not limited to wetlands, into systems, subsystems, classes, subclasses, and dominance types, and includes Water Regime Modifiers (seasonally flooded, intermittently flooded, etc.) for classes and subclasses.

[110] Data on regulated facilities or activities subject to individual permits or general permits under the Section 402 program is primarily from the EPA's Integrated Compliance Information System National Pollutant Discharge Elimination System (ICIS-NPDES) database. ICIS-NPDES is an information management system maintained by the EPA's Office of Compliance to track permit compliance and enforcement status of facilities regulated by the National Pollutant Discharge Elimination System (NPDES) under the CWA. ICIS-NPDES data are available for download from EPA's Enforcement and Compliance History Online website at https://echo.epa.gov/tools/data-downloads.

[111] *See* the RPA for additional errors in the dataset.

[112] The agencies used a two-step approach to identify CWA section 402 discharges to ephemeral streams. First, the agencies used the NHD dataset to determine whether receiving waters are perennial. Second, for non-perennial waters, the agencies used NWI data on the flow regime to distinguish, for purposes of this analysis, between intermittent and ephemeral streams.

As further described in Section II.C, the NWI contains a Water Regime Modifier in the classification of wetlands and deepwater habitats, which provides a description in general terms of hydrologic characteristics. For purposes of this analysis, the agencies have interpreted streambeds identified in the NWI with Cowardin codes R4SBA (Riverine, Intermittent, Streambed, Temporarily Flooded) or R4SBJ (Riverine, Intermittent, Streambed, Intermittently Flooded) as ephemeral, and streambeds with Cowardin code R4SBC (Riverine, Intermittent, Streambed, Seasonally Flooded) as intermittent. If the Cowardin classification code of the receiving water was either R4SBA (Riverine, Intermittent, Streambed, Temporarily Flooded) or R4SBJ (Riverine, Intermittent, Streambed, Intermittently Flooded), the agencies assumed the permitted discharge to likely be to an ephemeral water.

Based on this analysis, all NPDES permits in the case study areas affect streams with permanent or intermittent flow regimes. However, because the NHD data did not consistently distinguish between intermittent and ephemeral streams and NWI data are also subject to limitations, some discharges may be affecting ephemeral streams. See Section II.C for more details on data limitations.

Table III-11: CWA section 402 individual permits (SIC codes in parentheses) issued in case study watersheds in the Ohio River Basin

Industry category	Individual Permits[1]			General Permits[1]		
	Total number of NPDES permits	Permits with discharge point near ephemeral streams[2]		Total number of NPDES permits[1]	Permits with discharge point near ephemeral streams[2]	
		Number of permits	Percent of all permits		Number of permits	Percent of all permits
HUC 0509						
Sewerage Systems (4952)	156	0	0%	206	0	0%
Water Supply (4941)	28	0	0%	11	0	0%
Industrial Domestic Wastewater Treatment[3]	55	0	0%	194	0	0%
Construction and Development[4]	10	0	0%	282	0	0%
Other Categories[5]	253	0	0%	156	0	0%
Missing SIC Codes	11	0	0%	11	0	0%
Total	**513**	**0**	**0%**	**860**	**0**	**0%**
HUC 0510						
Industrial Domestic Wastewater Treatment[3]	115	0	0%	158	0	0%
Construction and Development[4]	31	0	0%	743	0	0%
Asphalt Paving Mixtures and Blocks (2951)	1	0	0%	25	0	0%
Sewerage Systems (4952)	67	0	0%	0	0	0%
Other Categories[5]	187	0	0%	648	0	0%
Missing SIC Codes	0	0	-	7	0	0%
Total	**401**	**0**	**0%**	**1,581**	**0**	**0%**
Total, both watersheds	**914**	**0**	**0%**	**2,441**	**0**	**0%**

[1] Source: EPA's ICIS-NPDES data, 2017. The facility permits included in the spatial analysis are limited to those for which the ICIS-NPDES database includes latitude/longitude coordinates. For permits with multiple SIC codes, only one SIC code was retained, with manufacturing industries prioritized, to avoid double-counting.

Table III-11: CWA section 402 individual permits (SIC codes in parentheses) issued in case study watersheds in the Ohio River Basin

Industry category	Individual Permits[1]			General Permits[1]		
	Total number of NPDES permits	Permits with discharge point near ephemeral streams[2]		Total number of NPDES permits[1]	Permits with discharge point near ephemeral streams[2]	
		Number of permits	Percent of all permits		Number of permits	Percent of all permits

[2] The agencies used the Cowardin classification code in NWI to determine whether 402 discharges have the potential to affect ephemeral streams (*i.e.*, the agencies interpreted Cowardin codes R4SBA and R4SBJ as ephemeral; *see* Section III.B.1 for more detail).

[3] Includes SIC Codes 6513, 6514, 6515, 7011, 7032, 7033, 8211, 8221, 8641, and 8661.

[4] Includes SIC Codes 1629, 1794, 6552, 1611, 1799, 1521, 1522, and 1623.

[5] Includes multiple categories, such as Aggregate Mining (1422, 1423, 1429, 1442, 1446, 1459, 1474, 1475, 1481, 1499), Surface Coal Mining (1221, 1222), Motor Vehicle Parts, Used (5015), Gasoline Service Stations (5541), Ready-Mixed Concrete (3273), Scrap and Waste Materials (5093), Refuse Systems (4953), Petroleum Bulk Stations and Terminals (5171), Electric Services (4911), Animal Feeding Operations (211, 212, 213, 214, 219, 241, 251, 252, 253, 254, 259, 271, 272, 279), Industrial Organic Chemicals (2869), Trucking Facilities (4212, 4231), Sawmills and Planning Mills (2421), Farm Supplies (5191), and Civic, Social, and Fraternal Associations (8641).

NPDES permits in the case study area were issued in three states in HUC 0509 (Kentucky, Ohio, and West Virginia) and one state in HUC 0510 (Kentucky). Based on potential state responses and different analytic scenarios described in Section II.A.3, Ohio and West Virginia are expected to regulate 402 permitted discharges to waters beyond the CWA under Scenarios 2 and 3, while Kentucky is not anticipated to regulate 402 discharges to waters beyond the CWA under any scenarios. This means under Scenarios 2 and 3 in the Ohio River Basin, only Kentucky may experience any regulatory changes due to the change in CWA jurisdiction. Therefore, even if some of the 402 permits may affect ephemeral streams, these discharges will be regulated in two of the three states where case study watersheds are located under Scenarios 2 and 3.

Given that none of the 402 permits in HUC 0509 and HUC 0510 are likely to be affected by the final rule, the agencies do not anticipate potential reduction in treatment costs and corresponding increases in loading to receiving waters, nor the potential costs for the NPDES authority that may arise from recalculating permitted limits[113] to account for dilution.

III.B.2.2.2 CWA Section 404

The agencies relied on the Corps' ORM2 database to identify 404 permits affecting waters that may no longer be jurisdictional under the final rule. For each permit, the ORM2 database provides information about affected waters, permanent and temporary impacts, and mitigation requirements. Under the final rule, ephemeral streams and wetlands that are adjacent to but that do not directly abut relatively

[113] Several of the common industry categories in the Ohio River Basin have TBELs, including construction and development, sewage systems (secondary), and asphalt paving mixtures and blocks. The industrial domestic wastewater treatment and water supply industries do not have national TBELs. For facilities in these two industry categories, effluent limitations are either WQBELs for pollutants with applicable water quality standards, or TBELs based on the best professional judgement of the permit writer (U.S. EPA, 2010).

permanent waters may no longer be jurisdictional under the CWA (but note that the definition of "adjacent wetlands" includes non-abutting wetlands in certain circumstances). The agencies identified permits affecting these waters using the following methodology:

1) Ephemeral streams: The Cowardin classes field in the Corps' ORM2 database includes information about river/stream type (perennial, intermittent, or ephemeral). The agencies classified any stream with a "Riverine, Ephemeral" (R6) class as an ephemeral stream. Whenever the Cowardin code field did not specify stream type, the agencies assumed that the stream would remain jurisdictional under the final rule, which could possibly result in an underestimation of potentially affected waters.

2) Wetlands adjacent to but not directly abutting permanent waters: The agencies used the water type field in the Corps' ORM2 database to select wetlands with a RPWWN water type. The RPWWN water type identifies wetlands that are adjacent to but do not directly abut relatively permanent waters, which will result in an overestimation of potentially affected waters given the final rule's definition of "adjacent wetlands."

The agencies consider recent CWA section 404 permitted activity to be the best predicter of the future location and type of activities potentially subject to CWA section 404 permitting. Table III-12 summarizes CWA section 404 permits issued in 2011-2015 within the two selected watersheds of the Ohio River Basin. The table includes permits that required mitigation and potentially affected ephemeral streams or wetlands adjacent to but not directly abutting permanent waters. As presented in the table, the agencies' geospatial analysis shows 55 permits in HUC 0509 and 40 permits in HUC 0510 issued by the Corps with impacts that required mitigation on waters potentially affected by the final "waters of the United States" definitional changes. Permanent impacts resulting from 404 permits included annual averages of 2.9 acres and 18,466 linear feet in HUC 0509 and 1.2 acres and 12,507 linear feet in HUC 0510. Most permit impacts occurred in Ohio and Kentucky for this case study. Ohio is likely to regulate waters beyond the CWA (*i.e.*, impacts excluded in Scenarios 1, 2, and 3) according to the assumptions previously stated. Kentucky is assumed to be less likely to regulate waters that are no longer jurisdictional under the CWA (*i.e.*, impacts included in scenarios 1, 2, and 3).

Table III-12: CWA section 404 permits issued in case study watersheds in the Ohio River Basin (2011-2015)

State	# Permitted Projects	# Permits with mitigation requirements potentially affected by revised definition of "waters of the United States"[1, 2]	Permanent impacts		Average Temporary impacts	
			Acres	Length Feet	Acres	Length Feet
HUC 0509						
IN	101	10	0.00	0	0.55	0
KY	226	15	4.54	41,122	0.00	0
OH	351	30	9.76	51,209	0.19	3,009
WV	141	0	0.00	0	0.00	0
Total	**819**	**55**	**14.30**	**92,331**	**0.74**	**3,009**
Avg. per year	**164**	**11**	**2.86**	**18,466**	**0.15**	**602**

Table III-12: CWA section 404 permits issued in case study watersheds in the Ohio River Basin (2011-2015)

State	# Permitted Projects	# Permits with mitigation requirements potentially affected by revised definition of "waters of the United States"[1, 2]	Permanent impacts		Average Temporary impacts	
			Acres	Length Feet	Acres	Length Feet
HUC 0510						
KY	967	40	5.83	62,535	0.04	2,261
Total	**967**	**40**	**5.83**	**62535**	**0.04**	**2,261**
Avg. per year	**193**	**8**	**1.17**	**12,507**	**0.01**	**452**

[1] Values based on permits with mitigation requirements on waterways determined to be RPWWN-type wetlands or interpreted to be ephemeral streams. Excludes permits issued for mitigation or restoration activities because the main purpose of these activities is to restore or enhance ecosystem services provided by water resources as opposed to dredge and fill activities that lead to permanent or temporary losses of ecosystem services.

[2] Number of permits includes permits with mitigation requirements that affect at least one water estimated to no longer be jurisdictional under the final rule.

The 404 program has an explicit national policy of "no net loss" in wetlands and other aquatic resources. Mitigation is designed to compensate for the loss of wetlands and other aquatic resources by providing equivalent ecosystem functions and services. As such, the agencies assumed that any mitigation is by definition functionally equivalent to the impact it is meant to compensate, though recognize that functional equivalence may not always occur on a case-by-case basis for all mitigated impacts. The agencies therefore use total permanent impacts, rather than total acres of mitigation, to estimate reductions in mitigation requirements from the revised "waters of the United States" definition. Table III-13 presents estimated reductions in average annual mitigation requirements in the two selected Ohio River Basin watersheds under different likely state response scenarios following the revised "waters of the United States" definition.

To estimate the expected reduction in mitigation requirements in the case study area, the agencies used estimated permanent impacts and Corps guidance on the ratio for compensatory mitigation for Category III wetlands (U.S. Army Corps of Engineers 2014). Category III wetlands are defined as not rare or unique and usually plentiful in the watershed. The recommended compensatory ratios for Category III wetlands range from less than 1:1 to 1.5:1. This analysis uses a 1:1 ratio.[114]

As shown in Table III-12 and Table III-13, for example, mitigation is also required for streams (linear feet). For streams, mitigation requirements include establishment of a riparian buffer for runoff treatment, reduction of nutrient loading from adjacent land uses, and reduction of stream temperature. Requirements for the riparian buffer width vary from state to state. The state of Ohio requires a minimum buffer width

[114] The agencies validated this assumption using ORM2 data on about 4000 projects where the relationship between impacted acres and required mitigation acres could be isolated. This analysis excludes any projects where impacts or mitigation included linear feet values and projects where some or all of the mitigation used credits or in-lieu fees. Based on the statistical analysis of these data, the most frequently observed mitigation ratio (the mode of the distribution) is 1:1 and the median ratio is 1.5:1.

of 50 feet on each side of the stream, while West Virginia uses a site-specific assessment and Kentucky does not provide a specific guidance on the buffer width (ELI, 2016; West Virginia Interagency Review Team, 2010). To estimate the expected average reduction in riparian area mitigation, the agencies assumed that buffer establishment requirements for ephemeral streams would be lower compared to the minimum requirements in Ohio since these requirements do not distinguish among different stream types.[115] Based on the minimum buffer zone requirements specific to ephemeral streams from other states, the agencies assumed that a 25 feet buffer zone would be required on each side of the stream. The agencies used the 50-foot buffer (25 feet on each side) assumption to convert linear feet mitigation requirements provided in the Corps' ORM2 database to riparian acres.

Mitigation may also be required to compensate for temporary impacts (*see* Table III-12). The mitigation is expected to be permanent even where the impacts are not; therefore, the reliance on permanent impacts only as proxy for estimating forgone mitigation may understate the potential changes under the final rule. However, this underestimation is likely small since temporary impacts account for less than five percent of total impacts in both HUC 0509 and HUC 0510.

The agencies also note that the estimated reduction in average mitigation requirements per year are based on CWA section 404 permits issued in 2011-2015 and therefore may not be representative of future impacts on water resources or mitigation requirements. Section III.B.5 provides more detailed discussion of uncertainty inherent in this analysis.

Table III-13: Estimated changes in average mitigation required per year in the Ohio River Basin, by potential state response scenario

State	Estimated Reduction in Average Mitigation Acres per Year[1,2]			Estimated Reduction in Average Mitigation Length Feet per Year[1,2]			Estimated Reduction in Average Mitigation Riparian Acres per Year[1,2,3]		
	Scenario 0	Scenarios 1 & 2	Scenario 3	Scenario 0	Scenarios 1 & 2	Scenario 3	Scenario 0	Scenarios 1 & 2	Scenario 3
HUC 0509									
IN	0.0	0.0	0.0	0	0	0	0.0	0.0	0.0
KY	0.9	0.9	0.9	8,224	8,224	8,224	9.4	9.4	9.4
OH	2.0	0.0	0.0	10,242	0	0	11.8	0.0	0.0
Total	**2.9**	**0.9**	**0.9**	**18,466**	**8,224**	**8,224**	**21.2**	**9.4**	**9.4**
HUC 0510									
KY	1.2	1.2	1.2	12,507	12,507	12,507	14.4	14.4	14.4
Total	**1.2**	**1.2**	**1.2**	**12,507**	**12,507**	**12,507**	**14.4**	**14.4**	**14.4**

[1] Values based on permits with mitigation requirements on waterways determined to be RPWWN-type wetlands or interpreted to be ephemeral streams. Excludes permits issued for mitigation or restoration activities because these permits do not result in the loss of ecosystems services provided by wetlands and streams. Permanent acre and linear feet impacts provided in the ORM2 database are used to estimate mitigation requirements. The agencies assumed a 1:1 ratio for compensatory requirements based on Corps guidance (U.S. Army Corps of Engineers 2014).

[115] There is no consensus among scientists whether areas adjacent to ephemeral streams/rivers should be called riparian (called xeroriparian). Some scientists support inclusion of areas adjacent to ephemeral streams/rivers in the definition of riparian areas because these areas perform many ecological functions performed by true riparian areas adjacent to perennial (called hydroriparian) and intermittent (called mesoriparian) streams. The counter argument is that xeroriparian areas do not provide the full spectrum of ecological functions performed by riparian areas adjacent to perennial and intermittent streams (Zaimes et al. 2007). In this EA, the agencies refer to the areas adjacent to ephemeral streams as "riparian."

Table III-13: Estimated changes in average mitigation required per year in the Ohio River Basin, by potential state response scenario

State	Estimated Reduction in Average Mitigation Acres per Year[1,2]			Estimated Reduction in Average Mitigation Length Feet per Year[1,2]			Estimated Reduction in Average Mitigation Riparian Acres per Year[1,2,3]		
	Scenario 0	Scenarios 1 & 2	Scenario 3	Scenario 0	Scenarios 1 & 2	Scenario 3	Scenario 0	Scenarios 1 & 2	Scenario 3

[2] Scenarios 1 and 2 are identical for the 404 program analysis.

[3] Based on mitigation lengths where impacts in linear feet are converted to acres by multiplying total linear feet by an average total buffer width of 50 feet (25 feet on each side of the stream) and converting square feet to acres.

III.B.2.2.2.1 Cost Savings

The final rule could result in cost savings in two ways:

1) Reduced permit costs, including application costs, permitting time costs, and impact avoidance and minimization costs, for projects no longer affecting waters regulated under the CWA, and

2) Reduced compensatory mitigation costs when impacts occur on waters no longer regulated under the CWA.

To estimate potential permit cost savings, the agencies determined the average number of individual and general 404 permits issued each year, based on permits issued from 2011 to 2015, that potentially affect only waters that may no longer be regulated as "waters of the United States" under the final rule. The number of permits considered in the permit cost analysis may differ from the number considered in the mitigation cost analysis. The permit cost analysis considers 404 permits that potentially affect only waters that may no longer be jurisdictional under the final rule. These permits may or may not have mitigation requirements. Any permits affecting both waters likely to remain jurisdictional and waters likely to no longer be jurisdictional under the final rule are not considered in the cost savings analysis. The mitigation cost analysis considers permits with mitigation requirements that potentially affect at least one water that may no longer be jurisdictional under the final rule, excluding permits issued for mitigation or restoration activities.

As described earlier, the agencies derived water classifications using the Corps' ORM2 section 404 permit database to determine whether a permit affected only waters that may no longer be jurisdictional under the final rule. The agencies then multiplied the annual average number of reduced individual and general 404 permits by lower bound Corps estimates of permit costs (U.S. EPA and Department of the Army, 2015).

The Corps estimated 404 permit application costs 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 (U.S. EPA and Department of the Army, 2015). The Corps analysis notes that the costs were developed for "typical" projects affecting up to three acres of jurisdictional waters. The agencies are only considering permit application cost savings for permits solely affecting

waters affected by the final rule. The impacts of these permits are less than "typical" on average.[116] The agencies thus used the lower bound estimate of the Corps' permit application cost range. Table III-14 shows the average number of estimated reduced individual and general 404 permits, Corps unit application costs, and the estimated reduction in permit applications costs for individual and general permits in the Ohio River Basin under each scenario. The Corps unit cost estimates ($15,100 per individual permit; $4,500 per general permit[117]) are adjusted from 1999$ to 2018$ using the CPI-U.

Permits affecting only RPWWN-type wetlands and ephemeral streams were issued in four states in HUC 0509 (Indiana, Kentucky, Ohio, and West Virginia) and one state in HUC 0510 (Kentucky). Under Scenario 0, the average annual reduction in 404 permit application costs for the Ohio River Basin is approximately $0.41 million. Under Scenarios 1, 2, and 3, which include permit reductions in Kentucky only, permit cost savings drop to $0.32 million.

Table III-14: Estimated average annual reduction in CWA section 404 permit application costs in the Ohio River Basin

Permit Type	Unit Costs from Corps NWP Analysis (2018$)	Scenario 0[1]		Scenarios 1 & 2[1,2]		Scenario 3[1]	
		Annual Average Reduction in Permits with Final Rule	Estimated Reduction in Permit Costs (millions 2018$)	Annual Average Reduction in Permits with Final Rule	Estimated Reduction in Permits Costs (millions 2018$)	Annual Average Reduction in Permit with Final Rule	Estimated Reduction in Permit Costs (millions 2018$)
HUC 0509							
IP	$15,100	0.0	$0.00	0.0	$0.00	0.0	$0.00
GP	$4,500	32.4	$0.15	11.4	$0.05	11.4	$0.05
Total		**32.4**	**$0.15**	**11.4**	**$0.05**	**11.4**	**$0.05**
HUC 0510							
IP	$15,100	0.0	$0.00	0.0	$0.00	0.0	$0.00
GP	$4,500	59.8	$0.27	59.8	$0.27	59.8	$0.27
Total		**59.8**	**$0.27**	**59.8**	**$0.27**	**59.8**	**$0.27**
Both Watersheds							
IP		0.0	$0.00	0.0	$0.00	0.0	$0.00
GP		92.2	$0.41	71.2	$0.32	71.2	$0.32
Total		**92.2**	**$0.41**	**71.2**	**$0.32**	**71.2**	**$0.32**

[1] Includes permits estimated to only affect waters that may no longer be jurisdictional under the final rule.

[2] Scenarios 1 and 2 are identical for the 404 program analysis.

[116] On average, CWA section 404 permits issued between years 2011 and 2015 on freshwater resources had 0.25 permanent impact acres. During the same timeframe, permits solely impacting waters affected by the final rule had 0.15 permanent impact acres.

[117] The agencies note that the Supreme Court has recognized significantly higher costs associated with obtaining CWA section 404 permits from the Corps. *See Rapanos*, 547 U.S. at 721 ("The average applicant for an individual permit spends 788 days and $271,596 in completing the process, and the average applicant for a nationwide permit spends 313 days and $28,915 — not counting costs of mitigation or design changes. Sunding & Zilberman, The Economics of Environmental Regulation by Licensing: An Assessment of Recent Changes to the Wetland Permitting Process, 42 Natural Resources J. 59, 74-76 (2002). '[O]ver $1.7 billion is spent each year by the private and public sectors obtaining wetlands permits.' *Id*., at 81."). The agencies decided to use the Corps' estimated permit costs in this EA as it is the most recent agency estimate. Had the agencies used the Sinding & Zilberman values, the 404 program cost savings and overall avoided costs associated with the final rule would be significantly greater.

To estimate annual cost savings from reduced mitigation requirements, the agencies multiplied the cost of each mitigation acre or linear foot (low and high estimates) by the estimated reduction in annual mitigation requirements (Table III-13), and summed the acreage and linear feet values for each scenario. The Corps estimated state-specific per-acre costs of wetland mitigation and per linear foot estimates of stream mitigation by examining published studies and survey results, making phone inquiries to Corps Districts and mitigation banks, and researching web sites (U.S. EPA and Department of the Army, 2015). A team of Corps experts developed a range of values for each state. Costs for mitigation in estuarine environments, whose jurisdictional status will not be affected by this rule, are not included where explicitly identified by mitigation bank and in-lieu fee program fee schedules. Mitigation costs for each state vary widely. 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 Corps' mitigation costs estimates may be an overestimate (U.S. EPA and Department of the Army, 2015).

Table III-15 provides annual cost savings estimates from reduced mitigation requirements in the Ohio River Basin under different potential state response scenarios. The annual cost savings from reduced mitigation requirements for HUC 0509 vary by scenario to account for potential state responses to the final definitional change. Since Kentucky is not expected to regulate waters above the federal level, the annual mitigation cost savings for HUC 0510 remain consistent across all scenarios. Annual mitigation cost savings for the Ohio River Basin under Scenario 0 range from a low of $8.46 million to a high of $31.16 million. Under Scenarios 1, 2, and 3, annual mitigation cost savings range from a low of $6.64 million to a high of $16.48 million.

Table III-15: Estimated annual cost savings (2018$) of reduced mitigation requirements in the Ohio River Basin resulting from the final definitional change, by potential state response scenario

State	Cost Per Acre (2018$)		Cost Per Linear Foot (2018$)		Scenario 0[1] (millions 2018$)		Scenarios 1 & 2[1,2] (millions 2018$)		Scenario 3[1] (millions 2018$)	
	Low	High	Low	High	Low	High	Low	High	Low	High
HUC 0509										
IN	$51,513	$73,149	$303	$655	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
KY	$113,346	$170,019	$309	$778	$2.64	$6.55	$2.64	$6.55	$2.64	$6.55
OH	$38,635	$222,538	$170	$1,391	$1.82	$14.68	$0.00	$0.00	$0.00	$0.00
Total	-	-	-	-	**$4.46**	**$21.23**	**$2.64**	**$6.55**	**$2.64**	**$6.55**
HUC 0510										
KY	$113,346	$170,019	$309	$778	$4.00	$9.93	$4.00	$9.93	$4.00	$9.93
Total	-	-	-	-	**$4.00**	**$9.93**	**$4.00**	**$9.93**	**$4.00**	**$9.93**

Table III-15: Estimated annual cost savings (2018$) of reduced mitigation requirements in the Ohio River Basin resulting from the final definitional change, by potential state response scenario

State	Cost Per Acre (2018$)		Cost Per Linear Foot (2018$)		Scenario 0[1] (millions 2018$)		Scenarios 1 & 2[1,2] (millions 2018$)		Scenario 3[1] (millions 2018$)	
	Low	High	Low	High	Low	High	Low	High	Low	High
Both Watersheds										
Total	-	-	-	-	**$8.46**	**$31.16**	**$6.64**	**$16.48**	**$6.64**	**$16.48**

[1] Estimated changes in average mitigation required per year are presented in Table III-13. For each state, cost savings are calculated by multiplying the cost of each mitigation acre or linear foot (low and high estimates) by the estimated reduction in annual mitigation requirements and summing the acreage and linear feet values for each scenario.

[2] Scenarios 1 and 2 are identical for the 404 program analysis.

Table III-16 provides total annual 404 program cost savings[118] in the Ohio River Basin resulting from the final rule, under each potential state response scenario. Total costs savings combine the estimated reduction in permit costs and mitigation requirements. Under Scenario 0, estimated cost savings range from a low of $8.87 million to a high of $31.57 million annually. Under Scenarios 1, 2, and 3, which only include cost savings in Kentucky, total estimated cost savings range from a low of $6.96 million and a high of $16.80 million annually. These estimates are subject to the uncertainty discussed in Section III.B.5. The sources of uncertainty come from data limitations and as well as parameter uncertainty used as input in this analysis (*e.g.*, the ratio used for estimating for compensatory mitigation and per unit mitigation costs).

Table III-16: Total estimated annual 404 program cost savings in the Ohio River Basin (millions 2018$)

HUC	Scenario 0[1]		Scenarios 1 & 2[1,2]		Scenario 3[1]	
	Low	High	Low	High	Low	High
0509[3]	$4.61	$21.38	$2.70	$6.60	$2.70	$6.60
0510[3]	$4.27	$10.20	$4.27	$10.20	$4.27	$10.20
Total	**$8.87**	**$31.57**	**$6.96**	**$16.80**	**$6.96**	**$16.80**

[1] The total estimated cost savings is equal to the sum of reduction in application costs and the reduction in mitigation costs.

[2] Scenarios 1 and 2 are identical for the 404 program analysis.

[3] For HUC 0509, Scenario 0 includes cost savings in Indiana, Kentucky, Ohio, and West Virginia. Scenarios 1, 2, and 3 includes cost savings in Kentucky only. For HUC 0510, cost savings remain constant across all scenarios since all permits are issued in Kentucky, a state that is not likely to regulate waters above federal requirements.

III.B.2.2.2.2 Forgone Benefits

Reductions in mitigation requirements from the revised "waters of the United States" definition may result in forgone benefits. Without mitigation requirements on certain waters, the agencies anticipate a potential decline in total non-abutting wetland acreage, ephemeral stream miles and the riparian areas associated with ephemeral streams. The decline in water resources could result in a decline in the services

[118] The total estimated cost savings equal the sum of reduction in applications costs and reduction in mitigation costs.

that these resources provide, including fauna and flora support, flood control, water filtration, and recreation. Section III.B.1.4 provides more detail on ecosystem services provided by affected resources.

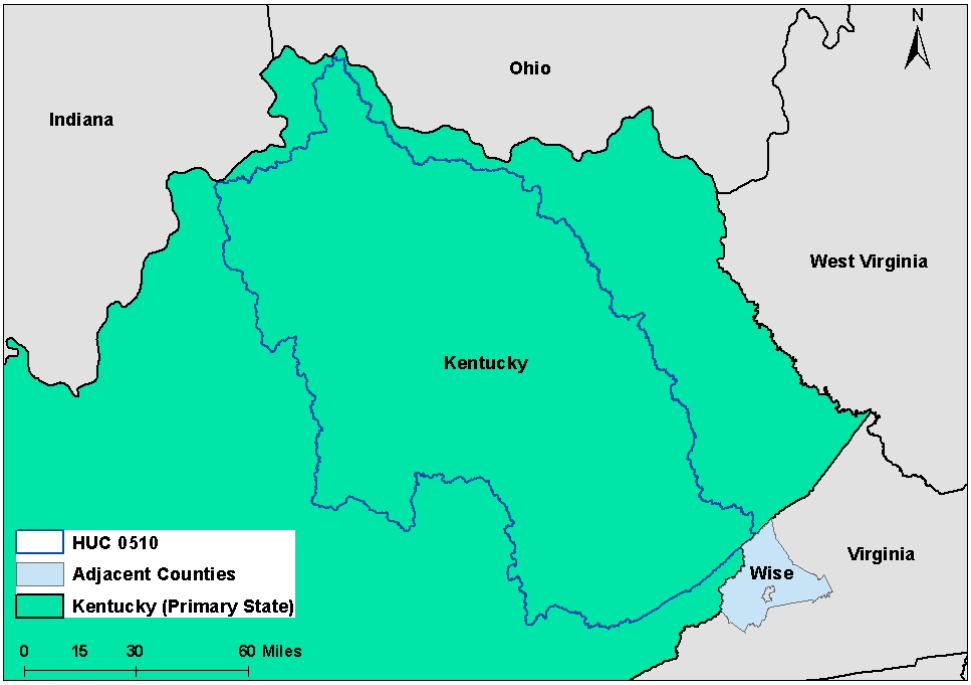
To estimate the forgone benefit value of lost mitigation acres, the agencies used a benefit transfer value from Blomquist and Whitehead (1998), who used survey responses to calculate household WTP values for preserving four types of wetlands (*i.e.*, freshwater marsh, temporarily, seasonally, and permanently flooded bottomland hardwood forest) in the Western Kentucky coal field region. Because the Blomquist and Whitehead (1998) study was conducted in the same geographic area, the resources valued in the original study are representative of the wetland types found in the case study area. The NWI wetlands mapper indicates that both "forested and shrub wetlands" and "freshwater emergent wetlands" are dominant in the Ohio River Basin case study area (U.S. FWS, 2018a). Within the Ohio River Basin, forested wetlands provide ecosystem services similar to those valued in the original study, including hydrologic, biogeochemical, and ecological water management services and enhance habitats for several different species (University of California Association of Natural Resource Extension Professionals, 2014).

The agencies calculated per acre estimates for the four different wetland types by dividing the WTP values by 500, the number of acres respondents were told to value in the survey. The agencies used the minimum and maximum WTP values for the four types of wetlands to derive low ($0.006/acre) and high ($0.038/acre) per acre WTP values, respectively. As noted above, the agencies estimated the total wetland and riparian area lost due to reduced mitigation requirements by (1) multiplying linear feet values provided in the ORM2 database by an average total buffer width of 50 feet (25 feet on each side of the stream) and converting square feet to acres and (2) adding this value to the estimated annual loss of wetland acreage obtained from the ORM2 database based on mitigated impacts for relevant permits. The agencies then estimated annual forgone benefits by multiplying per acre WTP estimates by the total annual number of impact acres (sum of wetland acres and linear feet converted to acres) potentially affected by the final rule and the number of households that value required mitigation.

To determine the number of households that value the required mitigation, the agencies applied a similar methodology to the one used in Blomquist and Whitehead (1998). The survey population included all Kentucky households as well as households in four cities outside of, but bordering, western Kentucky: Evansville, IN; Clarksville, TN; Carbondale, IL; and Cape Girardeau, MO. Following Blomquist and Whitehead (1998), the agencies applied the household WTP value to all households in the state with the majority of the watershed's 404 impacts (Ohio for HUC 0509; Kentucky for HUC 0510) as well as households in counties adjacent to the watershed in neighboring states (Figure III-12; Figure III-13).

Figure III-12: Locations of households included in the forgone benefits analysis for HUC 0509.

Figure III-13: Locations of households included in the forgone benefits analysis for HUC 0510.



The agencies calculated an annualized forgone benefit value based on forgone benefits from 2020 to 2039 (Eq. III-1):

$$WTP_{Annualized} = \left(\sum_{T=2020}^{2039} \frac{HWTP_Y \times HH_Y}{(1+i)^{Y-2018}} \right) \times \left(\frac{i \times (1+i)^n}{(1+i)^{n+1} - 1} \right) \quad \textbf{Eq. III-1}$$

Where:

$WTP_{Annualized}$ = Annualized forgone benefit value in 2018 dollars

$HWTP_Y$ = Annual household WTP in *Start Year* dollars for the required mitigation in year (*Y)*

HH_Y = Number of affected households in year (*Y)*

T = Year when benefits are realized

i = Discount rate (3 percent)

n = Number of periods for annualization (20 years for this analysis)

To estimate the number of affected households in future years, the agencies used projected population changes from 2015 to 2040 (Kentucky State Data Center, 2016; Ohio Development Services Agency, 2018; University of Virginia, 2017; West Virginia University, 2014) divided by the average number of people per household (U.S. Census Bureau, 2015).

Table III-17 and Table III-18 provide estimated annualized forgone benefits from lost mitigation requirements in the Ohio River Basin under different state response scenarios, with three percent and seven percent discount rates, respectively. HUC 0509 includes mitigation requirements in Kentucky, Ohio, and Indiana. Scenario 0 includes mitigation requirements in all three states. Under Scenarios 1, 2, and 3, only mitigation requirements in Kentucky are included. All mitigation requirements in HUC 0510 occur in Kentucky, which is not expected to regulate waters above the federal level under any scenarios. The estimated forgone benefits for HUC 0510 thus remain the same under all scenarios. Annualized forgone benefits for the Ohio River Basin under Scenario 0 range from $0.70 million to $4.63 million using a 3 percent discount rate and from $0.52 million to $3.42 million using a 7 percent discount rate. Total present value (TPV) of forgone benefits during the 2020-2039 study period ranges from $13.96 million to $92.59 million using a 3 percent discount rate and from $10.31 million to $68.37 million using a 7 percent discount rate. For Scenarios 1, 2, and 3, annualized forgone benefits range from $0.38 million to $2.51 million using a 3 percent discount rate and from $0.28 million to $1.85 million using a 7 percent discount rate. TPV ranges from $7.56 million to $50.15 million using a 3 percent discount rate and from $5.58 million to $36.99 million using a 7 percent discount rate. Similar to the estimates of avoided costs, these estimates are subject to uncertainty and limitations that are discussed in Section III.B.5 of this report.

Table III-17: Estimated annualized forgone benefits (millions 2018$) of lost mitigation requirements in the Ohio River Basin resulting from the final definitional change, by potential state response scenario (3 percent discount rate)

HUC	# Affected Households in 2020[3]	Scenario 0[1]		Scenarios 1 & 2[1,2]		Scenario 3[1]	
		Low	High	Low	High	Low	High
0509	5,170,870	$0.56	$3.72	$0.24	$1.60	$0.24	$1.60
0510	1,866,005	$0.14	$0.91	$0.14	$0.91	$0.14	$0.91
Total	**7,036,875**	**$0.70**	**$4.63**	**$0.38**	**$2.51**	**$0.38**	**$2.51**

[1] Estimated changes in average mitigation required per year are presented in Table III-13. Forgone benefits are calculated for each scenario by multiplying total forgone mitigation values for each scenario (sum of acres and linear feet converted into acres) by the total number of affected households and the appropriate household WTP value (low: $0.006/acre; high: $0.039/acre). The agencies calculated forgone benefits for the years 2020-2039 and annualized values using a 3 percent discount rate.

[2] Scenarios 1 and 2 are identical for the 404 program analysis.

[3] The agencies accounted for population growth and change in the number of households throughout the 2020-2039 study period.

Table III-18: Estimated annualized forgone benefits (millions 2018$) of lost mitigation requirements in the Ohio River Basin resulting from the final definitional change, by potential state response scenario (7 percent discount rate)

HUC	# Affected Households in 2020[3]	Scenario 0[1]		Scenarios 1 & 2[1,2]		Scenario 3[1]	
		Low	High	Low	High	Low	High
0509	5,170,870	$0.42	$2.75	$0.18	$1.18	$0.18	$1.18
0510	1,866,005	$0.10	$0.67	$0.10	$0.67	$0.10	$0.67
Total	**7,036,875**	**$0.52**	**$3.42**	**$0.28**	**$1.85**	**$0.28**	**$1.85**

[1] Estimated changes in average mitigation required per year are presented in Table III-13. Forgone benefits are calculated for each scenario by multiplying total forgone mitigation values for each scenario (sum of acres and linear feet converted into acres) by the total number of affected households and the appropriate household WTP value (low: $0.006/acre; high: $0.039/acre). The agencies calculated forgone benefits for the years 2020-2039 and annualized values using a 7 percent discount rate.

[2] Scenarios 1 and 2 are identical for the 404 program analysis.

[3] The agencies accounted for population growth and change in the number of households throughout the 2020-2039 study period.

III.B.2.2.3 CWA Section 311

The Middle Ohio watershed (HUC 0509) includes a total of 32 FRP facilities across Indiana, Kentucky, Ohio, and West Virginia according to geospatial analysis of the EPA's internal database of FRP facilities. As noted in section II.C, the high resolution NHD data are not sufficiently complete or detailed in many parts of the United States to identify ephemeral streams that may change jurisdictional status under the final rule. These limitations apply to the watersheds in the Ohio River basin, as the high-resolution NHD data do not differentiate ephemeral streams from intermittent streams in this region. For this reason, and since planning requirements consider proximity to *any* jurisdictional waters or wetlands as one factor in determining FRP applicability to a given facility, the agencies used the presence of perennial waters and wetlands abutting those waters as an indication that FRP plan owners would reach the same FRP

applicability determination under the final rule, *i.e.*, the final rule would have no impact on CWA section 311 applicability to these facilities.

Of the total of 32 FRP planholders in the Middle Ohio watershed, the agencies found 30 FRP facilities with at least one perennial stream within a half-mile of the facility. The remaining two facilities are located in proximity to a wetland whose Cowardin codes indicate a perennial flow regime. Thus, the planholders may reach the same FRP applicability determination when assessing their facility's potential for a discharge under the final rule given the proximity to waters subject to CWA jurisdiction within the planning distance.

There are six FRP facilities in the Kentucky-Licking watershed (HUC 0510), all in Kentucky. The geospatial analysis shows that all six facilities are located in close proximity to perennial streams (within a half-mile) as mapped in the high resolution NHD, in addition to also having other streams and wetlands in proximity. The presence of jurisdictional waters within the half-mile planning distance of the facilities suggests that the FRP determination would remain the same under the final rule even if some other waters within this radius become non-jurisdictional.

As described in Section III.A.3, changes in the jurisdictional status of certain streams and wetlands may lead owners of some oil handling facilities to conclude that they do not pose a reasonable potential for a discharge of oil to jurisdictional waters. The agencies do not have sufficiently detailed information, such as facility coordinates, about facilities that prepared and maintain SPCC plans in the Ohio River watersheds to assess the potential impacts of the final rule on the universe of regulated facilities in the two case study watersheds.

Neither Indiana, Ohio, nor West Virginia have state-specific requirements for spill plans. Kentucky has established state-specific requirements for oil and gas facilities under 401.KAR.5:090, Control of Water Pollution from Oil and Gas Facilities. The state requirements specify that operators must develop and implement SPCC Plans "*when required under 40 CFR part 112"* (emphasis added). Therefore, to the extent that some SPCC planholders forgo implementing the prevention measures required under SPCC, the risk of spills to ephemeral streams and other non-jurisdictional waters may increase.

Historical spill data provide limited illustration of the potential impacts. Between 2001 and 2017, EPA FOSCs oversaw responses to 31 oil spills affecting waters within the two case study watersheds. The resources affected in these incidents range from unnamed drainage ditches that flow into perennial or intermittent waterbodies to large traditional navigable waters such as the Ohio River. In one incident,[119] the discharge affected a dry creek bed but posed a threat to tributaries of the Ohio River. The EPA FOSC deployed to oversee the incident response noted that "response taken in the aftermath of the spill were effective in containing the migration of product to the immediate area downgradient of the wreck." In several incidents, the oil travelled along drainage paths before reaching a larger waterbody.

It is uncertain whether the FOSC determination to intervene due to impacts or threat to jurisdictional waters would have been different for these and other similar incidents under the final rule, particularly in cases where the waters in the immediate path of the release are ephemeral streams or non-abutting wetlands. The case examples discussed above, however, suggest that the response may be the same as

[119] http://www.epaosc.org/LewisUS25Spill

existing practice given the potential for spills to travel to jurisdictional waters through non-jurisdictional conveyances.

III.B.2.3 Potential Environmental Impacts

III.B.2.3.1 Water Quality

To evaluate the potential water quality impacts of the final rule, the agencies developed models of the selected case study watersheds and sub-watersheds using SWAT (Nietsch et al. 2011). The modeling approach, summarized below, generally follows the methodology used for analyzing the potential water quality impacts of the proposed rule (U.S. EPA and Department of the Army, 2018b), but with some changes to respond to numerous comments the agencies received on the proposed rule, correct minor errors[120] discovered in the analysis of the proposed rule, and to incorporate improved methodology and data.[121] Specifically, the agencies made the following main improvements:

- Wetlands are consistently represented as SWAT wetland features, instead of as a combination of ponds and wetlands.
- The models use location-specific parameters for wetland catchment fractions and other wetland dimensions and characteristics based on a spatial analysis of elevation and hydrographic data, instead of using uniform or default values.
- Modeled wetland changes reflect the historical distribution of CWA section 404 permits across subbasins, instead of assuming that wetland impacts are proportional to baseline wetland acreage.
- Modeled impacts reflect projected wetland changes across all contributing tributaries of a 4-digit HUC watershed instead of only including wetland changes for immediate contributing areas and selected tributaries.

Each model encompasses roughly one 4-digit HUC watershed and delineates subbasins and reaches at the resolution of 12-digit HUCs. Land uses within each watershed are based on the 2006 National Land Cover Database (NLCD; Fry et al, 2011),[122] the 2011-2012 Cropland Data Layer (U.S. Department of Agriculture, 2015), as well as wetlands represented in the NWI. The SWAT model represents wetlands through both land cover (as provided in hydrologic response units, or HRUs) and as an aggregated wetland hydrologic feature within each subbasin. The SWAT models represent wetlands using an aggregated wetland feature at the subbasin level.[123] As described below, the modeled scenarios address

[120] The agencies noted that the original version of SWAT used for the proposed rule analysis double-counted precipitation on wetlands. The agencies also noticed that the default calculations of wetland dimensions did not retain the desired normal surface area. For the final rule, the agencies used a revised version of SWAT that corrects both of these errors.

[121] It should be noted that this water quality modeling approach is used for all case studies presented in this EA.

[122] The 2006 NLCD is the most current data EPA pre-processed and incorporated into the Hydrologic and Water Quality System (HAWQS) to streamline the development of SWAT models for national-level analyses. EPA is in the process of updating HAWQS to incorporate the NCLD 2011 data, but both those efforts were not completed by the time the agencies analyzed the potential effects of the final rule.

[123] The subbasin-level wetland captures the two main categories of wetlands in each subbasin: abutting wetlands that are hydrologically connected to the main reach of a subbasin, and non-abutting wetlands without a direct connection.

changes in the jurisdictional status of certain wetlands abutting streams with ephemeral flow regimes and riparian areas of ephemeral streams. Table III-19 describes the two models used for the Ohio River basin case study.

The agencies used estimates of potential changes in CWA section 404 permits requiring mitigation of wetland impacts under the final rule (*see* Section III.B.2.2.2 for details) to also specify scenario inputs for SWAT. These inputs include net changes in the number of wetland acres (including riparian areas) within each watershed due to forgone mitigation activities based on the analysis of the ORM2 permit data. They also include the associated changes in water storage and pollutant removal capacity provided by the wetlands. The agencies did not model potential 402 impacts in SWAT due to data limitations and expectations that there would be no net impacts from changes in permit requirements at the level of 12-digit HUC (HUC12) subbasins, which is the resolution at which SWAT provides spatially explicit water quality estimates. Furthermore, as discussed in Section III.B.2.2.1, estimated changes in permitted point source discharges under CWA section 402 are small. Accordingly, existing point source loads were kept constant across the scenarios. The agencies further assumed no state-level regulation of waters potentially affected by the final rule (*i.e.*, Scenario 0).

Table III-19: Summary of SWAT models used to estimate water quality impacts of the final rule in the Ohio River basin

Model characteristics	HUC 0509	HUC 0510
	Middle Ohio	Kentucky-Licking
Total watershed area (square miles)[1]	10,754	3,706
Number of HUC12 subbasins and reach segments modeled[2]	346	106
Average annual precipitation (in/year)	48.8	52.4
Baseline land use distribution:		
% developed	6.3%	2.3%
% agriculture	28.1%	44.7%
% forested	61.7%	51.3%
% water	3.0%	1.5%
% wetlands	0.9%	0.2%
Unmitigated stream and wetland impacts[3] under the final rule over 20 years (acres)	514.5	149.2
Unmitigated stream and wetland impacts[3] under the final rule over 20 years (% of baseline acres)	0.9%	2.9%

[1] The watershed area is based on the SWAT model and may differ from the description in the introduction to Section III.B due to the omission or inclusions of HUC12 subbasins within the scope of each watershed as delineated in SWAT.

[2] For HUC 0509, reach-level predictions also include contributions from upstream watersheds HUCs 0503, 0505, 0506, 0507, 0508, and 0510.

[3] Unmitigated wetland impacts are based on permitted permanent impacts requiring mitigation and affecting wetlands abutting ephemeral streams from 2011-2015. Following the approach described in Section III.B.2.2.2, the agencies assumed a width of 50 feet for permitted impacts provided in linear feet in the ORM2 database. For watershed HUC 0509, the values in this table include only impacts in HUC12s subbasins of HUC 0509. The agencies also modeled impacts in the catchment of upstream tributaries. These modeled upstream impacts also affect reach-level predictions in HUC 0509.

III.B.2.3.1.1 Modeled CWA Program Impacts

Following the approach used for the proposed rule (U.S. EPA and Department of the Army, 2018b), the agencies simulated the watershed response to land use changes over a 20-year period, based on permitted activities shown in the ORM2 database in 2011-2015, under both the baseline (without the final rule) and final rule scenarios (with the final rule). The differences between model predictions for these two scenarios illustrate the potential effects of the rule on HUC12 reaches downstream from potentially affected waters. The watershed model enables the agencies to look at the estimated impacts of changes occurring within each subbasin immediately draining to the reach concurrently with cumulative effects from areas of the watershed upstream of the reach. For HUC 0509, the upstream reaches include impacts from changes modeled in HUCs 0501 through 0510 since these watersheds drain to tributaries of the Middle Ohio River.[124]

Table III-20 shows the predicted wetland impacts in HUCs 0509 and 0510 specified in the SWAT model. These inputs are derived from the same analysis of the ORM2 section 404 permit data described in Section III.B.2.2.2 and used in estimating cost savings and forgone benefits under the 404 program. The estimated impacts differ from the values reported under Section III.B.2.2.2 because of differences in the temporal scope of the analysis and geographical extent of the SWAT watershed. First, while Section III.B.2.2.2 reports estimated impacts over the five-year period of 2011-2015 or as annual averages, SWAT models use as inputs impacts projected over a 20-year period, which are calculated by multiplying impacts in 2011-2015 by four. Second, while the SWAT models approximately cover the extent of HUC 0509 and HUC 0510 watersheds, the boundaries do not match exactly and the SWAT models omit some HUC12 subbasins with permit impacts in the 404 data (these HUC12 subbasins are represented in a different SWAT model, including one HUC12 subbasin which is included in the model for HUC 0509). Generally, these differences do not yield significant differences in the representation of overall impacts predicted in Ohio River Basin watersheds.[125]

Table III-20: Summary of CWA section 404 program activities in Ohio River Basin SWAT models for permits with permanent or temporary impacts to waters potentially affected by the final rule and with mitigation requirements over 20-year analysis period. Modeled scenario considers permanent impacts only.

Type of Potentially Affected Resource[2]	Permanent Impacts (Acres)	Permanent Impacts (Linear Feet)	Total[1] Permanent Impacts (Acres)	Temporary Impacts (Acres)	Temporary Impacts (Linear Feet)	Total[1] Temporary Impacts (Acres)
HUC 0509[4]						
Wetland abutting ephemeral stream	57.2	0	57.2	3.0	0	3.0
Ephemeral stream[3]	0.0	369,323	423.7	0	12,036	13.8
Total	**57.2**	**369,323**	**480.9**	**3.0**	**12,036**	**16.8**

[124] HUCs 0501, 0502, and 0504 all drain to HUC 0503. In turn, HUCs 0503, 0505, 0506, 0507, 0508, and 0510 all drain to HUC 0509.

[125] One exception is the SWAT model for HUC 0510 which encompasses about half (48 percent) of the permanent permitted impacts reported in the section 404 data for HUC 0510, since that model covers only the Licking Creek portion of the watershed to the east and omits tributaries to the Kentucky River to the west (*see* map in Appendix C). This means that while the SWAT model results for HUC 0510 can provide further understanding of the forgone benefits presented in Section III.B.2.2.2, the two analyses should not be compared directly.

Table III-20: Summary of CWA section 404 program activities in Ohio River Basin SWAT models for permits with permanent or temporary impacts to waters potentially affected by the final rule and with mitigation requirements over 20-year analysis period. Modeled scenario considers permanent impacts only.

Type of Potentially Affected Resource[2]	Permanent Impacts (Acres)	Permanent Impacts (Linear Feet)	Total[1] Permanent Impacts (Acres)	Temporary Impacts (Acres)	Temporary Impacts (Linear Feet)	Total[1] Temporary Impacts (Acres)
HUC 0510						
Wetland abutting ephemeral stream	23.3	0	23.3	0.2	0	0.2
Ephemeral stream[3]	0.0	250,140	287.1	0.0	9,044	10.4
Total	**23.3**	**250,140**	**310.5**	**0.2**	**9,044**	**10.6**

[1] Represents the sum of impacts reported in acres and impacts reported in linear feet, assuming a width of 50 feet for linear impacts.

[2] See Table III-9 for criteria used to identify affected resources that may change jurisdiction under the final rule.

[3] Represents estimated forgone mitigation for impacts to riparian areas of ephemeral streams, assuming a total buffer 50 feet wide.

[4] 404 program activities for tributary watersheds 0501-0508 are not shown but were used in the models.

The ORM2 database measures authorized impacts as either areas or lengths. Following the approach used for the proposed rule (U.S. EPA and Department of the Army, 2018b) and in Section III.B.2.2.2, the agencies assumed a width of 50 feet (total) for stream impact measured in linear feet and calculated the equivalent affected area. For the analysis described below, the agencies considered only forgone mitigation of permanent impacts, but temporary impacts may also require mitigation and the mitigation actions may have permanent effects.

The modeling baseline assumes continued regulation of some ephemeral streams and adjacent wetlands under the CWA, based on requirements contained in CWA section 404 permits issued in 2011-2015 to mitigate permanent impacts to these waters. Not all ephemeral and intermittent streams are jurisdictional under the 2019 Rule baseline. "Isolated" and non-perennial waters typically require a significant nexus test or other review to determine jurisdiction under the 2019 Rule. The agencies used issued 404 permits to develop inputs for the baseline scenario and therefore all waters affected by permitted activities were deemed to be jurisdictional under the definition of "waters of the United States" in effect at the time the permit was issued, recognizing that many permits are issued following PJDs that presume the jurisdictional status of impacted waters to speed permitting and associated reviews. This includes the ephemeral streams in Table III-20. The modeling baseline assumes that future projects of a similar character as those in the ORM2 data set would get similar requirements over the next 20 years. Thus, under the assumed modeling baseline, a developer that permanently affects a wetland abutting ephemeral streams may be required to mitigate those impacts, for example by creating an equivalent wetland or purchasing corresponding credits, such that the wetland functions are maintained. The same would be true for stream impacts. For the purpose of modeling this scenario in SWAT, therefore, the agencies assume no net change in wetland or stream area, *i.e.*, mitigation actions replace affected waters on a one-to-one basis. While projects requiring CWA section 404 permits are diverse, for the SWAT analysis, the agencies further assume that permanent wetland and stream impacts arise from projects that increase developed areas, such as industrial development, low density residential areas, and roads, and replace

wetlands with a mix of pervious and impervious surfaces. Conversely, the agencies assume that wetlands created through compensatory mitigation are placed on available agricultural land within the same subbasin. As such, the net effect of the modeled baseline is less agricultural land and more developed land (and not net change in wetland areas).

The agencies modelled this scenario in SWAT by increasing the areas of hydrologic response units (HRUs)[126] with developed land uses by the amount equivalent to the mitigation requirements in Table III-20, and decreasing the areas of HRUs with agricultural land uses by the same amount. The agencies generally assigned the changes in wetland areas to the HUC12 subbasin indicated by 404 permits issued in 2011-2015.[127] This assumes that future development will follow roughly the same geographical distribution as development during the period of 2011-2012. Then, the agencies applied the absolute change in acres to other land uses within each subbasin as appropriate depending on the baseline or final rule scenario (*i.e.*, developed areas, agricultural land). Finally, within any given land use category in a HUC12 subbasin, the agencies distributed the subbasin-level change to individual HRUs in proportion to their existing area share.

In addition, because the SWAT model represents wetlands through both land use and as distinct hydrologic features within the subbasins, the agencies also adjusted the size of these features in the SWAT model to represent the scenario. Specifically, the agencies adjusted the volume and surface area of the wetlands represented in SWAT to account for the definitional changes. The agencies assumed no change in topography or large-scale drainage patterns as a result of the final rule such that the wetland catchment areas within each subbasin are constant in the two scenarios.[128]

The estimated changes due to the final rule are relatively small, as compared to both the total area of the watershed and the area of the affected land use type. Thus, mitigation requirements summarized in Table III-20 total 514.5 acres in watershed 0509 and 149.2 acres in watershed 0510, which translates into 0.12 and 0.28 percent increases in the amount of development in HUC 0509 and HUC 0510, respectively, and 0.03 percent and 0.01 percent decrease in the total agricultural land in the two watersheds. The calculations are applied to each HUC12 subbasin and the magnitude of impacts therefore varies across the watersheds, as summarized in Table III-21, which includes statistics for the subbasin with the largest absolute change.

[126] HRUs are the smallest spatial unit of analysis in the SWAT model. They are defined as unique combinations of subbasin, land use, soil, and slope within the modeled watershed.

[127] The agencies encountered instances in which the HUC12 where the permitted activity was recorded did not have wetland land or developed land uses in the SWAT watersheds, or had fewer wetland acres than implied by mitigation activities over the 20-year analysis period. In those cases, the agencies assigned excess projected activities to the subbasin within the HUC4 watershed that counts the largest wetland area, provided that it also had some developed areas and sufficient agricultural areas.

[128] Under this assumption, development on any existing wetland areas continues to drain to the remaining wetlands under the final rule scenario.

Table III-21: Summary of land use changes in Ohio River Basin SWAT watersheds resulting from 404 permits with permanent impacts to waters potentially affected by the final rule and with mitigation requirements, under baseline scenario

	HUC12 Subbasins		Largest absolute change in HUC12 subbasin		Total HUC4 watershed (all subbasins)	
Land use	Total count	Number with changes	acres	% of existing land use	Acres	% of existing land use
HUC 0509						
Developed area	346	34	107.8	55.7%	514.5	0.12%
Agricultural area	346	34	-107.8	-2.1%	-514.5	-0.03%
HUC 0510						
Developed area	106	6	74.7	9.8%	149.2	0.28%
Agricultural area	106	6	-74.7	-0.9%	-149.2	-0.01%

The modeled final rule scenario accounts for the estimated permanent reduction in wetland area due to the removal of mitigation requirements for projects affecting ephemeral streams and non-abutting wetlands. The net effect of the scenario is a reduction in wetland and stream riparian area due to forgone mitigation. Similar to the Baseline scenario described above, the agencies assumed that permitted projects result in increased developed land uses in the watershed, but this time the increase is accompanied by a net reduction in wetland area. The agencies assumed that incremental development within each subbasin is of the same character as the existing developed land use (*e.g.*, if 70 percent of the development within the subbasin consists of low-density development, then 70 percent of the increase is assumed to be low density development). The agencies mapped the changes presented in Table III-20 to the SWAT wetland land uses and wetland features. Table III-22 summarizes the changes by land use type. As described above, the agencies also adjusted the dimensions of SWAT wetlands to correspond to the estimated reduction in wetland and stream area within each subbasin. The potential effect of the final rule is thus two-fold: (1) changes in runoff/recharge and response to precipitation due to the changes in land cover, and (2) reduction in water storage and nutrient and sediment removal capacity.

Table III-22: Summary of land use changes in Ohio River Basin SWAT watersheds resulting from 404 permits with permanent impacts to waters potentially affected by the final rule and with mitigation requirements, under final rule scenario

	HUC12 Subbasins		Largest absolute change in HUC12 subbasin		Total HUC4 watershed (all subbasins)	
Land Use	Total count	Number with changes	acres	% of existing land use	Acres	% of existing land use
HUC 0509						
Developed area	346	34	107.8	55.7%	514.5	0.12%
Wetland area	346	34	-107.8	-2.1%	-514.5	-0.88%
HUC 0510						
Developed area	106	6	74.7	9.8%	149.2	0.28%
Wetland area	106	6	-74.7	-0.9%	-149.2	-2.94%

III.B.2.3.1.2 Changes in Subbasin Water Balance and Constituent Transport

Comparing SWAT outputs for the final rule scenario with those for the baseline scenario indicates the potential net impacts of the rule on the watershed and receiving streams. Those impacts – in terms of land

use changes and wetland area – are first felt at the HUC12 subbasin level as changes in runoff, recharge, groundwater flows, and pollutant loadings delivered to the receiving reach. Table III-23 and Table III-24 summarize the modeled changes between the final rule and baseline scenarios across subbasins within the watersheds HUC 0509 and 0510, respectively. Maps in Appendix C show the distribution of changes.

Table III-23: Estimated change in annual average subbasin water balance and constituent transport in SWAT watershed HUC 0509

	Number of Subbasins by Direction of Change			Absolute Change over All Subbasins[1]		
Model parameter	Increase	Decrease	No Change	Average	Minimum	Maximum
Evapotranspiration (m^3/yr)	3	31	312	-3,001	-246,342	2,161
Surface runoff (m^3/yr)	30	4	312	934	-58,415	142,767
Lateral flow (m^3/yr)	34	0	312	1,773	0	193,031
Groundwater flow (m^3/yr)	34	0	312	433	0	48,648
Total water yield (m^3/yr)	34	0	312	4,341	0	374,023
Sediment yield (ton/yr)	33	1	312	1.0	-6.9	133.1
Organic N (kg/yr)	33	1	312	2.4	-2.2	145.6
Organic P (kg/yr)	33	1	312	0.2	-0.8	15.4
NO_3 in surface runoff (kg/yr)	34	0	312	3.6	0.0	324.8
Soluble P (kg/yr)	33	1	312	0.2	0.0	13.2

[1] Total number of SWAT HUC12 subbasins is 346, but only 34 subbasins have modeled wetland changes under the final rule scenario.

Table III-24: Estimated change in annual average subbasin water balance and constituent transport in SWAT watershed HUC 0510

	Number of Subbasins by Direction of Change			Absolute Change over All Subbasins[1]		
Model parameter	Increase	Decrease	No Change	Average	Minimum	Maximum
Evapotranspiration (m^3/yr)	0	6	100	-2,510	-150,907	0
Surface runoff (m^3/yr)	6	0	100	5,223	0	297,590
Lateral flow (m^3/yr)	6	0	100	459	0	29,383
Groundwater flow (m^3/yr)	6	0	100	329	0	27,109
Total water yield (m^3/yr)	6	0	100	7,698	0	514,482
Sediment yield (ton/yr)	6	0	100	6.8	0.0	684.5
Organic N (kg/yr)	6	0	100	17.2	0.0	1,454.2
Organic P (kg/yr)	6	0	100	1.5	0.0	137.9
NO_3 in surface runoff (kg/yr)	6	0	100	7.2	0.0	517.0
Soluble P (kg/yr)	6	0	100	0.5	0.0	31.7

[1] Total number of SWAT HUC12 subbasins is 106, but only 6 subbasins have modeled wetland changes under the Final Rule.

III.B.2.3.1.3 Modeled Impacts to Streams

Changes within the immediate subbasin contributing to each reach affect the flow regime and water quality within the streams at the scale of HUC12 subbasins. The significance of these changes on the

receiving stream reach depends on their magnitude relative to other stream inputs such as point sources or contributions from upstream catchments.

The agencies compared SWAT model predictions for the final rule and baseline scenarios to estimate changes in nutrient and sediment loadings to HUC12 streams, changes in runoff and subsurface flows, and instream constituent concentrations resulting from changes in both loads and flow regimes. Table III-25 summarizes the direction and relative magnitude of mean annual changes over all reaches modeled in the two watersheds. Table III-26 summarizes changes in mean annual loadings delivered to the outlet of HUC 0509, the Ohio River downstream of Cincinnati, OH near Warsaw, KY. These results reflect the contributions from all upstream reaches and their respective catchments, as well as intervening instream processes modeled in SWAT, such as sediment deposition in stream channels and reservoirs.[129] Maps in Appendix C show the distribution of changes.

As shown in the two tables, the SWAT model outputs show general increases in mean daily flows and annual nutrient and sediment loads in streams. This increase follows from the combined effects of land use changes and reduced wetland functions modeled in SWAT.

Table III-25: Summary of modeled changes in loads transported by HUC12 reaches and in-stream concentrations within the SWAT watersheds for the Ohio River Basin

Parameter	Number of Reaches by Direction of Change[1]			Absolute and Percent Change over All Reaches		
	Increase	Decrease	No Change	Average Change	Average % Change	Maximum % Change
HUC 0509						
Annual TN load (kg/yr)	99	4	243	84.5	0.01%	0.70%
Annual TP load (kg/yr)	99	4	243	10.1	0.01%	0.34%
Annual sediment load (kg/yr)	97	6	243	6.3	0.01%	0.34%
Mean daily flow (m^3/s)	103	0	243	0.01	0.01%	0.33%
HUC 0510						
Annual TN load (kg/yr)	28	0	78	62.9	0.01%	0.38%
Annual TP load (kg/yr)	28	0	78	5.7	0.01%	0.42%
Annual sediment load (kg/yr)	25	3	78	2.8	0.01%	0.50%
Mean daily flow (m^3/s)	28	0	78	0.0	0.01%	0.30%

[1] Total number of reaches is 346 in HUC 0509 and 106 in HUC 0510.

Table III-26: Modeled changes in annual average loads delivered to the Ohio River downstream of Cincinnati, OH near Warsaw, KY (outlet of HUC 0509)

Parameter	Baseline	Final Rule	Change	% Change
Annual TN load (kg/yr)	363,424	364,409	985	0.27%
Annual TP load (kg/yr)	80,994	81,040	46	0.06%
Annual sediment load (ton/yr)	2,244,232	2,244,338	106	0.00%
Flow (cms)	3,042.27	3,042.37	0.10	0.003%

[129] SWAT model runs for HUC 0509 incorporate simulated flows and delivered loads at the outlet of tributaries (HUCs 0503, 0505, 0506, 0507, 0508, and 0510) that also see changes from forgone mitigation.

On average across the modeled reaches, the analysis predicts that the final rule increases mean daily flows and loadings minimally compared to the baseline. While the direction of the changes suggests that reducing CWA jurisdiction under the final rule could have some adverse impacts, the magnitude of these changes is small and often zero at the HUC12 spatial resolution explicitly addressed in the SWAT model.

III.B.2.3.2 Drinking Water

According to the EPA's Safe Drinking Water Information System (SDWIS) database, 29 community water systems get their source water from intakes located within the scope of the Middle Ohio SWAT watershed (HUC 0509) and 14 community water systems get their water from sources located in the Kentucky-Licking SWAT watershed (HUC 0510).

Results from the SWAT analysis show small changes in daily suspended sediment concentrations for reaches with drinking water intakes in HUC 0509 and HUC 0510 as a result of forgone mitigation of ephemeral stream and non-abutting wetland impacts.[130] The estimated changes in average daily sediment concentration range from -0.02 percent to 0.03 percent in HUC 0509 (with the lower concentrations attributable to higher mean daily flow rates), whereas changes in HUC 0510 range from -0.05 percent to 0.02 percent. Public water systems (PWS) use a variety of treatment processes to remove sediment through filtration and the addition of coagulants. Studies of drinking water treatment costs show that increased sediment loadings, and increased pollutants bound to these sediments, are likely to increase operation costs to the affected PWS (Dearmont, McCarl, & Tolman, 1998; Holmes, 1998; McDonald, Weber, Boucher, & Shemie, 2016). However, given the small predicted changes in sediment loadings, the agencies did not estimate the potential change in drinking water treatment costs.

Table III-27: Estimated impacts to modeled reaches with public drinking water intakes under the final rule in the Ohio River Basin SWAT watersheds

SWAT Watershed HUC4	Number of community water systems	Number of intakes	Number of people served	Change in mean daily suspended sediment concentration		
				Min	Mean	Max
0509	29	49	1,375,475	-0.02%	0.00%	0.03%
0510	14	16	90,775	-0.05%	0.00%	0.02%
Total	**43**	**65**	**1,466,250**			

Source: EPA analysis of SDWIS (2017) data. Based on intakes located in the HUC12 subbasins within the scope of SWAT models for HUC 0509 and HUC 0510. The analysis assumes that intakes are located on the main stem within each HUC12. If intakes are instead located on a tributary to the main stem, the impacts may be lower or greater than those presented here, depending on forgone mitigation within the catchment of the relevant tributary.

[130] There are 49 surface water intakes within the scope of SWAT model HUC 0509 and 17 intakes within the scope of SWAT model HUC 0510.

III.B.2.3.3 Dredging for Water Storage and Navigation

The SWAT models identify 11 reservoirs within the Middle Ohio watershed (HUC 0509) and one reservoir in the Kentucky-Licking SWAT watershed (HUC 0510).[131]

Reservoirs serve many functions, including storage of drinking and irrigation water supplies, flood control, hydropower supply, and recreation. Streams can carry sediment into reservoirs, where it can settle and cause buildup of silt layers over time. Sedimentation reduces reservoir capacity (Graf et al. 2010) and the useful life of reservoirs unless measures such as dredging are taken to reclaim capacity (Clark, et al., 1985).

SWAT model runs comparing the baseline to the final rule predict increases in sediment deposition in reservoirs of HUC 0509, calculated as the difference between fluxes in minus fluxes out of the reservoirs, by an average of 179 tons per year. This represents a less than 0.1 percent increase from the baseline sediment deposition of 665,300 tons per year in aggregate across the eleven reservoirs. In HUC 0510, sediment deposition is predicted to decline by 5 tons per year, a less than 0.1 percent decrease from the baseline sediment flux of -53,550 tons per year (*see* Table III-28 for detail).

Table III-28: Summary of modeled net sediment depositions in reservoirs in the Ohio River Basin (tons/year) in 2040

HUC4	Number of reservoirs[1]	Net annual sediment deposition in reservoirs		Change relative to baseline	
		Baseline	Final Rule	Tons/year	Percent
0509	11	665,300	665,479	179	0.03%
0510	1	-53,550	-53,555	-5	-0.01%

[1] Reservoirs modeled in SWAT watersheds, based on the U.S. Army Corps of Engineers National Inventory of Dams as of October 2010.

Changes in reservoir sedimentation due to forgone mitigation of CWA section 404 project impacts could affect maintenance dredging costs. However, given the small differences modeled in SWAT between the baseline and final rule scenarios, the agencies estimated that the resulting change in annualized dredging costs are likely to be small. Extrapolating from the analysis of the proposed rule (*see* U.S. EPA and Department of the Army, 2018b), the agencies estimated the annualized dredging costs to be less than one thousand dollars per year for the two watersheds. These estimates are subject to uncertainty. For example, some states may implement erosion controls in the upstream watershed to reduce the rate of sedimentation in the affected reservoirs instead of sediment dredging (Randle et al., 2017). The cost associated with erosion control strategies may be greater or lower than the estimated dredging costs. See Section III.B.5 for more detail on uncertainties in this analysis.

III.B.3 Case Study 2: Lower Missouri River Basin

This case study area encompasses the area along the border of Nebraska and Kansas, stretching into Colorado on the west and touching the Missouri River on the east. The Republican River and Kansas

[131] The SWAT watersheds include reservoirs identified in the U.S. Army Corps of Engineers National Inventory of Dams as of October 2010.

River watersheds lie mainly within the High Plains and Central Great Plains ecoregions. There are several climate zones in the area, ranging from mild mid-latitude and humid to dry steppe climates. Summers are typically hot, and winters can be mild to severe. Annual precipitation ranges from 305 to 940 mm (12 to 37 inches). Most streams in the area are intermittent, and a few are perennial. Land is primarily used for cropland. Other uses include land for grazing as well as oil and gas production (CEC, 2011).

Figure III-14 and Figure III-15 show maps of the HUC 1025 and HUC 1027 case study watersheds, respectively. The Republican River is a tributary to the Kansas River and therefore the outlet of watershed HUC 1025 flows into HUC 1027, along with contributions from the tributary watershed HUC 1026.

Figure III-14: Map of HUC 1025 – Republican River Basin showing high-resolution NHD water features and NWI wetlands in relation to state boundaries, major cities, and neighboring watersheds.

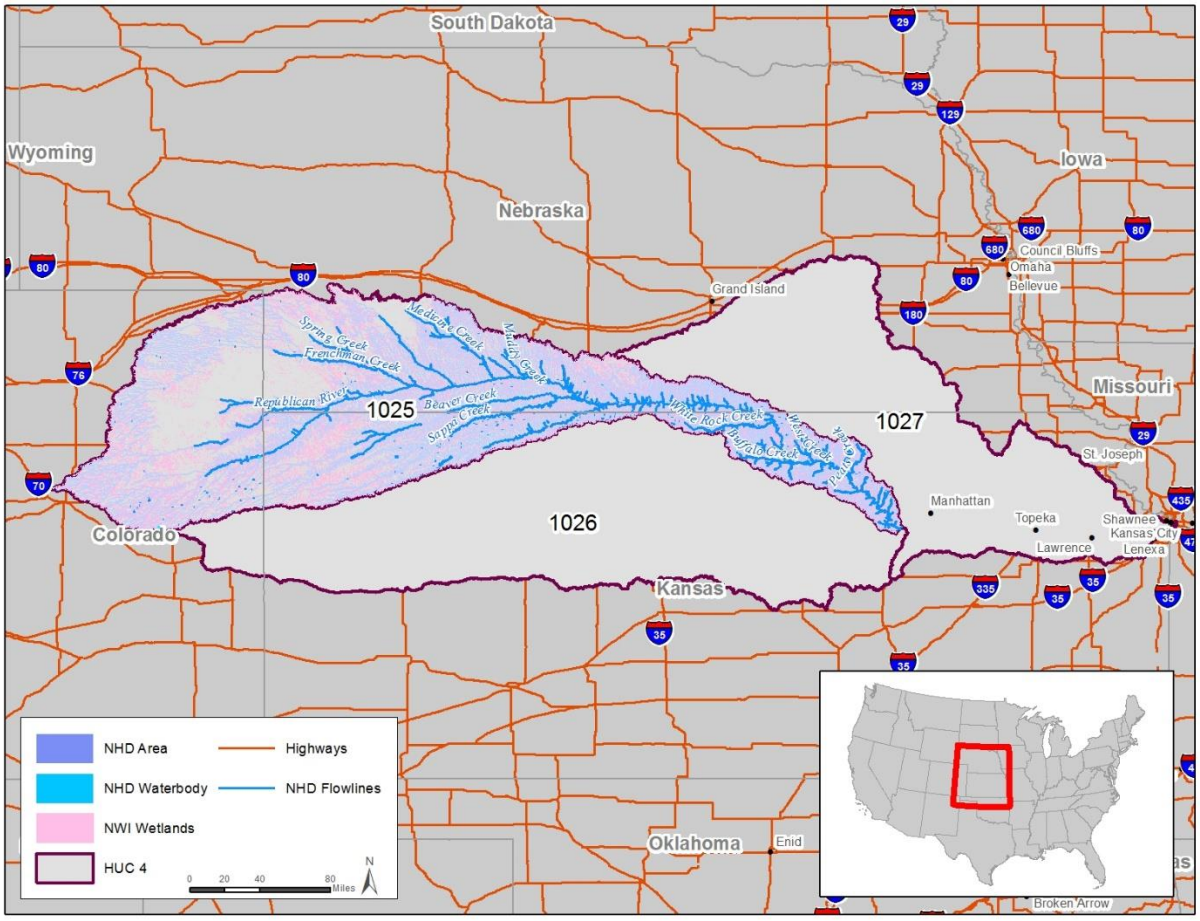
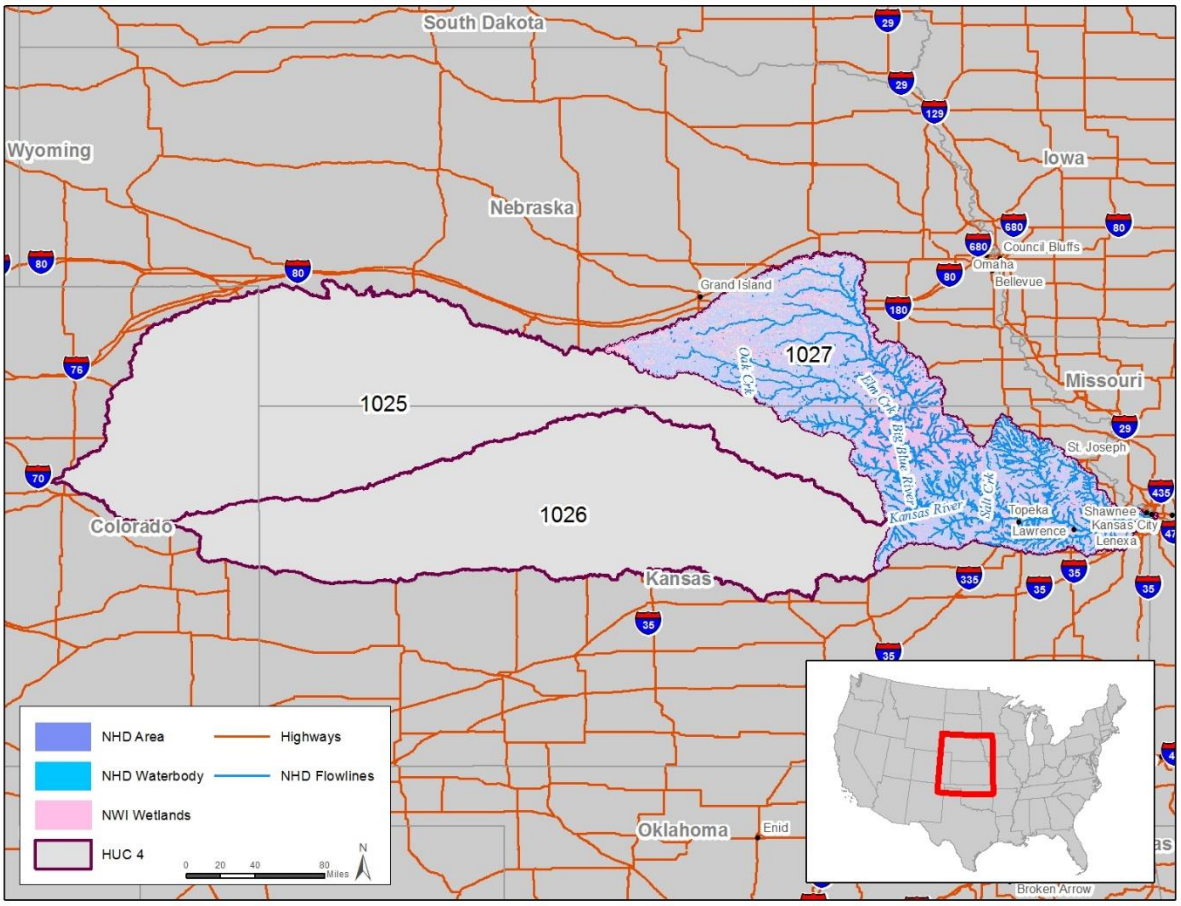


Figure III-15: Map of HUC 1027 – Kansas River Basin showing high-resolution NHD water features and NWI wetlands in relation to state boundaries, major cities, and neighboring watersheds.



III.B.3.1 Aquatic Resources Characteristics

Table III-29 summarizes the hydrography within the case study watersheds in terms of the number of stream miles in each flow category and acres of non-abutting abutting wetlands based on the agencies' geospatial analysis of the high resolution NHD and the NWI. As presented in the table, 77 to 86 percent of all stream miles within the two watersheds are identified in the NHD as either ephemeral or intermittent, and 11 to 17 percent of all wetland acres are non-abutting (*i.e.*, not touching high resolution NHD streams).[132] As was the case for the Ohio River basin, the NHD data within the study areas generally do not differentiate streams according to their flow regime, which explains the very small number of ephemeral reach miles, relative to the total number of reach miles. To overcome this limitation in the analyses of program impacts, the agencies therefore again relied on information available in permits and in the NWI data to estimate impacts to ephemeral streams, wetlands abutting ephemeral streams, and non-abutting wetlands.

[132] The agencies do not know how many wetlands that were determined to be "non-abutting" might otherwise satisfy the definition of "adjacent wetlands" under the final rule.

Table III-29: Hydrographic profile of case study watersheds in the Lower Missouri River Basin

Feature type	Mapped feature attributes	HUC 1025		HUC 1027	
		Miles or Acres	Percent of total	Miles or Acres	Percent of total
Streams (miles)	**Total**	40,561	100%	37,933	100%
	Perennial	2,339	6%	5,361	14%
	Intermittent	35,031	86%	29,362	77%
	Ephemeral	1	0%	11	0%
	Artificial path	2,407	6%	2,819	7%
	Other[1]	784	2%	380	1%
Wetlands (acres)	**Total**	356,673	100%	398,436	100%
	Abutting	242,234	68%	325,484	82%
	Non-abutting	114,439	32%	72,951	18%

[1] Includes canal, ditches, aqueducts, and other features without attributes.

The values are based on the agencies' geospatial analysis of NHD and NWI data and reflect gaps in NHD stream attributes and NWI wetland mapping.

III.B.3.2 Program Changes

III.B.3.2.1 CWA Section 402

Table III-30 presents the number of NPDES permits issued in the Lower Missouri River Basin by the most common industry categories. The number of permits issued in the two case study watersheds includes 538 individual permits and 1,940 general permits. Twenty-eight permits in the Lower Missouri River Basin have at least one discharge near an ephemeral stream (3 individual and 25 general permits).[133] Based on the permits with SIC codes, the most common industry requiring NPDES permits with at least one discharge near an ephemeral stream in the Lower Missouri River Basin include aggregate mining (15 permits) and construction and development (4 permits).

Table III-30: CWA section 402 individual permits (SIC codes in parentheses) issued in case study watersheds in the Lower Missouri River Basin

Industry category	Individual permits[1]			General permits[1]		
	Total number of NPDES permits	Permits with discharge point near ephemeral streams[2]		Total number of NPDES permits	Permits with discharge point near ephemeral streams[2]	
		Number of permits	Percent of all permits		Number of permits	Number of permits
HUC 1025						
Sewerage Systems (4952)	34	0	0%	8	1	13%
Aggregate Mining[3]	3	0	0%	21	15	71%
Construction and Development[4]	0	0	0%	47	4	9%

[133] Note that none of the permits the agencies reviewed for this watershed affected waters with the code "R4SBJ." All permits shown in Table III-30 have a discharge point near a feature identified with Cowardin code "R4SBA," which the agencies have interpreted for purposes of this analysis as an ephemeral stream.

Table III-30: CWA section 402 individual permits (SIC codes in parentheses) issued in case study watersheds in the Lower Missouri River Basin

Industry category	Individual permits[1]			General permits[1]		
	Total number of NPDES permits	Permits with discharge point near ephemeral streams[2]		Total number of NPDES permits	Permits with discharge point near ephemeral streams[2]	
		Number of permits	Percent of all permits		Number of permits	Number of permits
Ready-Mixed Concrete (3273)	0	0	0%	4	1	25%
Petroleum Bulk Stations and Terminals (5171)	0	0	0%	1	1	100%
Other Categories[5]	70	0	0%	31	-	0%
Missing SIC Codes	6	2	33%	150	1	1%
Total	**113**	**2**	**2%**	**262**	**23**	**9%**
HUC 1027						
Sewerage Systems (4952)	161	0	0%	9	0	0%
Aggregate Mining[3]	24	0	0%	8	0	0%
Construction and Development[4]	1	0	0%	17	0	0%
Ready-Mixed Concrete (3273)	0	0	0%	12	0	0%
Petroleum Bulk Stations and Terminals (5171)	0	0	0%	2	0	0%
Other Categories[5]	140	0	0%	152	0	0%
Missing SIC Codes	99	1	1%	1,480	2	0%
Total	**425**	**1**	**0%**	**1,680**	**2**	**0%**
Total for both watersheds	**538**	**3**	**1%**	**1,942**	**25**	**1%**

[1] Source: EPA's ICIS-NPDES data, 2017. The facility permits included in the spatial analysis are limited to those for which the ICIS-NPDES database includes valid latitude/longitude coordinates. For permits with multiple SIC codes, only one SIC code was retained, with manufacturing industries prioritized, to avoid double-counting.

[2] The agencies used the Cowardin classification code in NWI to determine whether 402 discharges are likely to affect ephemeral streams (*i.e.*, the agencies interpreted Cowardin codes R4SBA and R4SBJ as ephemeral; *see* Section III.B.1 for more detail). All permits shown as having a discharge point near ephemeral streams affect waters with a Cowardin code R4SBA.

[3] Includes SIC Codes 1422, 1423, 1429, 1442, 1446, 1459, 1474, 1475, 1481, and 1499.

[4] Includes SIC Codes 1629, 1794, 6552, 1611, 1799, 1521, 1522, and 1623.

[5] Includes multiple categories, such as Asphalt Paving Mixtures and Blocks (2951), Animal Feeding Operations (211, 212, 213, 214, 219, 241, 251, 252, 253, 254, 259, 271, 272, and 279), Electric Services (4911), Industrial Domestic Wastewater Treatment (6513, 6514, 6515, 7011, 7032, 7033, 8211, 8221, 8641, and 8661), Industrial Organic Chemicals (2869), Motor Vehicle Parts, Used (5015), Refuse Systems (4953), Trucking Facilities (4212, 4231), and Water Supply (4941).

The majority of CWA section 402 permit holders in the Lower Missouri River Basin have TBELs, including sewage systems (secondary), aggregate mining, and construction and development. The ready-mixed concrete and petroleum bulk stations and terminals industries do not have national TBELs. For facilities in these two industry categories, effluent limitations are either WQBELs for pollutants with applicable water quality standards, or TBELs based on the best professional judgement of the permit writer (U.S. EPA; 2011).

Of the three individual NPDES permits potentially affecting ephemeral streams, none have WQBELs. Should the definition of "waters of the United States" change, a permittee subject to more stringent limits based on a WQBEL could request a revision of its WQBEL to account for potential dilution or attenuation of the pollutant(s) occurring between end-of-pipe and the point where the effluent enters jurisdictional waters, subject to applicable anti-backsliding permit requirements. Under this scenario, the permittee may realize cost savings as compared to meeting the previous permit limits.

NPDES permits potentially affecting ephemeral waters (25 general and 3 individual) were issued in two states in the Lower Missouri River Basin (Colorado and Kansas). Colorado and Kansas are expected to regulate waters beyond the CWA under Scenario 2 (3) only.[134] All permits potentially affecting ephemeral waters thus drop from consideration under Scenario 2 (3). Section II.A describes potential state responses and different analytic scenarios in more detail.

NPDES permits issued under the ready-mixed concrete and petroleum bulk stations and terminals categories are not subject to national TBELs. In the Lower Missouri River Basin case study watersheds, two permits potentially affected by the final rule were issued in these categories from 2011-2015. Both of these permits were issued in Colorado and thus drop from consideration under Scenario 2 (3).

III.B.3.2.2 CWA Section 404

To estimate the potential effect of reduced mitigation requirements for non-abutting wetlands and ephemeral streams on potential cost savings and forgone benefits, the agencies used the approach described in Section III.B.2.2.2. Table III-31 summarizes CWA section 404 permits issued in 2011-2015 within the Lower Missouri River Basin that required mitigation on RPWWN-type wetlands or ephemeral streams. As presented in the table, the agencies' geospatial analysis shows 40 permits in HUC 1025 and 59 permits in HUC 1027 issued by the Corps with impacts that required mitigation on waters potentially affected by the revised definition of "waters of the United States." Permanent impacts resulting from 404 permits issued in 2011-2015 included annual averages of 0.1 acres and 6,646 linear feet in HUC 1025 and 1.1 acres and 7,873 linear feet in HUC 1027. In both case study watersheds, permit impacts occurred in Kansas and Nebraska. Kansas is likely to implement state regulations more stringent than the federal level under Scenario 3, while Nebraska is not anticipated to regulate waters beyond the CWA under any scenarios.

[134] Scenarios 2 and 3 are identical for the 402 program analysis.

Table III-31: CWA section 404 permits issued in case study watersheds in the Lower Missouri River Basin (2011-2015)[1]

State	# Permitted Projects	# Permits with mitigation requirements potentially affected by revised definition of "waters of the United States"[2]	Permanent impacts		Temporary impacts	
			Acres	Length Feet	Acres	Length Feet
HUC 1025						
CO	10	0	0.00	0	0.00	0
KS	207	38	0.63	33,230	0.00	5,005
NE	141	2	0.02	0	0.00	0
Total	**358**	**40**	**0.65**	**33,230**	**0.00**	**5,005**
Avg. per year	**72**	**8**	**0.13**	**6,646**	**0.00**	**1,001**
HUC 1027						
KS	742	54	4.86	39,131	0.30	730
MO	1	0	0.00	0	0.00	0
NE	288	5	0.43	236	0.00	0
Total	**1031**	**59**	**5.29**	**39,367**	**0.30**	**730**
Avg. per year	**206**	**12**	**1.06**	**7,873**	**0.06**	**146**

[1] Values based on permits with mitigation requirements on waterways determined to be RPWWN-type wetlands or interpreted to be ephemeral streams according to Cowardin codes R4SBA and R4SBJ. Excludes permits issued for mitigation or restoration activities because the main purpose of these activities is to restore or enhance ecosystem services provided by water resources as opposed to dredge and fill activities that lead to permanent or temporary losses of ecosystem services.

[2] Number of permits includes permits with mitigation requirements that potentially affect at least one water that may no longer be jurisdictional under the final rule.

Table III-32 presents estimated reductions in average annual mitigation requirements in the Lower Missouri River Basin under different likely state response scenarios following the revised "waters of the United States" definition. Section III.B.2.2.2 provides detail on input data and the assumptions used in this analysis.

Table III-32: Estimated changes in average mitigation required per year in the Lower Missouri River Basin, by potential state response scenario

State	Estimated Reduction in Average Mitigation Acres per Year[1,2]			Estimated Reduction in Average Mitigation Length Feet per Year[1,2]			Estimated Reduction in Average Mitigation Riparian Acres per Year[1,2,3]		
	Scenario 0	Scenarios 1 & 2	Scenario 3	Scenario 0	Scenarios 1 & 2	Scenario 3	Scenario 0	Scenarios 1 & 2	Scenario 3
HUC 1025									
KS	0.1	0.1	0.0	6,646	6,646	0	7.6	7.6	0.0
NE	0.0	0.0	0.0	0	0	0	0.0	0.0	0.0
Total	**0.1**	**0.1**	**0.0**	**6,646**	**6,646**	**0**	**7.6**	**7.6**	**0.0**

Table III-32: Estimated changes in average mitigation required per year in the Lower Missouri River Basin, by potential state response scenario

State	Estimated Reduction in Average Mitigation Acres per Year[1,2]			Estimated Reduction in Average Mitigation Length Feet per Year[1,2]			Estimated Reduction in Average Mitigation Riparian Acres per Year[1,2,3]		
	Scenario 0	Scenarios 1 & 2	Scenario 3	Scenario 0	Scenarios 1 & 2	Scenario 3	Scenario 0	Scenarios 1 & 2	Scenario 3
HUC 1027									
KS	1.0	1.0	0.0	7,826	7,826	0.0	9.0	9.0	0.0
NE	0.1	0.1	0.1	47	47	47	0.1	0.1	0.1
Total	**1.1**	**1.1**	**0.1**	**7,873**	**7,873**	**47**	**9.0**	**9.0**	**0.1**

[1] Values based on permits with mitigation requirements on waterways determined to be RPWWN-type wetlands or interpreted to be ephemeral streams. Excludes permits issued for mitigation or restoration activities because these permits do not result in the loss of ecosystems services provided by wetlands and streams. Permanent acre and linear feet impacts provided in the ORM2 database are used to estimate mitigation requirements. The agencies assumed a 1:1 ratio for compensatory requirements based on Corps guidance (U.S. Army Corps of Engineers 2014).

[2] Scenarios 1 and 2 are identical for the 404 program analysis.

[3] Based on mitigation lengths where impacts in linear feet are converted to acres by multiplying total linear feet by an average total buffer width of 50 feet (25 feet on each side of the stream) and converting square feet to acres.

III.B.3.2.2.1 Cost Savings

To estimate permit cost savings, the agencies determined the average number of individual and general 404 permits issued each year, based on permits issued from 2011 to 2015, that potentially affect only waters that may no longer be considered "waters of the United States" under the final rule. The agencies then multiplied the annual average number of reduced individual and general permits by lower bound Corps estimates of permit costs (U.S. EPA and Department of the Army, 2015). The agencies used the lower bound estimate to avoid double-counting compensatory mitigation costs, *but see supra* at footnote 117.

Table III-33 shows the average number of reduced individual and general 404 permits, Corps unit application costs, and the estimated reduction in permit applications costs for individual and general 404 permits in the Lower Missouri River Basin under each scenario. The Corps unit cost estimates ($15,100 per individual permit; $4,500 per general permit) are adjusted from 1999$ to 2018$ using the CPI-U.

Permits affecting only RPWWN-type wetlands and ephemeral streams were issued in three states in HUC 1025 (Colorado, Kansas, and Nebraska) and two states in HUC 1027 (Kansas and Nebraska). Under Scenarios 0, 1 and 2, the average annual reduction in 404 permit application costs for the Lower Missouri River Basin is approximately $0.27 million. Under Scenario 3, which includes permit reductions in Colorado and Nebraska, permit cost savings drop to $0.03 million.

Table III-33: Estimated average annual reduction in CWA section 404 permit application costs in the Lower Missouri River Basin

Permit Type	Unit Costs from Corps NWP Analysis (2018$)	Scenario 0[1]		Scenarios 1 & 2[1,2]		Scenario 3[1]	
		Annual Average Reduction in Permits with Rule	Estimated Reduction in Permit Costs (millions 2018$)	Annual Average Reduction in Permits with Rule	Estimated Reduction in Permit Costs (millions 2018$)	Annual Average Reduction in Permits with Rule	Estimated Reduction in Permit Costs (millions 2018$)
HUC 1025							
IP	$15,100	0.0	$0.000	0.0	$0.00	0.0	$0.00
GP	$4,500	21.0	$0.09	21.0	$0.09	4.0	$0.02
Total		**21.0**	**$0.09**	**21.0**	**$0.09**	**4.0**	**$0.02**
HUC 1027							
IP	$15,100	1.2	$0.02	1.2	$0.02	0.0	$0.00
GP	$4,500	34.8	$0.16	34.8	$0.16	2.6	$0.01
Total		**36.0**	**$0.17**	**36.0**	**$0.17**	**2.6**	**$0.01**
Both Watersheds							
IP		1.2	$0.02	1.2	$0.02	0.0	$0.00
GP		55.8	$0.25	55.8	$0.25	6.6	$0.03
Total		**57.0**	**$0.27**	**57.0**	**$0.27**	**6.6**	**$0.03**

[1] Includes permits estimated to only affect waters that may no longer be jurisdictional under the final rule.

[2] Scenarios 1 and 2 are identical for the 404 program analysis.

To estimate annual cost savings from reduced mitigation requirements, the agencies multiplied the cost of each mitigation acre or linear foot (low and high estimates) by the estimated reduction in annual mitigation requirements (Table III-32), and summed the estimated cost savings for each scenario. The agencies estimated low and high per acre and linear foot mitigation costs for each state. Table III-34 provides annual cost savings estimates from reduced mitigation requirements in the Lower Missouri River Basin under different potential state response scenarios. Annual mitigation cost savings under Scenarios 0, 1 and 2 range from a low of $1.41 million to a high of $5.51 million. Cost savings range from $0.01 million to $0.03 million under Scenario 3 since Kansas, one of the two states where all mitigation requirement reductions occur in the two case study watersheds, is expected to regulate waters beyond CWA requirements.

Table III-34: Estimated annual cost savings (2018$) of reduced mitigation requirements in the Lower Missouri River Basin resulting from the revised "waters of the United States" definition, by potential state response scenario

State	Cost Per Acre (2018$)		Cost Per Linear Foot (2018$)		Scenario 0[1] (millions 2018$)		Scenarios 1& 2[1,2] (millions 2018$)		Scenario 3[1] (millions 2018$)	
	Low	High	Low	High	Low	High	Low	High	Low	High
HUC 1025										
KS	$55,635	$108,590	$93	$371	$0.62	$2.48	$0.62	$2.48	$0.00	$0.00
NE	$55,635	$108,590	$93	$371	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total	-	-	-	-	**$0.62**	**$2.48**	**$0.62**	**$2.48**	**$0.00**	**$0.00**
HUC 1027										
KS	$55,635	$108,590	$93	$371	$0.78	$3.01	$0.78	$3.01	$0.00	$0.00
NE	$55,635	$108,590	$93	$371	$0.01	$0.03	$0.01	$0.03	$0.01	$0.03
Total	-	-	-	-	**$0.79**	**$3.04**	**$0.79**	**$3.04**	**$0.01**	**$0.03**

Table III-34: Estimated annual cost savings (2018$) of reduced mitigation requirements in the Lower Missouri River Basin resulting from the revised "waters of the United States" definition, by potential state response scenario

State	Cost Per Acre (2018$)		Cost Per Linear Foot (2018$)		Scenario 0[1] (millions 2018$)		Scenarios 1& 2[1,2] (millions 2018$)		Scenario 3[1] (millions 2018$)	
	Low	High	Low	High	Low	High	Low	High	Low	High
Both Watersheds										
Total	-	-	-	-	**$1.41**	**$5.51**	**$1.41**	**$5.51**	**$0.01**	**$0.03**

[1] Estimated changes in average mitigation required per year are presented in Table III-32. For each state, cost savings are calculated by multiplying the cost of each mitigation acre or linear foot (low and high estimates) by the estimated reduction in annual mitigation requirements and summing the acreage and linear feet values for each scenario.

[2] Scenarios 1 and 2 are identical for the 404 program analysis.

Table III-35 provides total annual 404 program cost savings estimated in the Lower Missouri River Basin resulting from the final rule, under each potential state response scenario. Total costs savings combine the estimated reduction in permit costs and mitigation requirements. Under Scenarios 0, 1, and 2 estimated cost savings range from a low of $1.68 million to a high of $5.78 million. Estimated cost savings range from $0.04 million to $0.06 million under Scenario 3, which includes cost savings in Colorado and Nebraska.

Table III-35: Total annual estimated cost savings in the Lower Missouri River Basin (millions 2018$)

HUC	Scenario 0[1]		Scenarios 1 & 2[1,2]		Scenario 3[1]	
	Low	High	Low	High	Low	High
1025	$0.72	$2.57	$0.72	$2.57	$0.02	$0.02
1027	$0.96	$3.21	$0.96	$3.21	$0.02	$0.04
Total	**$1.68**	**$5.78**	**$1.68**	**$5.78**	**$0.04**	**$0.06**

[1] Scenarios 0, 1, and 2 include cost savings in Kansas, Nebraska, and Colorado. Scenario 3 includes cost savings in Colorado and Nebraska. Scenario 3 only includes minimal cost savings because Kansas, the state where the majority of permits affected by the rule are issued within the case study region, is expected to regulate waters beyond CWA requirements.

[2] Scenarios 1 and 2 are identical for the 404 program analysis.

III.B.3.2.2.2 Forgone Benefits

To estimate the forgone benefit value associated with reduced mitigation requirements for non-abutting wetlands and ephemeral streams, the agencies relied on per household WTP values for preventing wetland losses from Blomquist and Whitehead (1998). Blomquist and Whitehead (1998) values are appropriate for the Lower Missouri watershed because the wetland types are similar to those found in the original study region (*i.e.*, freshwater marsh, temporarily, seasonally or permanently flooded bottomland hardwood). In particular, Missouri wetlands are dominated by forested and shrub swamps subject to frequent flooding from Missouri and other local rivers (MO DNR 2016). Within the southern Nebraska portion of the Lower Missouri River watershed, wetland types include both freshwater marshes (such as those within the Platte River region sandhills) and forested wetlands/swamps (such as those near the Central Platte River in south-central Nebraska; LaGrange, 2005). Certain southern Nebraska basin

wetlands are dominated by row-crop agriculture, such as those located in the Southwest Playas and the Rainwater Basin, and others are dominated by forested wetlands, such as those located near the Lower Missouri River (U.S. EPA, 2011). The National Wetlands Inventory (NWI) wetlands mapper indicates that both "forested and shrub wetlands" and "freshwater emergent wetlands" are present in the Lower Missouri River Basin case study area (U.S. FWS, 2018a). The number of wetland acres considered in the valuation scenario (500 acres) is small enough to calculate reasonable per acre WTP estimates.

To determine the number of potentially affected households, the agencies applied a similar methodology to the one used in Blomquist and Whitehead (1998). The survey population included state households where the affected wetlands were located (*i.e.*, Kentucky in the original study) as well as households in four cities outside of, but bordering, western Kentucky: Evansville, IN; Clarksville, TN; Carbondale, IL; and Cape Girardeau, MO. Following Blomquist and Whitehead (1998), the agencies applied the household WTP value to all households in the state with the majority of the watershed's 404 impacts (Kansas for both HUC 1025 and 1027) as well as households in counties adjacent to the watershed in neighboring states (Figure III-16; Figure III-17).

Figure III-16: Locations of households included in the forgone benefits analysis for HUC 1025.

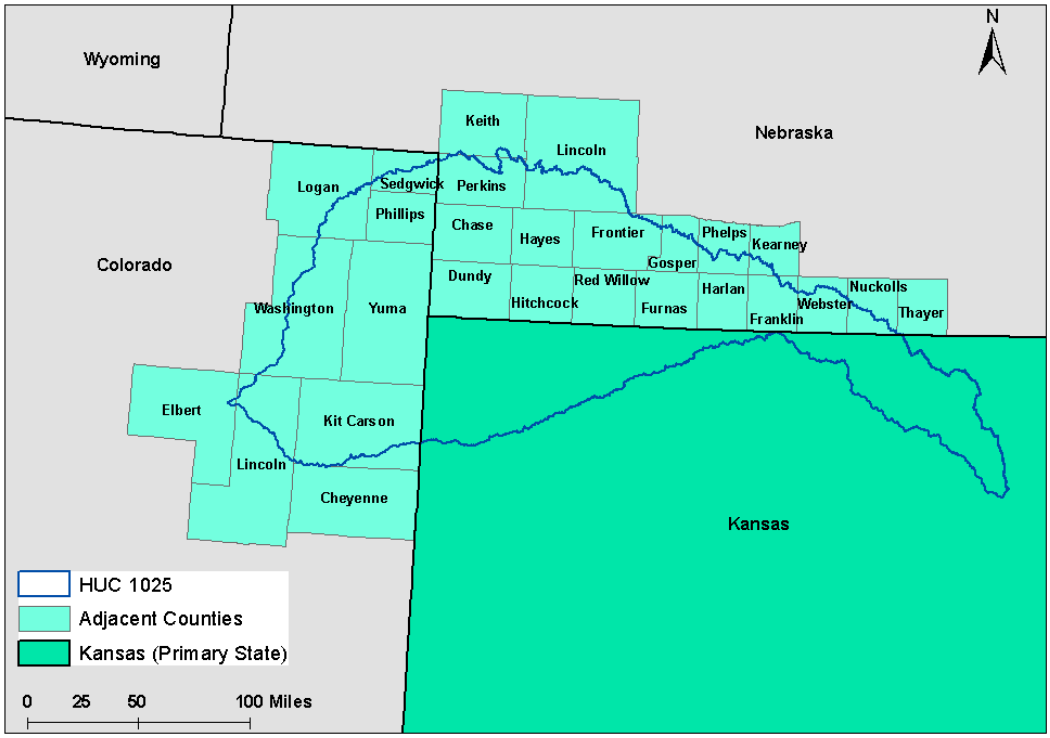
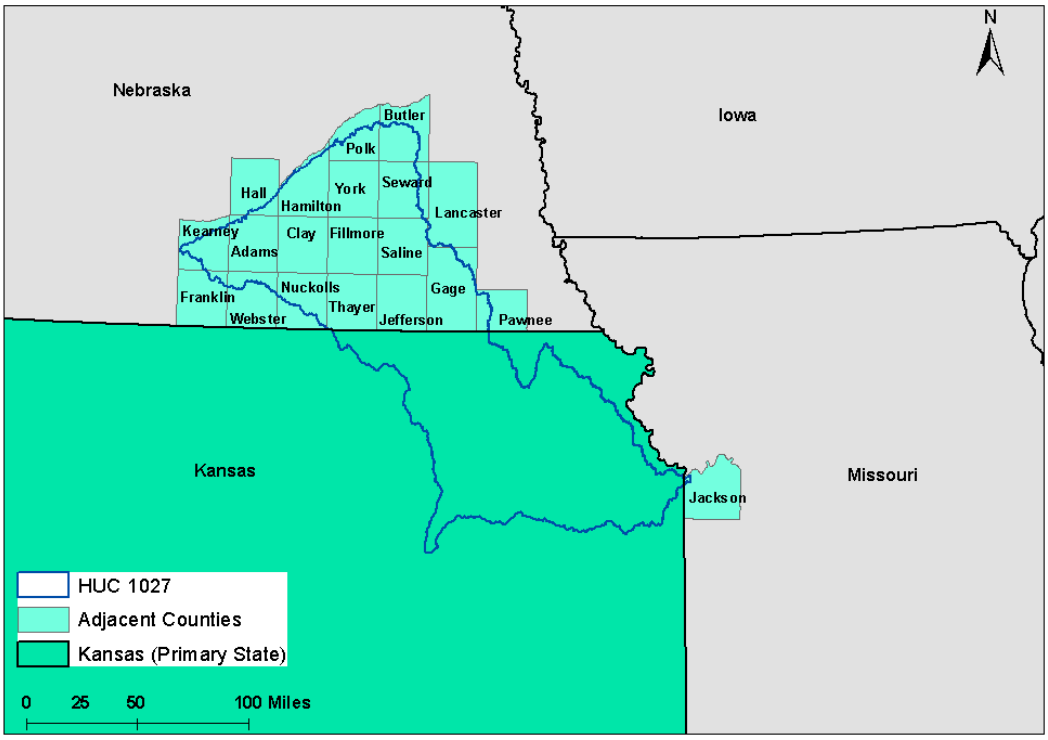


Figure III-17: Locations of households included in the forgone benefits analysis for HUC 1027.



To estimate the number of affected households in future years, the agencies used projected population changes from 2015 to 2040 (CEDBR, 2016; State of Colorado, 2018; Missouri Office of Administration, 2008; Drozd and Deichert, 2015) divided by the average number of people per household (U.S. Census Bureau, 2015).

Table III-36: and Table III-37: provide estimated annualized forgone benefits from lost mitigation requirements in the Lower Missouri River Basin under different state response scenarios, with three percent and seven percent discount rates, respectively. Mitigation requirements for HUCs 1025 and 1027 occur in Kansas and Nebraska. Scenarios 0, 1, and 2 include mitigation acres from both states. Annualized forgone benefits for the Lower Missouri River Basin under Scenarios 0, 1, and 2 range from $0.13 million to $0.84 million using a 3 percent discount rate and from $0.09 million to $0.61 million using a 7 percent discount rate. The total present value of estimated forgone benefits during the 2020-2039 study period ranges from $2.52 million to $16.72 million using a 3 percent discount rate and from $1.85 million to $12.30 million using a 7 percent discount rate. Under Scenario 3, Kansas is expected to regulate waters beyond federal requirements, but Nebraska is not anticipated to protect waters beyond federal requirements under any scenario. For Scenario 3, annualized forgone benefits have a high of $0.01 million (3 percent and 7 percent discount rates), and total present value ranges from $0.02 million to $0.15 million using a 3 percent discount rate and from $0.02 million to $0.11 million using a 7 percent discount rate.

Table III-36: Estimated annualized forgone benefits (millions 2018$) of lost mitigation requirements in the Lower Missouri River Basin resulting from the revised "waters of the United States" definition, by potential state response scenario (3 percent discount rate)

HUC	# Affected Households in 2020[3]	Scenario 0[1]		Scenarios 1 & 2[1,2]		Scenario 3[1]	
		Low	High	Low	High	Low	High
1025	1,264,605	$0.05	$0.31	$0.05	$0.31	$0.00	$0.00
1027	1,689,217	$0.08	$0.53	$0.08	$0.53	$0.00	$0.01
Total	**2,953,822**	**$0.13**	**$0.84**	**$0.13**	**$0.84**	**$0.00**	**$0.01**

[1] Estimated changes in average mitigation required per year are presented in Table III-32. Forgone benefits are calculated for each scenario by multiplying total forgone mitigation values for each scenario (sum of acres and linear feet converted into acres) by the total number of affected households and the appropriate household WTP value (low: $0.006/acre; high: $0.039/acre). The agencies calculated forgone benefits for the years 2020-2039 and annualized values using a 3 percent discount rate.

[2] Scenarios 1 and 2 are identical for the 404 program analysis.

[3] The agencies accounted for population growth and change in the number of households throughout the 2020-2039 study period.

Table III-37: Estimated annualized forgone benefits (millions 2018$) of lost mitigation requirements in the Lower Missouri River Basin resulting from the revised "waters of the United States" definition, by potential state response scenario (7 percent discount rate)

HUC	# Affected Households in 2020[3]	Scenario 0[1]		Scenarios 1 & 2[1,2]		Scenario 3[1]	
		Low	High	Low	High	Low	High
1025	1,264,605	$0.03	$0.22	$0.03	$0.22	$0.00	$0.00
1027	1,689,217	$0.06	$0.39	$0.06	$0.39	$0.00	$0.01
Total	**2,953,822**	**$0.09**	**$0.61**	**$0.09**	**$0.61**	**$0.00**	**$0.01**

[1] Estimated changes in average mitigation required per year are presented in Table III-32. Forgone benefits are calculated for each scenario by multiplying total forgone mitigation values for each scenario (sum of acres and linear feet converted into acres) by the total number of affected households and the appropriate household WTP value (low: $0.006/acre; high: $0.039/acre). The agencies calculated forgone benefits for the years 2020-2039 and annualized values using a 7 percent discount rate.

[2] Scenarios 1 and 2 are identical for the 404 program analysis.

[3] The agencies accounted for population growth and change in the number of households throughout the 2020-2039 study period.

III.B.3.2.3 CWA Section 311

Six FRP facilities are located within the Republican River watershed (HUC 1025) and an additional 36 FRP facilities are located within the Kansas River watershed (HUC 1027). The high-resolution NHD data for the case study watersheds do not accurately depict the extent of ephemeral streams in those watersheds, as some might be mapped as intermittent while others are not mapped at all. Therefore, the agencies were not able to determine the type of waters located in proximity of these facilities. However, as noted in Section III.B.2.2.3 for Case Study 1, a facility owner may determine that FRP requirements are applicable to the facility based on reasonable potential of an oil discharge (among other criteria) which means that proximity to any jurisdictional waters is a relevant consideration even if some other waters in the vicinity of the facility are not jurisdictional.

The agencies' analysis of the 42 facilities in the two case study watersheds identified five facilities without perennial or intermittent streams in the high-resolution NHD within a half-mile of the facility and only isolated water bodies visible on aerial photos. The final rule may affect the FRP applicability criteria for existing planholders by changing the inventory of resources considered within the half-mile planning distance and potentially leading facility owners to conclude that their facilities do not have a reasonable potential for an oil discharge to jurisdictional waters. Where FRP applicability changes, the facility owners may submit a request to EPA to reconsider FRP requirements.

EPA FOSCs responded to two incidents in the Kansas River watershed HUC 1027 between 2001 and 2017. The first incident[135] was associated with a vehicle accident that released petroleum into a ditch that flows into Piper Creek. The second incident,[136] a 10-inch diesel pipeline break, was determined upon FOSC evaluation not to affect jurisdictional waters. The FOSC and responsible party identified an intermittent creek approximately 150 yards south of the pipeline source of the spill, but the creek was completely dry at the time of the response and the extent of the diesel had been contained on land. The FOSC and responsible party agreed to check the creek periodically to verify that no diesel has traveled there. The information available for these spills suggests that the final rule would be unlikely to yield a different determination regarding the response or oversight.

III.B.3.3 Potential Environmental Impacts and Costs

III.B.3.3.1 Water Quality

The agencies assessed the potential water quality impacts of the final rule using the same methodology as described for the Ohio River basin watersheds. Table III-38 describes the two SWAT models used for this second case study. Modeled wetland impacts for HUC 1025 represent a very small share of the existing acres of wetlands in the watershed and of the overall watershed size.

Table III-38: Summary of SWAT models used to estimate water quality impacts of the final rule in the Missouri River basin

Model characteristics	HUC 1025	HUC 1027
	Republican River	Kansas River
Total watershed area (square miles)[1]	24,248.4	16,252.6
Number of HUC12 subbasins and reach segments modeled[2]	600	422
Average annual precipitation (in/year)	21.4	31.7
Baseline land use distribution:		
% developed	0.5%	2.0%
% agriculture	96.3%	85.5%
% forested	0.3%	5.1%
% water	0.6%	3.1%
% wetlands	2.3%	4.3%
Unmitigated stream and wetland impacts[3] under the final rule over 20 years (acres)	154.9	211.3
Unmitigated stream and wetland impacts[3] under the final rule over 20 years (% of baseline wetland acres)	0.04%	0.05%

[135] https://response.epa.gov/site/site_profile.aspx?site_id=8440

[136] https://response.epa.gov/site/site_profile.aspx?site_id=7346

Table III-38: Summary of SWAT models used to estimate water quality impacts of the final rule in the Missouri River basin		
Model characteristics	**HUC 1025**	**HUC 1027**
	Republican River	**Kansas River**

[1] The watershed area is based on the SWAT model and may differ from the description in the introduction to Section III.B due to the omission or inclusions of HUC12 subbasins within the scope of each watershed as delineated in SWAT.

[2] For HUC 1027, reach-level predictions also include contributions from upstream watersheds HUCs 1025 and 1026.

[3] Unmitigated wetland impacts are based on permitted permanent impacts requiring mitigation and affecting wetlands abutting ephemeral streams and non-abutting wetlands. The agencies assumed a width of 50 feet for linear impacts. For watershed HUC 1027, the value includes impacts in subbasins of HUC 1025 and HUC 1026 which also affect reach-level predictions.

III.B.3.3.1.1 Modeled CWA Program Impacts

Following the approach described in Section III.B.2.3.1, the agencies used estimates of potential changes in required mitigation for CWA section 404 permits to specify changes in land use and wetland area in SWAT models. Table III-39 shows the predicted impacts in HUCs 1025 and 1027 as defined in the SWAT model. The 404 program activities for tributary watershed HUC 1026 are not shown in the table, but were used in the model and contribute to predicted downstream impacts in HUC 1027.

Table III-39: Summary of 404 program activities in Missouri River Basin SWAT models for permits with permanent or temporary impacts to waters potentially affected by the final rule and with mitigation requirements over 20-year analysis period. Modeled scenario considers permanent impacts only.

Type of Potentially Affected Resource[2]	Permanent Impacts (Acres)	Permanent Impacts (Linear Feet)	Total[1] Permanent Impacts (Acres)	Temporary Impacts (Acres)	Temporary Impacts (Linear Feet)	Total[1] Temporary Impacts (Acres)
HUC 1025						
Wetland abutting ephemeral stream	2.6	0	2.6	0.0	0.0	0.0
Ephemeral stream[3]	0.0	132,920	152.6	0.0	20,020	23.0
Total	**2.6**	**132,920**	**155.2**	**0.0**	**20,020**	**23.0**
HUC 1027[4]						
Wetland abutting ephemeral stream	21.2	0	21.2	1.6	0.0	1.6
Ephemeral stream[3]	0.0	157,468	180.7	0.0	2,920	3.4
Total	**21.2**	**157,468**	**201.9**	**1.6**	**2,920**	**4.9**

[1] Represents the sum of impacts reported in acres and impacts reported in linear feet, assuming a width of 50 feet for linear impacts.

[2] See Table III-9 for criteria used to identify affected resources that may change jurisdiction under the final rule.

[3] Represents forgone mitigation for impacts to riparian areas of ephemeral streams, assuming a total buffer 50 feet wide.

[4] 404 program activities for tributary watershed 1026 are not shown, but were used in the models.

Table III-40 and Table III-41 summarize the changes specified for the baseline and final rule scenarios, respectively.

Table III-40: Summary of land use changes in Missouri River Basin SWAT watersheds resulting from 404 permits with permanent impacts to waters potentially affected by the final rule and with mitigation requirements, under baseline scenario

	HUC12 Subbasins		Largest absolute change in HUC12 subbasin		Total HUC4 watershed (all subbasins)	
Watershed and Land use	Total count	Number with changes	acres	% of existing land use	Acres	% of existing land use
HUC 1025						
Developed area	600	21	19.3	41.6%	154.9	0.20%
Agricultural area	600	21	-19.3	-0.1%	-154.9	<-0.01%
HUC 1027						
Developed area	422	29	39.8	59.5%	211.3	0.10%
Agricultural area	422	29	-39.8	0.2%	-211.3	<-0.01%

Table III-41: Summary of land use changes in Missouri River Basin SWAT watersheds resulting from 404 permits with permanent impacts to waters affected by the final rule and with mitigation requirements, under final rule scenario

	HUC12 Subbasins		Largest absolute change in HUC12 subbasin		Total HUC4 watershed (all subbasins)	
Watershed and Land Use	Total count	Number with changes	acres	% of existing land use	Acres	% of existing land use
HUC 1025						
Developed area	600	21	19.3	41.6%	154.9	0.20%
Wetland area	600	21	-19.3	-1.6%	-154.9	-0.04%
HUC 1027						
Developed area	422	29	39.8	59.5%	211.3	0.10%
Wetland area	422	29	-39.8	-2.6%	-211.3	-0.05%

III.B.3.3.1.2 Changes in Subbasin Water Balance and Constituent Transport

Table III-42 and Table III-43 summarize the modeled changes between the final rule and baseline scenarios across subbasins within the two watersheds (HUC 1025 and HUC 1027, respectively). Maps in Appendix C show the distribution of changes.

Table III-42: Estimated change in annual average subbasin water balance and constituent transport in SWAT watershed HUC 1025.

	Number of Subbasins by Direction of Change			Absolute Change over All Subbasins[1]		
Model parameter	Increase	Decrease	No Change	Average	Minimum	Maximum
Evapotranspiration (m^3/yr)	1	20	579	-512	-42,081	4,927
Surface runoff (m^3/yr)	19	2	579	146	-476	12,391
Lateral flow (m^3/yr)	20	1	579	0	-2	41
Groundwater flow (m^3/yr)	6	0	594	0	0	55

Table III-42: Estimated change in annual average subbasin water balance and constituent transport in SWAT watershed HUC 1025.

Model parameter	Number of Subbasins by Direction of Change			Absolute Change over All Subbasins[1]		
	Increase	Decrease	No Change	Average	Minimum	Maximum
Total water yield (m^3/yr)	19	2	579	146	-697	13,427
Sediment yield (ton/yr)	20	1	579	0.1	0.0	22.9
Organic N (kg/yr)	20	1	579	0.7	-0.4	75.4
Organic P (kg/yr)	20	1	579	0.1	0.0	11.3
NO_3 in surface runoff (kg/yr)	20	1	579	0.1	-0.5	6.0
Soluble P (kg/yr)	20	1	579	.0	-0.1	2.3

1 Total number of SWAT HUC12 subbasins is 600, but only 21 subbasins have modeled wetland changes under the final rule scenario.

Table III-43: Estimated change in annual average subbasin water balance and constituent transport in SWAT watershed HUC 1027.

Model parameter	Number of Subbasins by Direction of Change			Absolute Change over All Subbasins[1]		
	Increase	Decrease	No Change	Average	Minimum	Maximum
Evapotranspiration (m^3/yr)	0	28	394	-1,015	-60,051	0
Surface runoff (m^3/yr)	27	1	394	437	-19	21,928
Lateral flow (m^3/yr)	28	0	394	4	0	573
Groundwater flow (m^3/yr)	25	2	395	30	-68	8,641
Total water yield (m^3/yr)	26	2	394	447	-193	19,702
Sediment yield (ton/yr)	28	0	394	0.6	0.0	52.7
Organic N (kg/yr)	28	0	394	1.5	0.0	145.9
Organic P (kg/yr)	28	0	394	0.2	0.0	16.3
NO_3 in surface runoff (kg/yr)	28	0	394	0.0	0.0	1.8
Soluble P (kg/yr)	28	0	394	0.1	0.0	4.4

1 Total number of SWAT HUC12 subbasins is 422, but only 28 subbasins have modeled wetland changes under the final rule scenario.

III.B.3.3.1.3 Modeled Impacts to Streams

Table III-44 summarizes the direction and relative magnitude of mean annual changes over all reaches modeled in the two watersheds. Table III-45 summarizes changes in mean annual loadings delivered to the outlet of the modeled watersheds on the Kansas River near Kansas City. These results reflect the contributions from all upstream reaches and their respective catchments, as well as intervening instream processes modeled in SWAT, such as sediment deposition in reservoirs.[137] Maps in Appendix C show the distribution of changes.

[137] SWAT model runs for HUC 1027 incorporate simulated flows and delivered loads at the outlet of HUC 1025 for each scenario (baseline and final rule). The model run assumes no change in the contributions of other tributaries (HUCs 1026).

As shown in the two tables, the SWAT model runs suggest that the final rule may increase nutrient and sediment loads in streams within the Missouri River basin slightly; in other streams, the model runs suggest the final rule may decease nutrient and sediment loading. This increase follows from the combined effects of reduced wetland functions and land use change described in the previous section, but the relative magnitude of the changes is attenuated by "background" contributions from point sources – which, in the context of this analysis, are not affected by the final rule – and from upstream reaches – which may or may not be affected by the final rule, depending on the location.

Table III-44: Summary of modeled changes in loads transported by HUC12 reaches and in-stream concentrations within the SWAT watersheds for the Missouri River Basin

Parameter	Number of Reaches by Direction of Change[1]			Absolute and Percent Change over All Reaches		
	Increase	Decrease	No Change	Average Change	Average % Change	Maximum % Change
HUC 1025						
Annual TN load (kg/yr)	100	76	424	2.4	0.00%	0.12%
Annual TP load (kg/yr)	93	66	441	0.6	0.00%	0.13%
Annual sediment load (kg/yr)	97	67	436	0.5	0.00%	0.29%
Mean daily flow (m^3/s)	81	64	455	0.000	0.00%	0.14%
HUC 1027						
Annual TN load (kg/yr)	85	17	320	80.4	0.00%	0.35%
Annual TP load (kg/yr)	87	14	321	20.4	0.00%	0.31%
Annual sediment load (kg/yr)	87	16	319	10.5	0.01%	0.29%
Mean daily flow (m^3/s)	95	4	323	0.001	0.00%	0.09%

[1] Total number of reaches is 600 in HUC 1025 and 422 in HUC 1027.

Table III-45: Modeled changes in annual average loads delivered to the Kansas River near Kansas City (Outlet of HUC 1027)

Parameter	Baseline	Final Rule	Change	% Change
Annual TN load (kg/yr)	13,288,006	13,289,646	1,640	0.01%
Annual TP load (kg/yr)	3,129,837	3,130,253	416	0.01%
Annual sediment load (ton/yr)	1,684,798	1,684,915	117	0.01%
Flow (cms)	133.92	133.93	0.01	0.01%

III.B.3.3.2 Drinking Water

There is one public drinking water intake and one spring in the Republican River watershed (HUC 1025) and one infiltration gallery, 14 public drinking water intakes, and one spring in the Kansas River watershed (HUC 1027).

Based on the modeled distribution of forgone wetland mitigation under the final rule scenario as compared to Baseline, the SWAT runs predict no changes in mean daily suspended sediment concentration in the reaches used as drinking water sources in the two watersheds. Accordingly, the agencies estimated no changes in drinking water treatment costs.

Table III-46: Drinking Water Intakes in Lower Missouri River Study Areas

SWAT Watershed HUC4	Number of community water systems	Number of intakes	Number of people served	Modeled change in mean daily suspended sediment concentration in source waters		
				Minimum	Mean	Maximum
1025	1	1	2,812	0.00%	0.00%	0.00%
1027	11	14	238,085	-0.01%	0.00%	0.00%
Total:	12	15	240,897			

Source: EPA analysis of SDWIS (2017) data.

III.B.3.3.3 Dredging for Water Storage and Navigation

The SWAT models identify nine reservoirs within HUC 1025 and five reservoir in HUC 1027.[138] As shown in Table III-47, the SWAT model runs predict a small increase (less than 0.1 percent) in sediment deposition in reservoirs in the two watersheds, calculated as the difference between incoming sediment fluxes and outgoing fluxes.

Table III-47: Summary of modeled net sediment depositions in reservoirs in the Missouri River Basin (tons/year) in 2040

HUC4	Number of reservoirs[1]	Net annual sediment deposition in reservoirs		Change relative to baseline[2]	
		Baseline	Final Rule	Tons/year	Percent
1025	9	-8,843	-8,839	4	0.05%
1027	5	4,804,619	4,805,209	590	0.01%

[1] Reservoirs modeled in SWAT watersheds, based on the U.S. Army Corps of Engineers National Inventory of Dams as of October 2010.

[2] Changes may not correspond to the differences in sediment deposition due to rounding.

Similar to findings for Case Study 1 in Section III.B.2.3.3, the agencies estimated minimal changes in dredging costs based on the small increases in sedimentation in HUC 1027. Extrapolating estimates developed for the proposed rule suggests annualized changes in dredging costs of approximately $800 to $1,000 per year. See Section III.B.5 for more detail on uncertainties in this analysis.

III.B.4 Case Study 3: Rio Grande River Basin

This case study encompasses the length of the Pecos River from southeast of Santa Fe, New Mexico to the Texas-Mexico border where the Pecos River meets the Rio Grande. The Upper and Lower Pecos River watersheds are located within the Southwestern Tablelands ecoregion (CEC, 2011). According to CEC (2011), the ecoregion is characterized by dry mid-latitude stepped climate. Mean annual precipitation is 448 mm (17.6 inches). Water is generally scarce with streams mostly ephemeral and

[138] The SWAT watersheds include reservoirs identified in the U.S. Army Corps of Engineers National Inventory of Dams as of October 2010.

intermittent. Land use is mostly semiarid rangeland with ranching and livestock grazing the dominant land uses, and some oil and gas production.

Figure III-18 and Figure III-19 show maps of the HUC 1306 and HUC 1307 case study watersheds, respectively.

Figure III-18: Map of HUC 1306 – Upper portion of the Pecos River Basin showing NHD water features and NWI wetlands in relation to state boundaries, major cities, and neighboring watersheds.

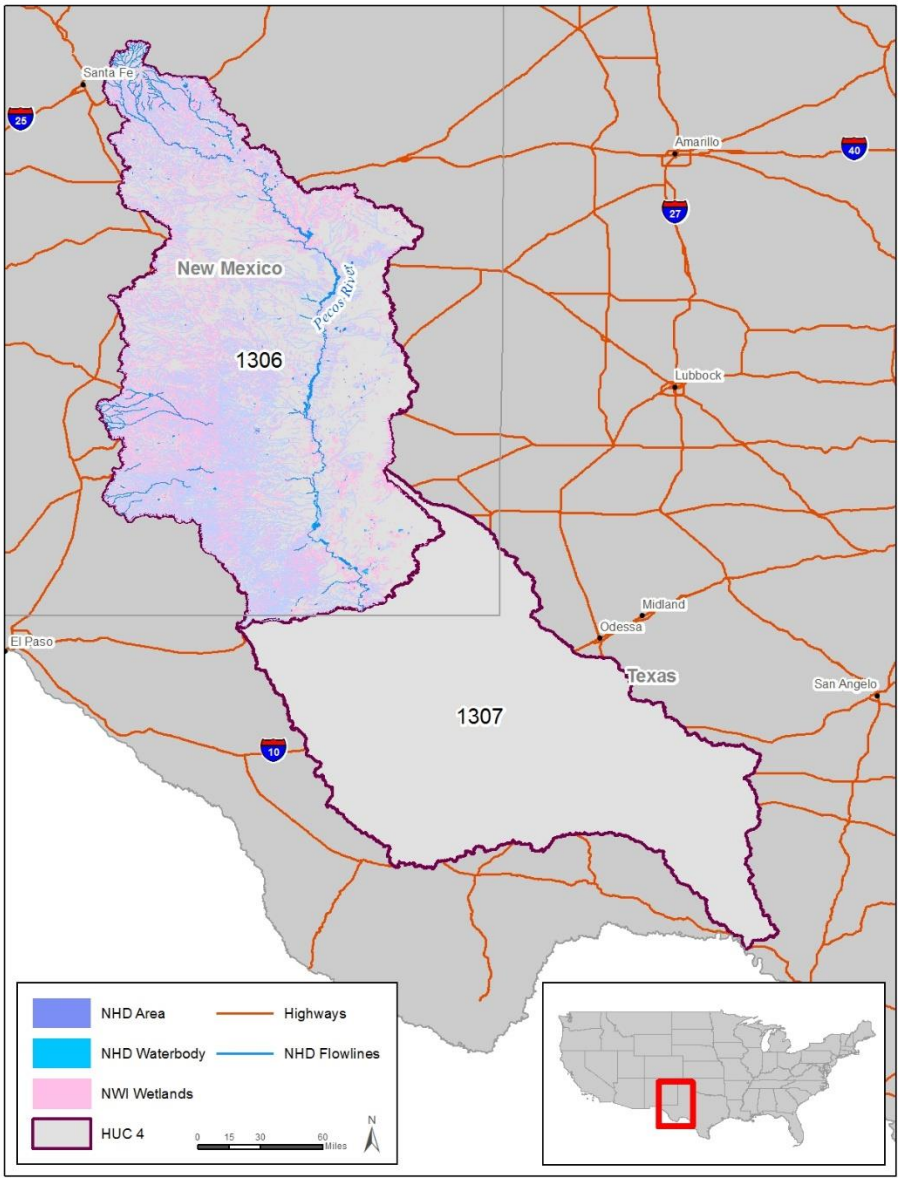
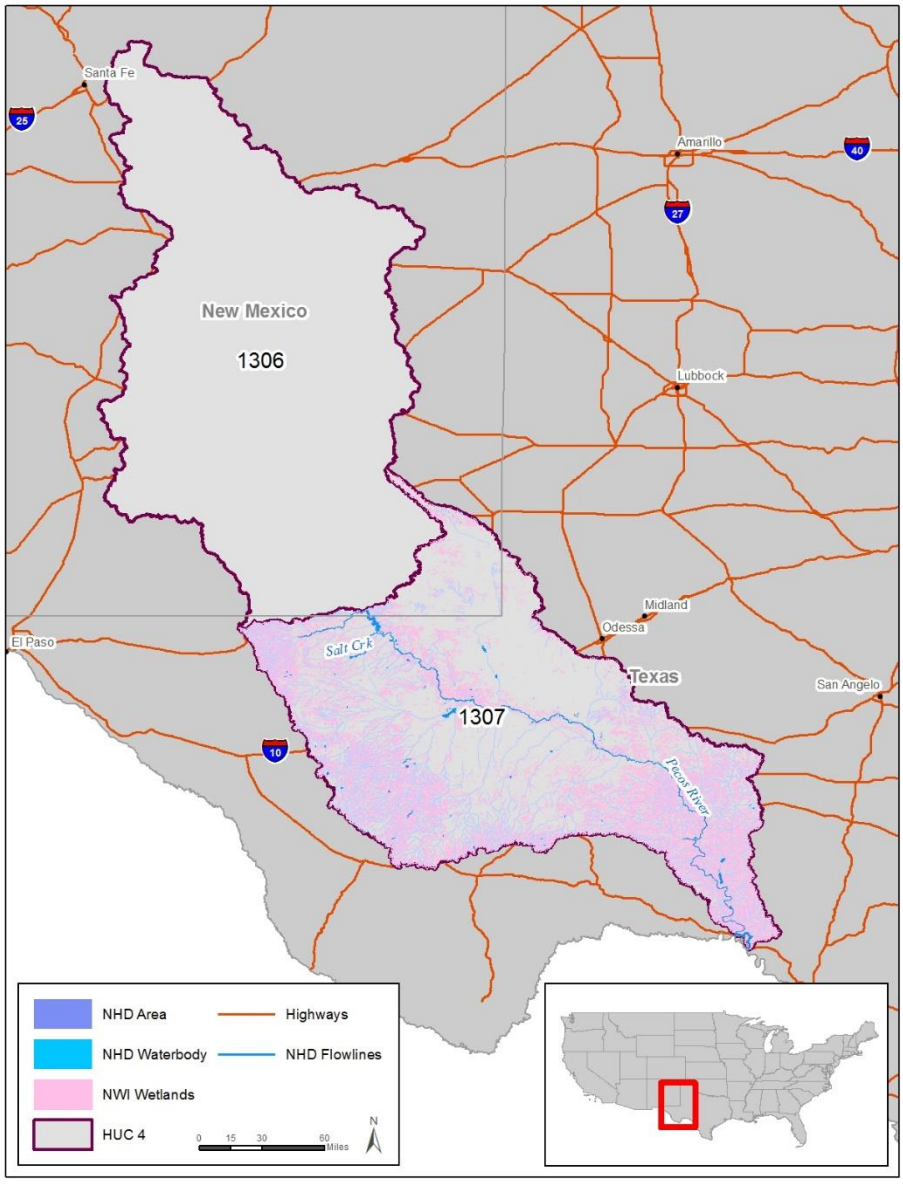


Figure III-19: Map of HUC 1307 – Lower portion of the Pecos River Basin showing NHD water features and NWI wetlands in relation to state boundaries, major cities, and neighboring watersheds.



III.B.4.1 Aquatic Resources Characteristics

Table III-48 summarizes the hydrography within the case study watersheds. The data present the number of NHD-identified stream miles in each flow regime category, as well as acres of non-abutting and "abutting" wetlands according to the agencies' geospatial analysis of the high resolution NHD and the NWI.[139] The high resolution NHD data for this region differentiates stream attributes according to the

[139] The agencies note that this analysis may not capture those wetlands that are not abutting a jurisdictional water but otherwise meet the revised definition of "adjacent wetlands."

stream flow regime. As presented in the table, 85 to 91 percent of stream miles within the two watersheds are identified as ephemeral, and 34 to 62 percent of all wetland acres were estimated to be "non-abutting" wetlands.

Table III-48: Hydrographic profile of case study watersheds in the Rio Grande River Basin

Feature Type	Mapped Feature Attributes	HUC 1306		HUC 1307	
		Miles or acres	Percent of total	Miles or acres	Percent of total
Streams (miles)	**Total**	35,440	100%	25,436	100%
	Perennial	872	2%	126	0%
	Intermittent	2,210	6%	947	4%
	Ephemeral	30,164	85%	23,171	91%
	Artificial path	1,252	4%	744	3%
	Other[1]	943	3%	448	2%
Wetlands (acres)	**Total**	52,652	100%	17,353	100%
	Abutting	34,593	66%	6,666	38%
	Non-abutting	18,058	34%	10,688	62%

[1] Includes canal, ditches, aqueducts, and other feature without attributes.

The values are based on the agencies' geospatial analysis of NHD and NWI data and reflect gaps in NHD stream attributes and NWI wetland mapping.

III.B.4.2 Program Changes

III.B.4.2.1 CWA Section 402

Table III-49 presents the number of NPDES permits issued in the Rio Grande River Basin by the most common industry categories. The number of permits issued in the two case study watersheds includes 22 individual permits and 201 general permits. Based on the permits with SIC codes, the most common industries in the Rio Grande River Basin include aggregate mining, motor vehicle parts (used), animal feeding operations, sewage systems, scrap and waste materials, ready-mixed concrete, and industrial domestic wastewater treatment. The agencies estimated that one individual permit and six general permits in the Rio Grande River Basin have at least one discharge near an ephemeral stream, based on the Cowardin classification code (Cowardin et al. 1979; Federal Geographic Data Committee, 2013) assigned to the NWI resource closest to the coordinates of permitted outfalls. None of the permits affected by the rule have SIC codes available.

Table III-49: CWA section 402 individual permits (SIC codes in parentheses) issued in case study watersheds in the Rio Grande River Basin

Industry category	Individual permits[1]			General permits[1]		
	Total number of NPDES permits	Permits with discharge point near ephemeral streams[2]		Total number of NPDES permits[1]	Permits with discharge point near ephemeral streams[2]	
		Number of permits	Percent of all permits		Number of permits	Number of permits
HUC 1306						
Aggregate Mining[3]	0	0	0%	15	0	0%
Motor Vehicle Parts, Used (5015)	0	0	0%	9	0	0%
Animal Feeding Operations[4]	0	0	0%	6	0	0%
Scrap and Waste Materials (5093)	0	0	0%	6	0	0%
Sewerage Systems (4952)	9	0	0%	1	0	0%
Other Categories[5]	6	0	0%	31	0	0%
Missing SIC Codes	0	0	0%	105	5	5%
Total	**15**	**0**	**0%**	**173**	**5**	**3%**
HUC 1307						
Industrial Domestic Wastewater Treatment[6]	2	0	0%	0	0	0%
Ready-Mixed Concrete (3273)	0	0	0%	3	0	0%
Aggregate Mining[3]	0	0	0%	2	0	0%
Animal Feeding Operations[4]	0	0	0%	2	0	0%
Sewerage Systems (4952)	3	0	0%	0	0	0%
Other Categories[5]	2	0	0%	0	0	0%
Missing SIC Codes	0	1	0%	21	1	5%
Total	**7**	**1**	**14%**	**28**	**1**	**4%**
Total for both watersheds	**22**	**1**	**5%**	**201**	**6**	**3%**

[1] Source: EPA's ICIS-NPDES data, 2017. The facility permits included in the spatial analysis are limited to those for which the ICIS-NPDES database includes latitude/longitude coordinates. For permits with multiple SIC codes, only one SIC code was retained, with manufacturing industries prioritized, to avoid double-counting.

[2] The agencies used the Cowardin classification code in NWI to determine whether 402 discharges are likely to affect ephemeral streams (*i.e.*, the agencies interpreted Cowardin codes R4SBA and R4SBJ as ephemeral for purpose of this analysis; *see* Section III.B.1 for more detail).

[3] Includes SIC Codes 1422, 1423, 1429, 1442, 1446, 1459, 1474, 1475, 1481, and 1499

[4] Includes SIC Codes 211, 212, 213, 214, 219, 241, 251, 252, 253, 254, 259, 271, 272, and 279

[5] Includes Asphalt Paving Mixtures and Blocks (2951), Construction and Development (1629, 1794, 6552, 1611, 1799, 1521, 1522, and 1623), Trucking Facilities (4212, 4231), and Water Supply (4941)

[6] Includes SIC Codes 6513, 6514, 6515, 7011, 7032, 7033, 8211, 8221, 8641, and 8661

Only one individual NPDES permit potentially affects ephemeral streams (NPDES ID TX0076422), and this permit is subject to WQBELs.[140] Should the definition of "waters of the United States" change, a permittee subject to more stringent limits based on a WQBEL could request revision of its WQBEL to account for potential dilution or attenuation of the pollutant(s) occurring between end-of-pipe and the point where the effluent enters jurisdictional waters, subject to applicable anti-backsliding permit requirements. Under this scenario, the permittee may realize cost savings as compared to meeting the previous permit limits.

NPDES permits for discharges near ephemeral waters were issued in one state in HUC 1306 (New Mexico) and two states in HUC 1307 (New Mexico and Texas). Based on potential state responses and analytic scenarios described in Section II.A.3, Texas is expected to protect waters beyond the CWA under Scenarios 2 and 3, while New Mexico is not anticipated to protect waters beyond the CWA under any scenarios.

The number of permits affected by the final rule in HUC 1306 remains constant under all scenarios since all permits for discharges near ephemeral streams are issued in New Mexico, which is not expected to regulate waters beyond the CWA under any scenario. The number of permits affected by the rule in HUC 1307 is reduced from 2 to 1 under Scenario 2 (3). As noted above, SIC codes are not available for the affected permits and therefore it is unknown whether these permits are based on TBELs or WQBELs and as a result the effects of the final rule on potential cost savings and changes in pollutant discharges are highly uncertain.

III.B.4.2.2 CWA Section 404

Table III-50 summarizes CWA section 404 permits issued in 2011-2015 within the Rio Grande River Basin that required mitigation on RPWWN-type wetlands or ephemeral streams. As presented in the table, the agencies' geospatial analysis shows one permit in HUC 1306 issued by the Corps with impacts that required mitigation on waters potentially affected by the final rule. The annual average permanent impacts resulting from 404 permits in HUC 1306 is 0.004 acres. Permit impacts occurred in New Mexico, a state that is not expected to implement state protections more stringent than CWA requirements under any scenario. From 2011-2015, no permits were issued in HUC 1307 that required mitigation on waters potentially affected by the final rule.

[140] Some of the common industry categories in the Rio Grande River Basin have technology-based effluent limitations (TBELs), including aggregate mining, animal feeding operations, and sewage systems (secondary). The industrial domestic wastewater treatment, motor vehicle parts, scrap and waste materials, and ready-mixed concrete industries do not have national TBELs. For facilities in these four industry categories, effluent limitations are either water quality-based (WQBELs) for pollutants with applicable water quality standards, or TBELs based on the best professional judgement of the permit writer (U.S. EPA; 2011).

Table III-50: CWA section 404 permits issued in case study watersheds in the Rio Grande River Basin (2011-2015)

State	# Permitted Projects	# Permits with mitigation requirements affected by revised definition of "waters of the United States" [1, 2]	Permanent impacts[1]		Temporary impacts[1]	
			Acres	Length Feet	Acres	Length Feet
HUC 1306						
NM	168	1	0.018	0	0.000	0
Total	**168**	**1**	**0.018**	**0**	**0.000**	**0**
Avg. per year	**34**	**0**	**0.004**	**0**	**0.000**	**0**
HUC 1307						
NM	39	0	0.000	0	0.000	0
TX	6	0	0.000	0	0.000	0
Total	**45**	**0**	**0.000**	**0**	**0.000**	**0**
Avg. per year	**9**	**0**	**0.000**	**0**	**0.000**	**0**

[1] Values based on permits with mitigation requirements on waterways determined to be RPWWN-type wetlands or interpreted to be ephemeral streams. Excludes permits issued for mitigation or restoration activities because the main purpose of these activities is to restore or enhance ecosystem services provided by water resources as opposed to dredge and fill activities that lead to permanent or temporary losses of ecosystem services. No 404 permits in HUC 1307 meet these requirements.

[2] Number of permits includes permits with mitigation requirements that potentially affect at least one water that may no longer be jurisdictional under the final rule.

III.B.4.2.2.1 Cost Savings

To estimate permit cost savings, the agencies determined the average number of individual and general 404 permits issued each year, based on permits issued from 2011 to 2015, that affect only waters that may no longer be jurisdictional under the final rule. The agencies then multiplied the annual average number of reduced individual and general permits by lower bound Corps estimates of permit costs (U.S. EPA and Department of the Army, 2015). The agencies used the lower bound estimate to avoid double-counting compensatory mitigation costs.

Table III-51 shows the average number of reduced individual and general permits, Corps unit application costs, and the estimated reduction in permit applications costs for individual and general permits in the Rio Grande River Basin under each scenario. The Corps unit cost estimates ($15,100 per individual permit; $4,500 per general permit) are adjusted from 1999$ to 2018$ using the CPI-U. *But see supra* at footnote 117.

Permits affecting only RPWWN-type wetlands or ephemeral streams were issued in one state in HUC 1306 (New Mexico) and two states in HUC 1307 (New Mexico and Texas). Reduced permit costs remain constant at $0.11 million under all scenarios because neither state is expected to regulate waters beyond federal requirements under any scenario.

Table III-51: Estimated average annual reduction in 404 permit application costs in the Rio Grande River Basin

Permit Type	Unit Costs from Corps NWP Analysis (2018$)	Scenario 0[1]		Scenarios 1 & 2[1,2]		Scenario 3[1]	
		Annual Average Reduction in Permits with the Final Rule	Estimated Reduction in Permits Costs (millions 2018$)	Annual Average Reduction in Permits with the Final Rule	Estimated Reduction in Permits Costs (millions 2018$)	Annual Average Reduction in Permits with the Final Rule	Estimated Reduction in Permits Costs (millions 2018$)
HUC 1306							
IP	$15,100	0.0	$0.00	0.0	$0.00	0.0	$0.00
GP	$4,500	17.0	$0.08	17.0	$0.08	17.0	$0.08
Total		**17.0**	**$0.08**	**17.0**	**$0.08**	**17.0**	**$0.08**
HUC 1307							
IP	$15,100	0.0	$0.00	0.0	$0.00	0.0	$0.00
GP	$4,500	8.0	$0.04	8.0	$0.04	8.0	$0.04
Total		**8.0**	**$0.04**	**8.0**	**$0.04**	**8.0**	**$0.04**
Both Watersheds							
IP		0.0	$0.00	0.0	$0.00	0.0	$0.00
GP		25.0	$0.11	25.0	$0.11	25.0	$0.11
Total		**25.0**	**$0.11**	**25.0**	**$0.11**	**25.0**	**$0.11**

[1] Includes permits estimated to only affect waters that may no longer be jurisdictional under the final rule.

[2] Scenarios 1 and 2 are identical for the 404 program analysis.

Because the average annual reduction in mitigation requirements is small in the Rio Grande River Basin (0.004 acres in HUC 1306; no reductions in HUC 1307), the annual cost savings from reduced mitigation requirements is negligible. To estimate annual cost savings from reduced mitigation requirements in HUC 1306, the agencies multiplied the estimated reduction in annual mitigation requirements (0.004 acres) by low ($53,419) and high ($74,684) per acre estimates for New Mexico. Annual mitigation cost savings under all scenarios are significantly less than $0.01 million ($192 to $269). Because mitigation cost savings are so small, the permit cost savings values presented in Table III-51 represent total cost savings.

III.B.4.2.2.2 Forgone Benefits

The agencies did not estimate the forgone benefit value of lost mitigation acres for the Rio Grande River Basin case study because none of the existing wetland valuation studies were conducted in the same geographic area or provided a good match for the affected resource characteristics. The meta-analysis of wetland valuation studies developed by Moeltner et al. (2019) was also based on a set of studies conducted in different geographic areas that valued the type of wetlands not typically present in the case study watershed (*e.g.*, fresh water marshes or forested seasonally or temporary flooded wetlands). Given that the estimated reduction in mitigation requirements in the case study area is very small (annual average of 0.004 acres), the estimated value of forgone benefits is likely to be small as well.

III.B.4.2.3 CWA Section 311

The watershed encompasses the Edwards Plateau's inland oil production area around Odessa and Midland, Texas. There were approximately 49,800 active oil wells in the two watersheds in 2018, based on data the agencies obtained from the Texas Railroad Commission and New Mexico's Oil Conservation

Division. Assuming that a facility corresponds to a tank battery with an average of four producing wells per tank battery,[141] this translates into an estimated 12,400 facilities that may be subject to SPCC requirements in the baseline if they have a reasonable expectation of a discharge to a jurisdictional water. Additionally, the 2012 Census of Agriculture (USDA, 2015) shows approximately 20 million acres of land in farm production and 4,000 farm establishments in the two watersheds. Based on average annual fuel expenditures by size class in the Census, the agencies estimate that approximately 160 farms may be subject to SPCC requirements in the baseline if they also have a reasonable expectation of a discharge to a jurisdictional water. The final rule could affect an unknown share of these facilities in cases where they no longer have a reasonable expectation of a discharge to a jurisdictional water.

The high-resolution NHD data in these two watersheds include attributes that distinguish streams mapped as ephemeral from those mapped as perennial or intermittent. In addition, the agencies obtained data on the location of wells that may be associated with onshore oil production regulated under the SPCC program. The combination of these two datasets enabled the agencies to assess the potential impacts of the final rule on an important subset of SPCC-regulated facilities in this region and nationally. The agencies' analysis inventoried the NHD waters and NWI wetlands located within a half-mile distance of each well. [142] The use of a half-mile radius was informed by the planning distance used in the FRP rule to identify resources that could be affected by an oil discharge; it is not a legal test for determining SPCC applicability.

Of the approximately 49,800 oil production wells in the upper and lower Pecos River watersheds (HUC 1306 and 1307), approximately 24,800 wells have water bodies, including wetlands, located within a half-mile of the well. For over half of those wells (13,800 wells), the only streams within the half-mile search radius are ephemeral (*i.e.*, there are no perennial or intermittent streams). Based on this analysis, and assuming that the geographical distribution of SPCC facilities is similar to that of the wells, the agencies estimate that 3,460 oil production facilities[143] within the watershed may be farther than a half-mile from any perennial or intermittent streams, and therefore may be less likely to have a reasonable potential to discharge to jurisdictional waters under the final rule. Facility owners that determine that their facility does not have a reasonable potential of a discharge may forgo preparing or maintaining an SPCC Plan in accordance with 40 CFR 112. As presented in Section III.A.3.2 (*see* Table III-7), the annualized cost of maintaining an SPCC Plan for a production facility ranges between $6,388 and $28,332. For a new facility, the annualized cost ranges between $42,138 and $539,552. The agencies did not have sufficient data to quantify the potential increase in oil spill risk from any change in the implementation of SPCC measures.

[141] The 4:1 ratio of wells per tank battery follows the approach EPA used for the Regulatory Impact Analysis for the 2008 Amendments to the Oil Pollution Prevention Regulations (40 CFR 112) (U.S. EPA, 2007).

[142] The Ohio River basin and Lower Missouri River basin high-resolution NHD data did not consistently map ephemeral streams. This lack of ephemeral stream data prevented similar analyses in the other case studies.

[143] The agencies estimated the number of facilities by assuming an average of 4 wells per facility (13,846 wells / 4 wells per facility = 3,461 facilities).

Table III-52: Proximity of waters to active oil production wells in the Upper and Lower Pecos watersheds

HUC4	State	Number of active oil wells	Number of wells based on proximity to waters, including wetlands (within a half-mile radius)	
			Any stream or wetland	Ephemeral stream only
	NM	13,565	6,104	4,116
	TX	0	0	0
	Total	13,565	6,104	4,116
1306	% of total	100%	45%	30%
	NM	7,115	3,137	1,611
	TX	29,083	15,551	8,119
	Total	36,198	18,688	9,730
1307	% of total	100%	52%	27%
Total		**49,763**	**24,792**	**13,846**
% of Total		**100%**	**50%**	**28%**

Based on geospatial analysis of oil well locations obtained from Texas Railroad Commission and New Mexico Oil Conservation Commission, relative to NHD high resolution and NWI mapped features.

The two watersheds also count a total of 16 FRP facilities, four in HUC 1306 and 12 in HUC 1307. Two of these facilities have streams categorized as perennial or intermittent in the high resolution NHD within a half-mile of the facility. The other 14 facilities have only ephemeral streams or wetlands within a half-mile of the facility. Therefore, because the final rule excludes ephemeral streams and certain non-abutting wetlands and these are the only resources within the FRP planning distance, these facilities could potentially seek reconsideration of FRP applicability. Conversely, as described in Section III.A.3.2.1.2, some facilities could elect to voluntarily maintain an FRP despite a change in their status and obligations under 40 CFR 112. Facility owner or operator responses to changes in CWA jurisdiction is unknown. For those facilities that seek reconsideration of FRP applicability, there may be cost savings for them from not having to maintain an FRP. As presented in Section III.A.3.2, the costs of maintaining an FRP ranges from approximately $32,300 to $37,200 (*see* Table III-8). The agencies did not have sufficient data to quantify the potential increase in oil spill risk, but analysis of the 14 facilities shows that they all have at least one million gallons of oil storage capacity and for at least 9 facilities, an oil discharge could impact sensitive environments, according to the harm criteria provided in EPA's FRP database. Sensitive environments are Plan-specific and include transportation routes, flora and fauna, and recreational areas.

EPA FOSCs did not respond to any oil spill incidents in the Upper and Lower Pecos watersheds between 2001 and 2017.

III.B.4.3 Potential Environmental Impacts and Costs

III.B.4.3.1 Water Quality

As described in Section III.B.4.2, the agencies found the estimated impacts of the final rule on the CWA sections 404 and 402 programs to be small in the Upper and Lower Pecos River watersheds. Given this finding of minimal changes and the scale and scope of the SWAT model, the agencies did not model water quality impacts downstream from affected wetlands and streams.

III.B.4.3.2 Drinking Water

According to the EPA's SDWIS database, the Upper Pecos River watershed (HUC 1306) includes 30 public drinking water facilities, including four intakes, two reservoirs, and 23 springs. There are no public drinking water facilities (intakes, springs, or others) in the Lower Pecos watershed. As described in the previous section, higher sediment loads due to reduced wetlands could increase the turbidity of source water, but these potential effects are expected to be small given the minimal predicted 404 program impacts.

Table III-53: Public drinking water intakes in the Upper and Lower Pecos watersheds

HUC4	Number of intakes	Number of people served	Potential impacts from final rule
1306	4	37,120	Not quantified
1307	0	0	Not quantified
Total	4	37,120	Not quantified

Source: EPA analysis of SDWIS (2017) data.

III.B.4.3.3 Dredging for Water Storage and Navigation

The agencies did not model the potential impacts of the final rule on reservoir sedimentation. As described above, higher sediment loads due to reduced wetlands could increase sedimentation in downstream reservoirs, but these potential effects are expected to be small given the minimal predicted 404 program impacts.

III.B.4.3.4 Potential Impacts to Tribal Resources from Affected Waters within and Upstream of Rio Grande Tribal Lands

A total of 23 federally recognized tribal lands intersect with the Rio Grande River Basin.[144] Changes in the scope of CWA programs on facilities and activities within and upstream of tribal lands could potentially expose tribal resources to incremental pollution from oil spills or point source discharges, and adverse effects from dredging activities or forgone wetland mitigation.

Of the 90 CWA section 402 discharge permits in the greater Rio Grande Basin, one discharge to waters on tribal land and 44 discharge to waters upstream of tribal lands.

The Corps issued 251 CWA section 404 permits affecting resources within the 23 tribal lands of the Rio Grande Basin between 2010 and 2015. Of these, 120 permits distributed among 18 tribal lands affected resources that may no longer be jurisdictional under the final rule based on permit information contained in the Corps' ORM2 database and using the criteria summarized in Table III-9. An additional 619 CWA section 404 permits were issued for dredge and fill activities affecting waters upstream of tribal lands in the Rio Grande Basin, including 256 permits pertaining to waters[145] that may no longer be jurisdictional under the final rule. In total over the 6-year period, potentially affected permits within and upstream of

[144] No tribal lands intersected the other two case study basins.

[145] All 256 permits are associated with ephemeral streams, as indicated by ORM2 code "R6-Riverine, ephemeral."

tribal lands amounted to 35 acres and 600 linear feet of permanent impact mitigation that may be forgone under the final rule.

The Rio Grande Basin in New Mexico includes two tribal lands with active oil wells: the Navajo Nation, with one active oil well, and the Jicarilla Apache Nation, with 17 active oil wells. There are 119 subwatersheds (defined by 12-digit HUCs) upstream of these tribal lands, with a total of 185 active oil wells distributed among 11 upstream subwatersheds.

III.B.5 Limitations and Uncertainty of Case Study Analyses

Several methodological and data limitations affect the case study analyses or contribute to uncertainty. These limitations are in addition to the limitations inherent to the data sources previously discussed in Section II.C. They include:

- **Case study locations may not be indicative of nationwide impacts**. Case study locations do not include watersheds predicted to see the largest changes in wetland areas or ephemeral streams and may therefore not be representative of potential impacts of the final rule across the United States. Factors considered by the agencies in selecting among case study candidates prioritized locations for which primary wetland valuation studies were available and the states were less likely to continue to regulate newly non-jurisdictional waters. While these locations show that the final rule may have relatively small impacts, the 404 program data used in the later national analysis identify other watersheds where a significantly greater amount of mitigation occurred in 2011-2015 to address impacts of permitted activities. Therefore, cost savings, environmental impacts, and forgone benefits in these watersheds may be larger (or smaller) than estimated for the three case studies presented in this section.

- Available data provide only an incomplete inventory of existing projects and permits affecting ephemeral streams and other waters potentially affected by the final rule. The high resolution NHD data do not consistently differentiate stream attributes according to the stream flow regime, limiting the agencies' ability to identify activities or dischargers affecting these waters in the baseline. Because of this limitation, EPA relied primarily on information provided in program databases and/or NWI wetland attributes when determining the type of potentially affected waters. The information provided in these alternative data sources was not always sufficient to categorize the flow regime; where this was the case, the agencies assumed that these waters are not ephemeral. This may have omitted relevant activities or permits from the analysis, which would understate the potential impacts of the final rule.

- **The analysis of the 402 program uses NWI data to estimate the flow regime of receiving waters**. To estimate which permitted discharges might be affected by the final rule, the agencies relied on 402 permit locational information and NWI data. The agencies used the Cowardin classification code assigned to the NWI resource closest to the coordinates of permitted outfalls to approximate the flow regime of the receiving waters. If the Cowardin classification code of the receiving water was either R4SBA (Riverine, Intermittent, Streambed, Temporarily Flooded) or R4SBJ (Riverine, Intermittent, Streambed, Intermittently Flooded), the permitted discharge was assumed to be an ephemeral water. The agencies used NWI instead of NHD to assess flow regime of receiving waters because the NHD dataset does not consistently distinguish between intermittent and ephemeral streams nationwide. The use of NWI data may result in an

underestimate of the number of 402 permits potentially discharging to ephemeral waters, as the NWI does not map all ephemeral streams and does not include a Water Regime Modifier for all streams, which was used to determine which streams mapped in the NWI were potentially ephemeral. However, because the agencies do not know how well the Cowardin Classification System codes R4SBA and R4SBJ correspond to actual ephemeral flow conditions in the field, the analysis may overestimate the number of 402 permits potentially discharging to ephemeral features.

- **Projects permitted in 2011-2015 may not be representative of future projects**. For the case study analysis, the agencies assumed that projects permitted under the 404 program during the period of 2011-2015 are representative of projects that may be permitted over the next 20 years in terms of the type and location of the projects, extent and character of the affected resources, and mitigation requirements. In fact, future development patterns may follow different distributions and affect locations that the agencies did not consider for this analysis.

- **The analysis focuses on compensatory mitigation as the main change under the 404 program.** The 404 permitting process promotes preventing impacts to waters through project location and design and only where those actions are not sufficient is mitigation of the unavoidable impacts necessary. For waters that are no longer jurisdictional under the final rule, the incentive to prevent or limit impacts may no longer be present. As such, impacts to existing wetlands and streams may be larger than indicated by the impacts for permitted projects, thereby understating the potential impacts of the final rule.

- **The analysis of the 404 program considers forgone mitigation of permanent wetland impacts only**. The analysis of avoided costs, forgone benefits, and SWAT model scenarios incorporate the impacts of forgone mitigation for permanent impacts to wetlands and omit additional mitigation that may also be needed to compensate for temporary impacts. To the extent that mitigation of temporary impacts results in the permanent protection of wetlands, the analytic scenarios may understate the potential impacts of the final rule on cost savings, forgone benefits, and water quality.

- The analysis of the 404 program relies on the ORM2 data on permanent impacts and the mitigation ratios to estimate changes in compensatory mitigation resulting from the final rule. The agencies assumed that 404 permitted projects primarily affect Category III wetlands and streams. Category III water resources are defined as not rare or unique and usually plentiful in the watershed. The recommended compensatory ratios range from less than 1:1 to 1.5:1. If pristine or otherwise unique resources are affected the mitigation ratios could range from 2:1 for Category II wetlands to 3:1 for Category I wetlands. The estimated costs and benefits may be understated if Category I and II wetlands are affected. In some cases, a mitigation ratio of less than 1:1 may be required; in such cases cost savings and forgone benefits may be overstated. Although the agencies validated their assumptions based on statistical analysis of ORM2 data on 4,000 projects where the relationship between impacted acres and required mitigation acres could be isolated, this analysis excluded any projects where impacts or mitigation included linear feet values and any projects where some or all of the mitigation used credits or in-lieu fees. To the extent that

excluded projects used significantly different mitigation ratios, the estimated costs savings and forgone benefits could be under or overstated.

- **The 404 permit cost savings analysis relies on Corps' estimates of permit application costs**. The Corps estimated permit application costs based on a "typical" permit. The permit application cost savings analysis for the final rule only includes permits solely affecting waters that may change jurisdictional status under the final rule (*e.g.*, ephemeral streams and certain RPWWN-type wetlands). Since the impacts of these permits are less than "typical" on average, the agencies used the lower bound estimate of the Corps' permit application cost range. The use of the lower bound estimate may underestimate costs for larger projects or for permits in high-cost regions. The use of the Corps' lower bound figures also underestimates cost savings relative to using the costs of obtaining individual and general 404 permits cited by the Supreme Court in *Rapanos* as $271,596 and $28,915, respectively. 547 U.S. at 721. Any permits affecting both waters likely to remain jurisdictional and waters likely to no longer be jurisdictional under the final rule are not considered in the cost savings analysis. Cost savings may be greater than estimated by the agencies in cases where eliminating some waters from permitting requirements streamlines the process and reduces overall permit costs.

- The analysis of forgone benefits associated with reduced mitigation requirements for ephemeral streams, typically expressed in linear feet, focuses on the total ecological impacts associated with reduced riparian areas. As noted above, requirements for the riparian buffer width vary from state to state. The agencies assumed that a 25-foot buffer zone on each stream side (50 feet total) is required around ephemeral streams in the analysis. Because some states do not specify minimum requirements for a buffer zone, while others specify a minimum requirement of a 50-foot buffer, the agencies' estimate of the lost riparian area may be overstated for some locations and understated for others.

- The value of forgone benefits from reduced riparian areas around ephemeral streams could be lower or higher compared to the WTP to avoid wetland losses, depending on the role of ephemeral streams and their riparian areas in a given watershed. Valuation of reduced mitigation requirements for wetlands and riparian areas is based on benefit transfer from a study by Blomquist and Whitehead (1998) that valued freshwater wetlands (including riparian). Given that riparian areas adjacent to ephemeral streams perform many of the characteristic ecological functions performed by riparian areas adjacent to perennial and intermittent streams, but may not provide a full spectrum of ecological functions (Zaimes et al. 2007), the estimated forgone benefits for the reduction in riparian areas around ephemeral streams may be overstated.

- **Transfer error may occur when benefit estimates from a study site are adopted to forecast the benefits of a proposed scenario.** Rosenberger and Stanley (2006) define transfer error as the difference between the transferred and actual, generally unknown, value. The wetland valuation study used in benefits transfer (*i.e.*, Blomquist and Whitehead, 1998) focused on wetlands within the Ohio River Basin. Thus, it provides nearly a perfect match to the resource characteristics considered in the analysis of forgone benefits. However, it was conducted 20 years ago and public preferences for wetland protection may change over time. It provides a good, but not a perfect match for the Lower Missouri River case study. Although the wetland types valued in the

original study are the same as in the Lower Missouri River case study area, public preferences for wetland preservation may differ across states and communities, for example, due to the difference in the baseline wetland area, the importance of wetland preservation at the watershed level, and other factors. Therefore, the estimated WTP values may under- or overstate the value of forgone benefits in the case study areas.

- **Potential hypothetical bias may be present in the source study used in benefits transfer**. Following standard benefit transfer approaches, this analysis proceeds under the assumption that the source study provides a valid, unbiased estimate of the welfare measure under consideration (cf. Moeltner et al., 2007; Rosenberger and Phipps, 2007).

- **The effect of distance between the affected households and the affected wetlands was not explicitly included in the analysis**. Following the Blomquist and Whitehead study (1998), the agencies assumed that all households in the state where wetland losses occur and households in the counties adjacent to the affected resources that reside in the neighboring state hold the same average WTP value for preventing wetland losses. The agencies would expect values for water quality improvements to diminish with distance (all else equal) between the home and affected water resources. This difference is implicitly captured in the average WTP reported in the original study. If the distribution of households by distance is different between the study site and the proposed scenario site, the estimated value of forgone benefits could be biased either upward or downward.

- **Water quality modeling focuses on potential environmental impacts within the immediate watershed**. The scope of the water quality models covers the HUC4 watersheds where wetland changes occur. However, the potential impacts of land use changes and forgone ecosystem services are not limited to these watersheds. Changes in flows and nutrient and sediment fluxes may also affect downstream waters. As such, the analysis may understate the potential impacts of the final rule.

- **Water quality modeling scenarios assume wetland impacts distributed across subbasins within a watershed.** As described in Section III.B.2.3.1, the agencies distributed potential changes in 404 program impacts due to the final rule among all subbasins within the SWAT watershed that had both existing wetlands and developed areas. This approach of distributing total watershed changes may understate potential localized hydrological and water quality impacts in cases where projects are concentrated in a few subbasins within a watershed. For example, in watershed HUC 0509, the ORM2 data show mitigated wetland impacts in 33 subbasins over 5 years, whereas the agencies distributed impacts over 300 subbasins over 20 years. For watershed HUC 0510, the ORM2 data show impacts in 11 subbasins, whereas the agencies distributed the impacts over 84 subbasins for modeling purposes.

- **The water quality models use a simplified representation of wetland functions in each watershed.** As described in Section III.B.2.3.1, the SWAT models represent wetlands through both land cover (HRUs) and as distinct hydrologic features within the subbasins. The SWAT models represent two main categories of wetlands in each subbasin: abutting wetlands that are hydrologically connected to the main reach of a subbasin, and non-abutting wetlands without a direct connection. The analysis used two HRU groups to represent each of the wetland land cover

types, and two SWAT hydrologic features, ponds and wetlands, to represent the hydrology of the two wetland groups. SWAT pond functions were configured to represent non-abutting wetland hydrology by specifying the aggregated subbasin area and depth of non-abutting wetlands according to the NWI data. In subbasins that include actual ponds, the wetland area was added to the pond area since only one pond per subbasin is currently supported in SWAT. Abutting wetlands hydrology was represented by the wetlands function of SWAT. By configuring the model this way, the agencies can distinguish the two wetland categories in modeling the potential impacts, but the modeling approach otherwise models the wetlands in a spatially aggregated manner that does not account for the exact location of the wetlands within each HUC12 subbasins.

- The analysis used the distance between certain oil storage or production facilities and waters as an approximate indicator of reasonable potential for a discharge for the CWA section 311 program. There is significant uncertainty in the universe of oil storage or production facilities that could be affected by the change in CWA jurisdictional scope. The SPCC rule does not require facility owners/operators to identify themselves to the EPA. While the agencies were able to use location data for equipment associated with a small subset of the SPCC-regulated universe (oil production wells) and FRP facilities, these data provide only partial insight into the reasonable potential for a discharge of oil to jurisdictional waters that determines SPCC and FRP applicability.

III.B.6 Discussion of Case Study Analysis Findings

Table III-54 to Table III-56 summarize the findings of the Stage 2 analysis across the three case study areas. In general, annual avoided costs exceed annualized forgone benefits, but as discussed in Section III.B.5 and noted in the summary tables, limitations of the data curtailed the agencies' ability to quantify or monetize some of the potential environmental effects and forgone benefits of the final rule.

Table III-54: Scenario 0 — Potential impacts, cost savings, and forgone benefits in the Case Study areas including potential impacts from all states in the watershed

	Annual Avoided Costs (2018$ millions)		Annualized Forgone Benefits (2018$ millions)[1]	
	Low	High	Low	High
Ohio River Basin				
CWA 402	$0.0	$0.0	$0.0	$0.0
CWA 404 Permit Application	$0.41	$0.41	N/A	N/A
CWA 404 Mitigation – Wetlands & Ephemeral Streams	$8.46	$31.16	$0.70[2]	$4.63
CWA 404 Mitigation – Water Quality	N/A	N/A	*not monetized*	*not monetized*
CWA 404 – Reservoir Dredging	N/A	N/A	negligible[3]	negligible
CWA 311 – FRP Requirements	*not monetized*	*not monetized*	*not monetized*	*not monetized*
CWA 311 – SPCC Requirements	*not monetized*	*not monetized*	*not monetized*	*not monetized*
SUBTOTAL	**$8.87**	**$31.57**	**$0.70**	**$4.63**
Lower Missouri River Basin				
CWA 402	*not monetized*	*not monetized*	*not monetized*	*not monetized*
CWA 404 Permit Application	$0.27	$0.27	N/A	N/A
CWA 404 Mitigation – Wetlands & Ephemeral Streams	$1.41	$5.51	$0.13[4]	$0.84

Table III-54: Scenario 0 — Potential impacts, cost savings, and forgone benefits in the Case Study areas including potential impacts from all states in the watershed

	Annual Avoided Costs (2018$ millions)		Annualized Forgone Benefits (2018$ millions)[1]	
	Low	High	Low	High
CWA 404 Mitigation – Water Quality	N/A	N/A	*not monetized*	*not monetized*
CWA 404 Mitigation – Reservoir Dredging	N/A	N/A	Negligible[3]	negligible
CWA 311 – FRP Requirements	*not monetized*	*not monetized*	*not monetized*	*not monetized*
CWA 311 – SPCC Requirements	*not monetized*	*not monetized*	*not monetized*	*not monetized*
SUBTOTAL	**$1.68**	**$5.78**	**$0.13**	**$0.84**
Rio Grande River Basin				
CWA 402	*not monetized*	*not monetized*	*not monetized*	*not monetized*
CWA 404 Permit Application	$0.11	$0.11	N/A	N/A
CWA 404 Mitigation – Wetlands & Ephemeral Streams	negligible[5]	negligible	*not monetized*	*not monetized*
CWA 404 Mitigation -Water Quality	N/A	N/A	*not quantified*	*not quantified*
CWA 404 Mitigation-Reservoir Dredging	N/A	N/A	*not quantified*	*not quantified*
CWA 311 – FRP Requirements	*not monetized*	*not monetized*	*not monetized*	*not monetized*
CWA 311 – SPCC Requirements	*not monetized*	*not monetized*	*not monetized*	*not monetized*
SUBTOTAL	**$0.11**	**$0.11**	**$0.00**	**$0.00**
Total 3 Case Studies				
TOTAL (Monetized Categories)	**$10.66**	**$37.46**	**$0.83**	**$5.47**

[1]Annualized forgone benefits are estimated at a 3 percent discount rate.

[2] For comparison purposes, the estimated annualized forgone benefits from reduced mitigation requirements in the Ohio River Basin range from a low of $0.52 to a high $3.42 million at a 7 percent discount rate.

[3] The estimated increase in annualized dredging costs is estimated to be less than one thousand dollars per year.

[4] For comparison purposes, annualized forgone benefits from reduced mitigation requirements in the Lower Missouri River Basin range from a low of $0.09 million to a high of $0.61 million at a 7 percent discount rate.

[5] The estimated annual mitigation cost savings range from range of $200 to $300 (actual dollars, not millions of dollars).

Table III-55: Scenarios 1 & 2 — Potential impacts, cost savings, and forgone benefits in the Case Study areas excluding the potential impact from states that may continue their baseline dredged/fill and surface water permitting practices

	Annual Avoided Costs (2018$ millions)		Annual Forgone Benefits (2018$ millions)	
	Low	High	Low	High
Ohio River Basin				
CWA 402	$0.0	$0.0	$0.0	$0.0
CWA 404 Permit Application	$0.32	$0.32	N/A	N/A
CWA 404 Mitigation – Wetlands & Ephemeral Streams	$6.64	$16.48	$0.38[2]	$2.51
CWA 404 Mitigation -Water Quality	N/A	N/A	*not quantified*	*not quantified*
CWA 404 Reservoir Dredging	N/A	N/A	*not quantified*	*not quantified*
CWA 311 – FRP Requirements	*not monetized*	*not monetized*	*not monetized*	*not monetized*
CWA 311 – SPCC Requirements	*not monetized*	*not monetized*	*not monetized*	*not monetized*
SUBTOTAL	**$6.96**	**$16.80**	**$0.38**	**$2.51**

Table III-55: Scenarios 1 & 2 — Potential impacts, cost savings, and forgone benefits in the Case Study areas excluding the potential impact from states that may continue their baseline dredged/fill and surface water permitting practices

	Annual Avoided Costs (2018$ millions)		Annual Forgone Benefits (2018$ millions)	
	Low	High	Low	High
Lower Missouri River Basin				
CWA 402	*not monetized*	*not monetized*	*not monetized*	*not monetized*
CWA 404 Permit Application	$0.27	$0.27	N/A	N/A
CWA 404 Mitigation – Wetlands & Ephemeral Streams	$1.41	$5.51	$0.13[3]	$0.84
CWA 404 Mitigation -Water Quality	N/A	N/A	*not quantified*	*not quantified*
CWA 404 Mitigation-Reservoir Dredging	N/A	N/A	*not quantified*	*not quantified*
CWA 311 – FRP Requirements	*not monetized*	*not monetized*	*not monetized*	*not monetized*
CWA 311 – SPCC Requirements	*not monetized*	*not monetized*	*not monetized*	*not monetized*
SUBTOTAL	**$1.68**	**$5.78**	**$0.13**	**$0.84**
Rio Grande River Basin				
CWA 402	*not monetized*	*not monetized*	*not monetized*	*not monetized*
CWA 404 Permit Application	$0.11	$0.11	N/A	N/A
CWA 404 Mitigation – Wetlands & Ephemeral Streams	negligible[4]	negligible	*not monetized*	*not monetized*
CWA 404 Mitigation -Water Quality	N/A	N/A	*not quantified*	*not quantified*
CWA 404 Mitigation-Reservoir Dredging	N/A	N/A	*not quantified*	*not quantified*
CWA 311 – FRP Requirements	*not monetized*	*not monetized*	*not monetized*	*not monetized*
CWA 311 – SPCC Requirements	*not monetized*	*not monetized*	*not monetized*	*not monetized*
SUBTOTAL	**$0.11**	**$0.11**		
Total 3 Case Studies				
TOTAL (Monetized Categories)	**$8.75**	**$22.69**	**$0.51**	**$3.35**

[1]Annualized benefits are estimated at a 3 percent discount rate.

[2] For comparison purposes, the estimated annualized benefits from reduced mitigation requirements in the Ohio River Basin range from a low of $0.28 to a high of $1.85 million at a 7 percent discount rate.

[3] For comparison purposes, the estimated annualized forgone benefits from reduced mitigation requirements in the Lower Missouri River Basin range from a low of $0.09 million to a high of $0.61 million at a 7 percent discount rate.

[4]The estimated annual mitigation cost savings range from $200 to $300 (actual dollars, not millions of dollars).

Table III-56: Scenario 3 — Potential impacts, cost savings, and forgone benefits in the Case Study areas excluding the potential impact from states that may continue their baseline dredged/fill and surface water permitting practices

	Annual Avoided Costs (2018$ millions)		Annual Forgone Benefits (2018$ millions)	
	Low	High	Low	High
Ohio River Basin				
CWA 402	$0.0	$0.0	$0.0	$0.0
CWA 404 Permit Application	$0.32	$0.32	N/A	N/A
CWA 404 Mitigation – Wetlands & Ephemeral Streams	$6.64	$16.48	$0.38[2]	$2.51
CWA 404 Mitigation -Water Quality	N/A	N/A	*not quantified*	*not quantified*

Table III-56: Scenario 3 — Potential impacts, cost savings, and forgone benefits in the Case Study areas excluding the potential impact from states that may continue their baseline dredged/fill and surface water permitting practices

	Annual Avoided Costs (2018$ millions)			Annual Forgone Benefits (2018$ millions)	
	Low	High		Low	High
CWA 404 Reservoir Dredging	N/A	N/A		*not quantified*	*not quantified*
CWA 311 – FRP Requirements	*not monetized*	*not monetized*		*not monetized*	*not monetized*
CWA 311 – SPCC Requirements	*not monetized*	*not monetized*		*not monetized*	*not monetized*
SUBTOTAL	**$6.96**	**$16.80**		**$0.38**	**$2.51**
Lower Missouri River Basin					
CWA 402	*not monetized*	*not monetized*		*not monetized*	*not monetized*
CWA 404 Permit Application	$0.03	$0.03		N/A	N/A
CWA 404 Mitigation – Wetlands & Ephemeral Streams	$0.01	$0.03		<$0.01	$0.01
CWA 404 Mitigation -Water Quality	N/A	N/A		*not quantified*	*not quantified*
CWA 404 Mitigation-Reservoir Dredging	N/A	N/A		*not quantified*	*not quantified*
CWA 311 Compliance	*not monetized*	*not monetized*		*not monetized*	*not monetized*
CWA 311 Compliance	*not monetized*	*not monetized*		*not monetized*	*not monetized*
SUBTOTAL	**$0.04**	**$0.06**		**<$0.01**	**$0.01**
Rio Grande River Basin					
CWA 402	*not monetized*	*not monetized*		*not monetized*	*not monetized*
CWA 404 Permit Application	$0.11	$0.11		N/A	N/A
CWA 404 Mitigation – Wetlands & Ephemeral Streams	Negligible[3]	negligible		*not monetized*	*not monetized*
CWA 404 Mitigation – Water Quality	N/A	N/A		*not quantified*	*not quantified*
CWA 404 Mitigation – Reservoir Dredging	N/A	N/A		*not quantified*	*not quantified*
CWA 311 – FRP Requirements	*not monetized*	*not monetized*		*not monetized*	*not monetized*
CWA 311 – SPCC Requirements	*not monetized*	*not monetized*		*not monetized*	*not monetized*
SUBTOTAL	**$0.11**	**$0.11**			
Total 3 Case Studies					
TOTAL (Monetized Categories)	**$7.11**	**$16.97**		**$0.38**	**$2.52**

[1]Annualized forgone benefits are estimated at a 3 percent discount rate.

[2] For comparison purposes, the estimated annualized benefits from reduced mitigation requirements in the Ohio River Basin range from a low of $0.28 million to a high of $1.85 million at a 7 percent discount rate.

[3] The estimated annual mitigation cost savings range from range of $200 to $300 (actual dollars, not millions of dollars).

III.C Stage 2 Quantitative Assessment of Potential National Impacts

III.C.1 Potential Cost Savings and Forgone Benefits of Reduced Wetland Mitigation Requirements

The case studies demonstrate that data limitations constrain the agencies' ability to quantify and value the potential effects of the final rule on the CWA sections 402 and 311 programs across the country, but that it is possible to quantify and value at least some of the potential effects of the final rule on the CWA section 404 program nationwide. Accordingly, to evaluate the potential impacts of the final rule, the agencies focused on potential CWA section 404 program impacts for which data are sufficient to develop quantitative estimates at the national level. The approach incorporates the predicted state response under

various scenarios (*see* Section II.A.3). Inputs for this analysis were derived using the same approach as described for the case studies (*see* Section III.B.2.2.2), which relies on section 404 permit data from the Corps' ORM2 database to identify aquatic resources and permits potentially affected by the final rule. To estimate cost savings, the agencies used the same methodology described in Section III.B.2.2.2.1. To estimate forgone benefits, the agencies used a meta function benefits transfer to value forgone wetland mitigation (see Appendix D).

National-level estimates of this analysis are summarized below. Table III-57 presents national-level cost savings from reduced permit requirements. Table III-58 presents national-level cost savings from reduced mitigation requirements. Table III-59 presents total national-level cost savings (sum of permit cost savings and reduced mitigation requirement savings). Table III-60 presents forgone benefit estimates based on annual WTP for wetlands under each of the state response scenarios. State-level estimates of cost savings and forgone benefits are provided in Appendix E.

As shown in the tables, the estimated cost savings from avoided permit applications and mitigation generally exceed forgone benefits of wetlands. This is true for all four state response scenarios the agencies analyzed and under most cost or WTP assumptions. For example, under Scenarios 1 and 2, annual cost savings range between $130.6 million and $263.7 million (under low and high cost assumptions), compared to estimated forgone benefits of $62.5 million (based on mean WTP). However, the high estimate of forgone benefits based on the 95th percentile of the WTP for wetlands protection are greater than the low and high estimated cost savings under Scenario 0 and greater than the lower bound of cost savings under Scenarios 1, 2, and 3.

Table III-57: Estimated national average annual reduction in CWA 404 permit application costs

Permit Type	Unit Costs from Corps NWP Analysis (2018$)[5]	Estimated Annual Average Reduction in Permits with Final Rule	Estimated Reduction in Permit Costs (millions 2018$)
Scenario 0[1,2]			
IP	$15,100	81	$1.22
GP	$4,500	5,783	$26.02
Total		**5,864**	**$27.2**
Scenario 1&2[1,3]			
IP	$15,100	38	$0.6
GP	$4,500	3,119	$14.0
Total		**3,157**	**$14.6**
Scenario 3[1,4]			
IP	$15,100	28	$0.4
GP	$4,500	2,509	$11.3
Total		**2,537**	**$11.7**

[1] Estimated annual average permit reductions based on permits issued in years 2011-2015 estimated to only affect RPWWN-type wetlands or ephemeral streams.

[2] Includes all states except Hawaii.

[3] Scenario 1 and 2 are identical for the CWA section 404 program analysis. These scenarios include Alaska, Alabama, Arkansas, Arizona, Colorado, Delaware, Georgia, Iowa, Idaho, Kansas, Kentucky, Louisiana, Missouri, Mississippi, Montana, North Carolina, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, South Carolina, South Dakota, Texas, Utah, and Wisconsin.

Table III-57: Estimated national average annual reduction in CWA 404 permit application costs

Permit Type	Unit Costs from Corps NWP Analysis (2018$)[5]	Estimated Annual Average Reduction in Permits with Final Rule	Estimated Reduction in Permit Costs (millions 2018$)

[4] Includes Alaska, Alabama, Arkansas, Arizona, Colorado, Idaho, Kentucky, Louisiana, Missouri, Mississippi, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, South Carolina, South Dakota, and Texas.

[5] *But see supra* at footnote 117.

Table III-58: Estimated national average annual cost savings of reduced mitigation requirements resulting from the revised definition of "waters of the United States"

Unit	Estimated Annual Average Mitigation Reduction under Final Rule	Low (millions 2018$)	High (millions 2018$)
Scenario 0[1,2]			
Acres	974.0	$57.9	$125.5
LF	445,749	$159.3	$360.0
Total		**$217.2**	**$485.5**
Scenario 1[1,3]			
Acres	399.3	$22.5	$43.3
LF	301,335	$93.4	$205.9
Total		**$115.9**	**$249.1**
Scenario 3[1, 4]			
Acres	317.6	$13.4	$28.2
LF	222,469	$84.0	$174.6
Total		**$97.5**	**$202.8**

[1] Estimated annual average mitigation reduction based on permits issued in years 2011-2015 with mitigation requirements on waterways determined to be RPWWN-type wetlands or interpreted to be ephemeral streams. Excludes permits issued for mitigation or restoration activities because the main purpose of these activities is to restore or enhance ecosystem services provided by water resources as opposed to dredge and fill activities that lead to permanent or temporary losses of ecosystem services. Cost savings are calculated by multiplying the cost of each mitigation acre or linear foot (low and high estimates) for each state by the expected reduction in annual mitigation requirements, and summing the state-level acreage and linear feet values for each scenario.

[2] Includes all states except Hawaii.

[3] Scenario 1 and 2 are identical for the CWA section 404 program analysis. These scenarios include Alaska, Alabama, Arkansas, Arizona, Colorado, Delaware, Georgia, Iowa, Idaho, Kansas, Kentucky, Louisiana, Missouri, Mississippi, Montana, North Carolina, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, South Carolina, South Dakota, Texas, Utah, and Wisconsin.

[4] Includes Alaska, Alabama, Arkansas, Arizona, Colorado, Idaho, Kentucky, Louisiana, Missouri, Mississippi, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, South Carolina, South Dakota, and Texas.

Table III-59: Total national estimated annual cost savings (millions 2018$)

Cost Type	Scenario 0[1]		Scenario 1&2[2]		Scenario 3[3]	
	Low	High	Low	High	Low	High
Permit Cost Savings	$27.2	$27.2	$14.6	$14.6	$11.7	$11.7
Mitigation Cost Savings	$217.2	$485.5	$115.9	$249.1	$97.5	$202.8
Total	**$244.5**	**$512.7**	**$130.6**	**$263.7**	**$109.2**	**$214.5**

[1] Includes all states except Hawaii.

[2] Scenario 1 and 2 are identical for the CWA section 404 program analysis. These scenarios include Alaska, Alabama, Arkansas, Arizona, Colorado, Delaware, Georgia, Iowa, Idaho, Kansas, Kentucky, Louisiana, Missouri, Mississippi, Montana, North Carolina, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, South Carolina, South Dakota, Texas, Utah, and Wisconsin.

[3] Includes Alaska, Alabama, Arkansas, Arizona, Colorado, Idaho, Kentucky, Louisiana, Missouri, Mississippi, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, South Carolina, South Dakota, and Texas.

Table III-60: Total estimated annual national forgone benefit of reduced mitigation requirements resulting from the revised definition of the "waters of the United States," by potential state response scenario

Scenario	Households	Estimated Annual Forgone Mitigation Acres	Mean WTP per household per acre (2018$)	Mean Estimate of Forgone Benefits (millions 2018$)	Lower 5th WTP per household per acre (2018$)	Lower 5th Estimate of Forgone Benefits (millions 2018$)	Upper 95th WTP per household per acre (2018$)	Upper 95th Estimate of Forgone Benefits (millions 2018$)
Scenario 0[1,2]	116,987,661	1,485.62	$0.02	$173.20	<$0.01	$28.62	$0.10	$554.94
Scenario 1 & 2[1,3]	44,798,739	745.18	$0.02	$62.49	<$0.01	$8.22	$0.10	$206.70
Scenario 3[1,4]	31,023,825	572.97	$0.02	$55.15	<$0.01	$6.04	$0.10	$192.31

[1] Estimated annual average mitigation reduction based on permits issued in years 2011-2015 with mitigation requirements on waterways determined to be RPWWN-type wetlands or interpreted to be ephemeral streams. Excludes permits issued for mitigation or restoration activities because the main purpose of these activities is to restore or enhance ecosystem services provided by water resources as opposed to dredge and fill activities that lead to permanent or temporary losses of ecosystem services.

[2] Includes all states except Hawaii.

[3] Scenario 1 and 2 are identical for the CWA section 404 program analysis. These scenarios include Alaska, Alabama, Arkansas, Arizona, Colorado, Delaware, Georgia, Iowa, Idaho, Kansas, Kentucky, Louisiana, Missouri, Mississippi, Montana, North Carolina, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, South Carolina, South Dakota, Texas, Utah, and Wisconsin.

[4] Includes Alaska, Alabama, Arkansas, Arizona, Colorado, Idaho, Kentucky, Louisiana, Missouri, Mississippi, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, South Carolina, South Dakota, and Texas.

III.C.2 Potential Impacts to States

For states, the final rule could result in increased administrative costs from taking on responsibilities to regulate newly non-jurisdictional waters. Although the potential state responses to the final rule are not limited to dredge and fill activities, this analysis of potential impacts to states is based on the predicted change in jurisdictional dredge and fill activity estimated in Section III.C.1 above. Depending on whether states currently have an active dredge and fill or wetlands program and how the state responds to the final rule, states may incur costs for initiating a new program or for expanding an existing program, or the final rule may have no effect on state costs. All states that have not already assumed the CWA section 404 program could incur cost savings from a potential reduction in CWA section 401 reviews of Corps-issued 404 permits. Based on the federalism analysis in Section II.A.3, the agencies estimated which states may take on the responsibilities and associated costs of regulating waters that may no longer be jurisdiction under the final rule. This transfer of costs from the federal to the state level would occur for states that choose to create a dredged and fill program under state law to regulate waters that become non-jurisdictional or to expand their own existing dredged and fill or wetland programs to cover waters that become non-jurisdictional. These states may also incur additional upfront costs to set up or expand their programs. The agencies used the federalism analysis to determine which states may be likely to do nothing in response to the final rule. The potential options that states could choose in response to the final rule are:

- Continue broad regulations of affected waters. This would apply to New Jersey, which has assumed the CWA section 404 program and regulates waters more broadly than the CWA under state law.
- Pursue assumption of the CWA section 404 program. States currently considering assumption are Arizona, Florida, Indiana, Maryland, Minnesota, Nebraska, North Dakota, Oregon, and Wisconsin (Feret, 2019). It is presumed that if states assume the 404 program that they would extend coverage under state law to waters that experienced a jurisdictional change under the rule, but this does not necessarily follow.
- Start a state dredged and fill or wetlands program to cover all "waters of the state," including federally non-jurisdictional waters.
- Expand an existing state dredged and fill or wetlands program to cover federally non-jurisdictional waters.
- Reduce an assumed CWA section 404 program. This would apply only to Michigan, which limits its program to the jurisdictional scope of the CWA.
- Continue existing regulations, which may or may not regulate affected waters.

Depending on which option states choose in response to the final rule, they may incur a certain set of costs. Initial costs could include application costs for assuming the CWA section 404 program, hiring, training, information technology infrastructure, creating the annual report for an assumed 404 program, and administrative revision of statutes or programs. If a state initiated a dredged and fill program under state law in response to the rule, the agencies assume that the state would also likely incur similar costs with the exception of the CWA section 404 application and 404 annual report costs. States expanding an

existing dredged and fill program may also incur hiring and training costs, but it is uncertain whether they would need to incur additional information technology costs or costs for administrative revisions to statutes or programs. Recurring costs could include permit review and legal costs. Table III-61 shows which costs states would potentially incur according to potential response options.

Table III-61: Potential state 404 costs incurred by scenario

Scenario	Initial Costs						Recurring Costs/Cost Savings		
	Application for 404 Assumption	Hiring	Training	Information Technology	Annual Report for 404 Program	Administrative Revision	Permit Review	401 Certification Review	Legal
No change, continue broad regulations	–	–	–	–	–	–	–	–	–
Pursue assumption	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Cost Savings	Yes
Start state wetland program	–	Yes	Yes	Yes	–	Yes	Yes	Cost Savings	Yes
Expand existing state wetland program	–	Yes	Yes	Uncertain	–	Uncertain	Yes	Cost Savings	Yes
Reduce state 404 program	–	–	–	–	–	Yes	Cost Savings	–	–
No change, continue narrow regulations	–	–	–	–	–	–	–	Cost Savings	–

Values for costs were gathered from multiple sources and are shown in Table III-62. Values for hiring, training, IT support, staffing and legal support are assumed to be similar between 404 program and state dredged and fill permitting programs.

- **404 Assumption Application/Investigation Costs** – States that decide to assume the 404 program will incur costs from applying for assumption as well as investigating assumption. An EPA ICR estimates that completing the assumption application costs approximately $24,000 on average per state (U.S. EPA, 2017). This estimate is based on a state requiring 520 hours to prepare the documentation and an average state employee salary of $60,210 multiplied by a 1.6 overhead factor. The ICR estimate focuses on the hours required to complete the actual application. States will also typically spend significant resources investigating the feasibility of assuming the 404 program prior to completing the actual application. The Association of State Wetland Managers estimated that, on average, states spend $225,000 to investigate assumption (Hurld & Linn, 2008).

- **Hiring Costs** – No sources were found that discussed hiring costs for 404 programs or state dredged and fill programs, but a 2016 Society for Human Resource Management Survey found that the average cost-per-hire (sum of internal and external recruiting costs divided by the number

of hires) for companies is $4,129 (SHRM, 2016). This value provides a benchmark of expected hiring burden for each position.

- **Training Costs** – Although there are no detailed assessments on costs for training, and processes are likely to vary by state, Montana's feasibility study of 404 assumption offers an estimate of potential training costs. The state described the need to hire 8 to 10 project managers who would train with the Corps for about 20 to 24 months before they could begin issuing permits (Water Policy Interim Committee, 2016). Taking the number of staff, dividing by the average number of annual permits in Montana between 2011-2015 (796 permits), multiplying by the average state employee salary of $60,210 (U.S. EPA, 2017), then multiplying the result by two yields a training cost per permit that can be multiplied by the average annual number of permits for each state.

- **Information Technology Costs** – There is limited information on the cost of new IT infrastructure for states to administer 404 programs or state dredged and fill programs, but a few state feasibility studies on 404 assumption indicate that the cost can be significant. Minnesota estimated that they would incur a one-time cost of $3 million to set up an online permitting and reporting system (Minnesota DNR and BWSR, 2017). Virginia estimated that upgrading the state's databases and IT infrastructure to enable the 404 permitting program would cost about $2 million the first year, about $1 million the second year, and $0.5 million the third year, or roughly $3.5 million in total initial IT costs (Virginia Department of Environmental Quality, 2012). Both states already have a wetland permitting program.

- **Administrative Revision Costs** – Some states may incur costs from administrative rulemaking and amending statutes whether they initiate, expand, or reduce state programs. Although Michigan has assumed the CWA section 404 program, the state limits the program to the jurisdictional scope of the CWA. While in the long-term this may lead to reduced permitting costs, in the short-term the state could incur administrative costs in order to revise its statute and permitting requirements within two years (U.S. EPA and Department of the Army, 2018a).

- **Permit Review Costs** – While states that take on additional responsibilities of regulating non-jurisdictional waters may need to hire additional staff, the agencies estimate this cost purely for illustrative purposes and not for the national costs, as it is a transfer of costs from the federal government to states. To estimate review costs per state dredged and fill permit, the agencies used values from the CWA section 404 assumption ICR, which estimated an average permit review time of 10 hours and average state salary of $60,210 (U.S. EPA, 2017). Multiplying the salary by an overhead factor of 1.6 yielded an average salary of $96,336. After dividing the salary by the number of working hours per year (2,000 after accounting for two weeks of vacation) to calculate an average hourly wage of approximately $48.17 per hour, the agencies multiplied the hourly wage by the average permit review time of 10 hours. This yielded an average review cost per permit of $493 after converting to 2018 dollars.

- **401 Certification Review Cost Savings** – For states expected to experience cost savings resulting from potentially reduced CWA section 401 certification reviews of Corps-issued 404 permits, the agencies estimated a range of values for cost savings per permit. Values were gathered from case studies conducted by the Association of State Wetland Managers (ASWM).

ASWM surveyed 11 states[146] and asked them for estimates regarding the number of FTEs required for CWA section 401 reviews. The agencies divided FTE estimates by the number of average annual 404 permits for the state, which yielded a range of estimates for FTEs required per permit. ASWM asked states for FTE estimates for all 401 reviews of federal permits, including Federal Energy Regulatory Commission, RHA Sections 9 and 10, and Nuclear Regulatory Commission permits in addition to 404 permits. Most permits that states review are 404 permits although they are typically not the most complex. For example, according to the ASWM case studies, 99 percent and 90 percent of CWA section 401 certifications are for 404 permits in Louisiana and North Carolina, respectively (ASWM, 2011). Because most permits reviewed are CWA section 404 permits and there is no additional information for how many FTEs each state requires to only review 404 permits, the agencies assumed that FTE estimates from ASWM are for 404 permits only. Dividing FTE estimates by the number of 404 permits for the ASWM case study states then multiplying by the average state employee salary yielded a range of 401 review costs per permit ranging between $48-$1,847, with an average review cost per permit of $671. The agencies multiplied these low, mean, and high values by the number of 404 permits issued for waters that may become non-jurisdictional (wetlands coded as "RPWWN" and streams coded as "Riverine, Ephemeral" in the Corps' ORM2 database) and therefore would no longer need 401 certification review.

- **Annual Report Costs** – States that assume the CWA section 404 program must submit an annual report to the EPA assessing their program. U.S. EPA (2017) estimates that each state will need 90 hours to collect data, analyze the information, and prepare the annual report. Based on a state employee salary of $60,210 and a 1.6 overhead factor, annual report generation would cost $3,752 per state.

- **Legal Costs** – There is limited information on legal costs of assumed 404 programs or state dredged and fill programs. However, Arizona provided a quantitative estimate in their 404 program assumption feasibility study. Arizona projected that they would require $220,000 per year for legal support services by the state attorney general (Arizona Department of Environmental Quality, 2018).

Table III-62: Estimated state costs related to changes to 404 program and dredged and fill programs

	Low (2018$)	Mean (2018$)	High (2018$)
Initial costs			
Application for 404 Assumption	$24,585	$24,585	$24,585
404 Assumption Investigation	$263,504	$263,504	$263,504
Hiring Cost per FTE	$4,309	$4,309	$4,309
Training Cost per Permit[1]	$1,985	$2,233	$2,481
Information Technology	$3,073,084	$3,468,892	$3,864,700
Administrative Revision	Unknown	Unknown	Unknown

[146]ASWM case studies on resources devoted to section 401 reviews include Delaware, Georgia, Idaho, Kentucky, Louisiana, Missouri, North Carolina, South Carolina, Tennessee, Texas, and Wisconsin (ASWM, 2011).

Table III-62: Estimated state costs related to changes to 404 program and dredged and fill programs

	Low (2018$)	Mean (2018$)	High (2018$)
Annual recurring costs			
Annual Report for Assumed 404 Program	$3,843	$3,843	$3,843
Review per State Dredged and Fill Permit	$493	$493	$493
401 Certification Review Cost Savings per Corps-issued 404 Permit	-$48	-$671	-$1,847
Legal Costs per Permit[2]	$140	$140	$140

[1] Training costs based on Montana's feasibility study of assuming the 404 program and the number of average annual permits in the state between 2011-2015.

[2] Legal costs based on Arizona's feasibility study of assuming the 404 program and the number of average permits in the state between 2011-2015.

There is significant uncertainty with many of these potential state costs, particularly the initial costs, that makes them difficult to estimate nationally. There is uncertainty as to which states would assume the CWA section 404 program. Furthermore, the actual net cost for states assuming the CWA section 404 program will depend on whether they were starting a program from scratch or transitioning from an existing dredged and fill program. For those states that do not assume the CWA section 404 program, but have an existing dredged and fill program, their costs for expanding their program will depend on how comprehensive their existing program is. Finally, the reduction in CWA section 401 certification reviews will free up state staff that already have a familiarity with reviewing dredge and fill activities. It is very likely that states will shift these employees to any expanded effort. As a result of these uncertainties, the agencies decided to only develop national estimates for dredged and fill permit review costs and CWA section 401 certification review cost savings.

The agencies assigned cost estimates to each state based on the federalism analysis in Section II.A.3 and which states have already assumed the 404 program. The criteria for assigning scenarios that states may follow are shown in Table III-63. In addition, Michigan may need to reduce its assumed 404 program because it does not regulate beyond what federal regulations require. However, the agencies cannot estimate the resulting cost savings from reduced 404 permitting because the ORM2 database does not contain all permits for the states that have assumed the 404 program.

- States that are expected to continue current practices and experience no change in permitting costs and potential 401 certification review cost savings have their own dredged and fill program (or a state-run 404 program in the case of New Jersey), regulate waters more broadly than the CWA requires, and do not have broad legal limitations. There are 24 states that have these characteristics, detailed in Table III-63.

- States that are expected to start their own dredged and fill programs do not currently have their own program, do not regulate waters more broadly than the CWA requires, and do not have broad legal limitations that would hinder them from starting their own programs. There are 14 states that have these characteristics. Costs were calculated for these states by multiplying the average number of all annual 404 permits in the state between 2011-2015 by the average review cost per permit. CWA section 401 review cost savings were also calculated for these states.

- States that are expected to expand dredged and fill programs already have an existing state program, do not regulate more broadly than the CWA requires, and do not have broad legal limitations. There are 6 states with these characteristics. Costs for states that are expected to expand state dredged and fill programs were calculated by multiplying the average number of annual 404 permits that may become non-jurisdictional in the state (wetlands coded as "RPWWN" and streams coded as "Riverine, Ephemeral" in the Corps' ORM2 database) by the average review cost per permit. Potential CWA section 401 review cost savings were also calculated for these states.

- States that are expected to continue their current narrow regulations and incur net cost savings from potentially reduced 401 certification reviews may or may not have their own dredged and fill programs, do not regulate waters more broadly than the CWA, and have broad legal limitations. There are 6 states with these characteristics. Only potential 401 review cost savings were calculated for these states.

Table III-63: Potential state 404 response scenarios based on dredge and fill regulation criteria

Scenario	Has a State dredged and fill program (inland)	Regulates waters more broadly than the CWA requires	Does not have broad legal limitations
No change, continue broader regulations[1]	1	1	1
Start state dredged and fill program[2]	0	0	1
Expand existing state dredged and fill program[3]	1	0	1
No change, continue narrower regulations[4]	0 or 1	0	0

[1] States assumed to continue broad regulations and experience no change are California, Connecticut, Florida, Illinois, Indiana, Maine, Maryland, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oregon, Pennsylvania, Rhode Island, Tennessee, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming.
[2] States assumed to start their own dredged and fill programs are Alabama, Alaska, Arkansas, Colorado, Georgia, Louisiana, Missouri, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, South Carolina, and Texas.
[3] States assumed to expand state dredged and fill programs are Delaware, Hawaii, Iowa, Kansas, Montana, and Utah.
[4] States assumed to experience no change and net cost savings from potentially reduced 401 reviews are Arizona, Idaho, Kentucky, Michigan, Mississippi, and South Dakota. However, the agencies are aware of Arizona's interest in developing a state dredged and fill program.

Table III-64 provides estimated state 404 permitting costs and 401 costs savings after accounting for each of the different scenarios. As mentioned previously, the state permitting costs are considered a transfer cost from the federal government to those states that elect to provide state oversight to those newly non-jurisdictional waters. As such, they will not be included in national rule estimates.

Table III-64: Estimated total annual state permitting costs and cost savings for all states

Permitting costs (2018$)	Cost savings from reduced 401 reviews (2018$)		
	Low	Mid	High
$9,043,199	-$147,918	-$2,068,782	-$5,669,263

IV. Regulatory Flexibility Act (RFA) Analysis

The Regulatory Flexibility Act (RFA, 5 U.S.C. et *seq*., Public Law 96-354), amended by the 1996 Small Business Regulatory Enforcement Fairness Act (SBREFA), requires the agencies to consider the economic impact that a new rule will have on small entities. The purpose of the RFA and SBREFA laws is to ensure that, in developing rules, agencies identify and consider ways to avoid undue impacts on small entities that will be affected by the regulation, whether as small entities that will be subject to regulatory requirements or as small governments that will be responsible for complying with or administering the regulation. While the RFA does not require an agency to minimize a rule's impact on small entities if there are legal, policy, factual, or other reasons for not doing so, it does require that agencies:

- Determine, to the extent feasible, the economic impact on small entities subject to the rule;
- Explore regulatory options for reducing any significant economic impact on a substantial number of such entities; and,
- Explain the ultimate choice of regulatory approach.

For any notice-and-comment rule it promulgates, the agencies must either certify that the rule "will not, if promulgated, have a significant economic impact on a substantial number of small entities" ("SISNOSE") or prepare a Regulatory Flexibility Analysis if the Agency cannot make this certification. Small entities include small businesses and small organizations as defined by SBA, and governmental jurisdictions with populations of less than 50,000.

The final rule is not expected to have a significant economic impact on a substantial number of small entities under the RFA. This is a deregulatory action that reduces the jurisdictional scope of the CWA. The burden on entities regulated under the CWA that are affected by this final rule, including small entities, is reduced for most compared to the 2019 baseline. The agencies therefore certify that this action will not have a significant impact on a substantial number of small entities.

IV.A Entities Regulated under Clean Water Act Programs

The final rule will affect entities regulated under CWA programs that impact waters whose jurisdictional status will change. The potential impact of the regulation on small entities is difficult to assess due to the lack of sufficient geospatial data identifying waters resources that will incur a jurisdictional change and resulting difficulty in identifying regulated activity that may be affected. The agencies reviewed available information on the type of entities that are regulated under the CWA section 311, 402, and 404 programs primarily affected by this final rule, with the purpose of identifying sectors with small entities that may incur impacts. The final rule is expected to result in fewer entities subject to these programs, and a reduced regulatory burden for a portion of the entities that will still be subject to these programs. As a result, small entities subject to these regulatory programs in the aggregate are unlikely to suffer adverse impacts due to compliance with the regulation.

Under the CWA section 402 program, entities are covered by either an individual or general permit. The entities covered by an individual permit, whether public or private, discharge to waters of sufficient size to accommodate their effluent. Based on the results from the case study analyses, only a very small

number of NPDES permitted facilities were identified as potentially discharging to a water that may be affected by the final rule. The agencies presume that the results from the case study analyses likely hold for the rest of the country, and that most of these waters that have permitted discharges will be unaffected by the regulation. Those individual permittees that do discharge to waters that experience a jurisdictional change will still require an individual permit but may actually experience a reduction in their regulatory burden if the stringency of their limits is modified by their permitting authority, if such modifications are allowed under applicable anti-backsliding provisions. Those entities whose activities are covered by a NPDES general permit are not likely to be significantly affected by the final rule. General permits are generic documents intended for a specific type of activity that can impact water resources. Obtaining coverage under a general permit typically does not require a site-specific assessment, and so takes less time and effort than an equivalent individual permit. However, to obtain coverage under a general permit the entity must accept the terms of the permit as written. The agencies assume that most eligible permittees will seek coverage under a general permit and forgo the cost and potential delays of a site-specific assessment of the jurisdictional status of water resources that may be affected by their activity. As a result, the agencies generally do not anticipate that general permittees will be impacted by the final rule.[147] Small entities are a subset of these entities subject to general permits and they will be equally unaffected.[148]

Based on the lack of identified impacts in the three case study analyses, the agencies consider the potential effects on the regulated community of NPDES permit holders to be minimal to none. This finding extends to those NPDES permit holders that are small entities.

For the CWA section 404 program, the final rule will reduce the number of waters under CWA jurisdiction, and this will in turn reduce the amount of avoidance, minimization, and mitigation measures necessary to obtain CWA section 404 permit coverage, as well as reduce the total number of future CWA section 404 permits. The agencies reviewed national 404 permit data from 2011 through 2015 to identify North American Industrial Classification System (NAICS) categories corresponding to entities that obtained 404 permit coverage during that period, but are either not expected to require 404 permit coverage under the final rule or would see reduced requirements based on the affected waters. In instances where the permitted activity affected only waters that change jurisdictional status under the final rule, a permit would no longer be required. In other cases where the permitted activity affected both jurisdictional and non-jurisdictional waters under the final rule, the permit requirements would be reduced. Based on historical data for 2011 through 2015, the agencies identified an estimated 8,129 permit actions that could face different requirements under the final rule. To determine the number of unique affected entities, the agencies identified permits with identical project names and, where possible, companies with multiple projects/permits. Removing these duplicate permit records resulted in an estimated 3,101 unique affected entities.

The agencies identified the NAICS industry of each permittee based on the reported project name and work type. The agencies first identified the general category of work based on the first listed work type:

[147] An exception may occur in arid areas of the country where more water features may change jurisdictional status due to the final rule, assuming a continued over-application of jurisdiction post-*SWANCC* and post-*Rapanos*. In these areas the NPDES authority may require fewer entities to obtain general permit coverage.

[148] See above EA tables for a discussion of the total estimated avoided costs.

agriculture, development, dredging, energy generation, mining and drilling, transportation, structure, or other. The agencies then further refined the work type to reflect the specific activity that occurred and associated each specific work type with one or more 6-digit NAICS industry codes. Table IV-1 provides a summary list of the NAICS categories that engage in projects estimated to be affected by the final rule, and the total number of affected entities. The agencies were able to assign an industry to 98 percent of permittees. In two percent of cases, the reported work type and project name did not provide sufficient information to classify the permit by a specific NAICS sector. These entities are listed as "Unassigned" in Table IV-1.

The Small Business Administration (SBA) has developed size standards to carry out the purposes of the Small Business Act. These size standards are used for defining small entities under the RFA. The agencies used the applicable SBA small entity size standards and available 2012 Economic Census and 2017 Census of Agriculture data by firm revenue or employment size categories to estimate the percentage of entities that meet the small business standard in each NAICS industry. In cases where data were unavailable to determine the fraction of small entities, the agencies conservatively assumed 100 percent. As summarized in Table IV-1, the agencies estimate that 2,899 small entities could be affected by changes in 404 permit coverage under the rule, or 580 small entities per year on average.

Table IV-1: CWA 404 program NAICS categories

NAICS Codes	NAICS Industry Description	Estimated Number of Affected Entities	Estimated Number of Affected Small Entities
Subsector 11	Agriculture, Forestry, Fishing, and Hunting	235	226
Subsector 2111	Oil and Gas Extraction	63	63
Subsector 2121	Coal Mining	150	149
Subsector 2123	Nonmetallic Mineral Mining and Quarrying	44	44
Subsector 2211	Electric Power Generation, Transmission, and Distribution	127	56
Subsector 2212	Natural Gas Distribution	24	9
Subsector 2213	Water, Sewage, and Other Systems	27	20
Subsector 236	Construction of Buildings	1,464	1,464
Subsector 237	Heavy and Civil Engineering Construction	703	703
Subsector 482	Rail Transportation	37	37
Subsector 486	Pipeline Transportation	82	63
Subsector 5622	Waste Treatment and Disposal	14	7
Subsector 92612	Regulation and Administration of Transportation Programs	73	0
Unassigned	n/a	58	58
Total	**n/a**	**3,101**	**2,899**

Source: EPA analysis of data from Corps ORM2 database (2018)

The agencies expect that the reduction in future CWA section 404 permit obligations will result in cost savings rather than cost increases. These reductions are expected to extend to the universe of small

entities required to obtain CWA section 404 permit coverage approximately equal to their existing portion of the overall 404 regulatory burden.[149]

The CWA section 311 program has two main components that address the risk and harm from oil spills: spill prevention and preparedness under the SPCC and FRP programs; and spill response under the National Contingency Plan. The final rule may result in some facilities no longer having a reasonable potential of a discharge to a water subject to CWA jurisdiction. Table IV-2 lists the NAICS categories commonly regulated under the CWA section 311 program. For these facilities the compliance burden may be reduced under the final rule unless they decide to voluntarily continue implementing their plan or are required to by state or tribal authorities. The agencies acknowledge that spill risks may increase for any of these facilities that reduce their future spill protection measures.

Table IV-2: CWA 311 program NAICS categories

NAICS Codes	Category
4227	Petroleum and Petroleum Products Wholesalers
2211	Electric Power Generation, Transmission, and Distribution
3241	Petroleum and coal products manufacturing
miscellaneous	Other Commercial Facilities
454311	Heating Oil Dealers
31-33	Manufacturing

Source: Renewal of Information Collection Request for the Implementation of the Oil Pollution Act Facility Response Plan Requirements (40 CFR 112) (EPA # 1630.12)

Spill risk liabilities for states and tribes may increase if facilities decrease their future spill prevention measures. For waters under federal jurisdiction, the Oil Spill Liability Trust Fund (OSLTF) is used to cover containment, clean-up, and remediation costs when a responsible party cannot be identified. For containment, clean-up, and remediation costs for spills affecting non-jurisdictional waters, states and tribes bear the financial burden when a responsible party cannot be identified. So even if the overall probability of a risk does not increase within a state or tribal jurisdiction, there may be an increased financial risk that corresponds with the change in the scope of CWA jurisdiction. However, for the purposes of the RFA, states and tribal governments are not considered small government entities.[150]

IV.B Entities Potentially Impacted by Changes in Ecosystem Services

Narrowing the scope of federal jurisdiction under the CWA may result in a reduction in the ecosystem services provided by some waters, such as less habitat, increased flood risk, and higher pollutant loads. As a result, both public and private entities that rely on these ecosystem services may be adversely impacted, albeit indirectly. For example, loss of wetlands can increase the risk of property damage due to flooding. To predict if there will be significant impacts to any given sector it is important to assess which sectors may be more impacted by changes in ecosystem services.

[149] See above EA tables for a discussion of the total estimated avoided costs (for example, Tables IV-56 and 57).

[150] The RFA defines "small governmental jurisdiction" as the government of a city, county, town, township, village, school district, or special district with a population of less than 50,000 (5 U.S.C. 601(5)).

Increases in flood risk may occur in the watersheds where the wetland losses occur and are not expected to impact a specific group or business sector. Habitat loss can have an effect on recreational activities such as hunting, fishing, and bird watching, depending on the type of ecosystem and species affected (*e.g.*, NAICS Code: 114210- Hunting and Trapping). Businesses that serve hunters or anglers, localities that collect admission fees or licenses, and non-profit organizations that focus on recreating within or preserving natural habitats are examples of sectors that could be affected by habitat loss, many of which could be categorized as small. Changes in water quality can also impact recreational activities and by extension those businesses and localities that support these activities (*e.g.*, NAICS Code: 423910- Sporting and Recreational Goods and Supplies Merchant Wholesalers). In addition, increased pollutant loadings, should they occur, can lead to higher drinking water treatment costs for localities, and for businesses that require water treatment for their production process. Higher sediment loads may impact downstream communities by increasing the need for dredging to maintain reservoir capacity and for navigation, and by potentially shortening the useful life infrastructure damaged by increased scouring.

Potential changes in ecosystem services will be project-specific and difficult to reasonably predict given the uncertainty around the magnitude of potential changes due to the final rule. Based on the results from the three case study analyses, it is likely that many of these reductions in services will be small, infrequent, and dispersed over wide geographic areas, thereby limiting the significance of the financial impacts on small organizations and governments and small entities within specific business sectors. In addition, states and tribes may already address waters potentially affected by the revised definition, thereby reducing forgone benefits.

IV.C Entities Potentially Impacted by Changes in Mitigation Demand

An economic sector that may be indirectly impacted by the final rule are mitigation banks, and companies that provide restoration services. Mitigations banks are often limited liability companies that have been authorized by a state or federal agency to generate credits that can be used to meet the demand for mitigation, driven by state and federal regulations. Restoration services are businesses that provide the range of services needed for mitigation efforts. Their customers can be mitigation banks or permittees that meet their regulatory requirements through on-site or off-site mitigation. Although primarily a business sector, there are mitigation banks owned and managed by non-profit organizations and government entities, such as state transportation departments. Businesses involved in mitigation banking and providing ecological restoration services are not contained within a single economic sector as defined by the North American Industrial Classification System (NAICS). A survey of this restoration sector conducted in 2014 showed that many of the businesses involved in this sector fall into five categories: Environmental Consulting (NAICS: 541620); Land Acquisition (NAICS: 237210); Planning, Design, and Engineering (NAICS: 541320, 541330); Site Work (earth moving, planting) (NAICS: 237210, 237990); and Monitoring (BenDor et al, 2015).

Assessing potential impacts to the restoration sector is problematic given that this sector falls under a range of potential NAICS and associated SBA small business definitions. Existing data on 404 permits maintained by the agencies does not identify sufficient ownership and business arrangement information to determine the economic profile of mitigation bank ownership, nor does it identify specific entities involved in performing restoration work. In addition, states and tribes may require mitigation for impacted waters no longer covered under the final rule, thereby reducing the future change in mitigation demand.

IV.D Conclusion

Overall, the agencies consider the potential small entity impacts of the final rule are neither significant nor substantial, based on the lack of any significant cost increase for those entities that must comply with regulations under the CWA sections 311, 402, and 404 programs. Potential impacts to the mitigation banking sector would not be the direct result of these businesses complying with the final rule. Rather, they would be the indirect result of other entities coming into compliance with final rule. Similarly, potential impacts to small localities, organizations, and businesses due to changes in ecosystem services are indirect effects. The agencies certify that this action will not have a significant economic impact on a substantial number of small entities. In making this determination, the impact of concern is any significant adverse economic impact on small entities. An agency may certify that a rule will not have a significant economic impact on a substantial number of small entities if the rule relieves regulatory burden, has no net burden or otherwise has a positive economic effect on the small entities subject to the rule. This is a deregulatory action, and the burden on all entities affected by this final rule, including small entities, is reduced compared to the 2019 Rule. The agencies have therefore concluded that this action will relieve regulatory burden to small entities.

V. References

Acreman, M., Holden, J. 2013. How Wetlands Affect Floods. *Wetlands* (2013), 33: 773-786.

Adler, J.H. 2005. Jurisdictional Mismatch in Environmental Federalism. New York University *Environmental Law Journal* 14:130-178

Alaska Department of Environmental Conservation (ADEC). 2008. Alaska Pollutant Discharge Elimination System (APDES) Capacity Building Plan. Retrieved from: https://dec.alaska.gov/water/apdes-history/capacity-building

Arizona Department of Environmental Quality. 2018. Clean Water Act §404 Program Technical Working Group - Fees White Paper. Retrieved from: http://static.azdeq.gov/wqd/rulemaking/404/twg/fees_wp.pdf

Arnold, J.G., J.R. Kiniry, R. Srinivasan, J.R. Williams, E.B. Haney, and S.L. Neitcsch. 2012. Soil & Water Assessment Tool: Input/Output Documentation, Version 2012. Texas Water Resources Institute. TR-439

Association of State Wetland Managers (ASWM). 2011. 401 Certification Case Studies. Retrieved from: https://www.aswm.org/wetland-programs/401-certification/1496-401-certification-case-studies

Association of State Wetland Managers (ASWM). 2015. *West Virginia State Wetland Program Summary*. Retrieved from: https://www.aswm.org/pdf_lib/state_summaries/west_virginia_state_wetland_program_summary_083115.pdf

BenDor T., T.W. Lester, A. Livengood, A. Davis, L. Yonavjak. 2015. Estimating the Size and Impact of the Ecological Restoration Economy. PLoS ONE 10(6): e0128339. doi:10.1371/journal.pone.0128339

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.

Center for Economic Development and Business Research (CEDBR). 2016. *Kansas Population Forecast 2014 to 2064*. Retrieved from: www.cedbr.org/population-projections-2

Clark, E.H., J.A. Haverkamp, and W. Chapman. 1985. "Eroding Soils: The Off-Farm Impacts." Washington, DC: The Conservation Foundation.

Commission for Environmental Cooperation (CEC). 2011. North American Terrestrial Ecoregions: Level III. May 2011.

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service. FWS/OBS-79/31. Washington, DC.

Dearmont, D., B.A. McCarl, and D.A. Tolman. 1998. Costs of water treatment due to diminished water quality: a case study in Texas. Water Resources Research, 34(4), 849-853.

Department of Commerce and National Oceanic and Atmospheric Administration. 1994. Guidance for Facility and Vessel Response Plans Fish and Wildlife and Sensitive Environments. 59 FR 7314.

Dijkstra, B. and P.G. Fredriksson. 2010. Regulatory Environmental Federalism. *Annual Review of Resource Economics*, Vol. 2, Issue 1, pp. 319-339.

Drozd, D., and J. Deichert. 2015. *Nebraska County Population Projections: 2010 to 2050*. Retrieved from University of Nebraska at Omaha: https://www.unomaha.edu/college-of-public-affairs-and-community-service/center-for-public-affairs-research/documents/nebraska-county-population-projections-2010-to-2050.pdf

Eastern Research Group, 2016. Hurricane Sandy and the value of trade-offs in coastal restoration and protection. In: Technical Report. Prepared for NOAA Office for Coastal Management by Eastern Research Group, Lexington, MA.

Environmental Law Institute (ELI). 2013. State Constraints: State-Imposed Limitations on the Authority of Agencies to Regulate Waters Beyond the Scope of the Federal CWA (2013), ELI Project No. 0931-01. Executive Summary.

Environmental Law Institute (ELI). 2016. Assessing Stream Mitigation Guidelines at the Corps District and State Levels.

Federal Emergency Management Agency (FEMA). 2015. *New Mexico Flood Disaster Information and Risk Analysis Report.* Washington, D.C.: Federal Emergency Management Agency.

Federal Emergency Management Agency (FEMA). 2016. *Disaster Housing Assistance.* Retrieved from FEMA.gov Data Visualization Datasets: https://www.fema.gov/media-library/assets/documents/106308. December 19, 2016.

Federal Geographic Data Committee. 2013. Classification of Wetlands and Deepwater Habitats of the United States. FGDC–STD-004-2013. Second Edition. Retrieved from www.fws.gov: https://www.fws.gov/wetlands/documents/Classification-of-Wetlands-and-Deepwater-Habitats-of-the-United-States-2013.pdf

Findlay, S., and Houlahan, J. 1997. Anthropogenic correlates of species richness in southeastern Ontario wetlands. *Conservation Biology*, 11(4),1000-1009.

Fredriksson P.G., M. Matschke, and J. Minier. 2010. Environmental policy in majoritarian systems. *Journal of Environmental Economics and Management* 59:177–91.

Fredriksson, P.G. 2018. Environmental Federalism: Lessons Learned from the Literature. Report Prepared for EPA's National Center for Environmental Economics. Washington D.C., U.S. EPA NCEE, February 2018.

Fritz, K. M., E. Hagenbuch, E. D'Amico, M. Reif, P.J. Wigington, S.G. Leibowitz, R.L. Comeleo, J.L. Ebersole, and T. Nadeau. 2013. Comparing the Extent and Permanence of Headwater Streams from Two Field Surveys to Values from Hydrographic Databases and Maps. *Journal of the American Water Resources Association* 49(4) 867-882.

Fry, J., G. Xian, S. Jin, J. Dewitz, C. Homer, L. Yang , C. Barnes, N. Herold, and J. Wickham. 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PE&RS, Vol. 77(9):858-864.

Graf, W., E. Wohl, T., Sinha, and J. L. Sabo. 2010. Sedimentation and sustainability of western American reservoirs. Water Resources Research.

Hanemann, W.M. 1994. "Valuing the Environment through Contingent Valuation." *Journal of Economic Perspectives*, 8 (4): 19-43.

Hardy, P.C., D.J. Griffin, K.A. Juenzi, and M.L. Morrison. 2004. Occurrence and habitat use of passage neotropical migrants in the Sonoran Desert. *Western North American Naturalist* 64:59-71.

Helland, E. 1998. Environmental Protection in the Federalist System: The Political Economy of NPDES Inspections. *Economic Inquiry* 36:305-19.

Holmes, T. P. 1988. The offsite impact of soil erosion on the water treatment industry. *Land Economics*, 64(4): 356-366.

Hurld, K., and J. Linn. 2008. Pursuing Clean Water Act 404 Assumption: What States Say About the Benefits and Obstacles. Retrieved from Association of State Wetland Managers: https://www.aswm.org/pdf_lib/hurld.pdf

Idaho Department of Environmental Quality (IDEQ). 2017. Idaho Pollutant Discharge Elimination System Program Description. Retrieved from: http://www.deq.idaho.gov/media/60180493/ipdes-program-description-0717.pdf

Idaho Department of Environmental Quality (IDEQ). 2019. Idaho Pollutant Discharge Elimination System Program. Retrieved from: https://www.deq.idaho.gov/water-quality/ipdes/primacy-application/

IUCN SSC Amphibian Specialist Group. 2014. *Pseudotriton ruber*. The IUCN Red List of Threatened Species 2014: e.T59404A56253351. http://dx.doi.org/10.2305/IUCN.UK.20141.RLTS.T59404A56253351.en

Kentucky State Data Center. 2016. Projections of Population and Households: State of Kentucky, Kentucky Counties, and Area Development Districts 2015-2040. Retrieved from: http://www.ksdc.louisville.edu/wp-content/uploads/2016/10/projection-report-v16.pdf

Kern, M.M, A. A. Nassar , J.C. Guzy, and M.E. Dorcas. 2012. Oviposition Site Selection by Spotted Salamanders (*Ambystoma maculatum*) in an Isolated Wetland, Journal of Herpetology, 47(3):445-449. 2013.

LaGrange, T. 2005. *Guide to Nebraska's Wetlands and their Convservation Needs.* Retrieved from Nebraska Game and Parks Commission: https://outdoornebraska.gov/wp-content/uploads/2015/10/NebraskaWetlandsGuide_03182016.pdf

Langbein, W.B. and K.T. Iseri. 1960. General introduction and hydrologic definitions manual of hydrology. U.S. Geological Survey Water-Supply Pap. 1541-A, 29pp.

Levick, L., J. Fonseca, D. Goodrich, M. Hernandez, D. Semmens, J. Stromberg, . . . W. Kepner. 2008. The Ecological and Hydrological Significance of Ephemeral and Intermittent Streams in the Arid and Semi-arid American Southwest. Washington, D.C.: U.S. EPA and USDA/ARS Southwest Watershed Research Center.

Levinson A. 2003. Environmental regulatory competition: a status report and some new evidence. *National Tax Journal* 56:91–106.

Loomis, J., M. Hanemann, B. Kannimen, T. Wegge. 1991. Willingness to Pay to Protect Wetlands and Reduce Wildlife Contamination from Agricultural Drainage. *The Economics and Management of Water and Drainage in Agriculture*. Chapter 21, pp 411-429.

Massachusetts Department of Environmental Protection. 2013. Massachusetts Department of Environmental Protection Report to the General Court of the Commonwealth on the Topic of

NPDES Authorization. Retrieved from Mass.gov: https://www.mass.gov/files/documents/2016/08/ru/npdesdel.pdf

McDonald, R. K. Weber, J. Padowski, T.Boucher, and D. Shemie. 2016. Estimating watershed degradation over the last century and its impact on water-treatment costs for the world's large cities. Proceedings of the National Academy of Science of the United States of America: https://www.pnas.org/content/113/32/9117

Minnesota Department of Natural Resources and Minnesota Board of Water and Soil Resources (Minnesota DNR and BWSR). 2017. Minnesota Federal Clean Water Act Section 404 Permit Program Feasibility Study. Retrieved from Minnesota Board of Water & Soil Resources: http://www.bwsr.state.mn.us/wetlands/cwa_404/Minn_Section_404_Assumption_Feasibility_Study_Report_Final.pdf

Missouri Department of Natural Resources (MO DNR). 2016. *Youth Education and Interpretation: Wetlands*. DNREDU0016. October 2016.

Missouri Office of Administration Division of Budget & Planning. 2008. "Missouri Population Projections by County, Age, and Sex: 2000 to 2030." *2000 To 2030 Projections*. Retrieved from: https://oa.mo.gov/budget-planning/demographic-information/population-projections/2000-2030-projections

Moeltner K. and R. Woodward. 2009. Meta-Functional Benefit Transfer for Wetland Valuation: Making the Most of Small Samples. *Environmental and Resource Economics*, 42:89-108.

Moeltner, K. 2015. Optimal Scope and Bayesian Model Search in Benefit Transfer. In: Johnston R., Rolfe J., Rosenberger R., Brouwer R. (eds) *Benefit Transfer of Environmental and Resource Values. The Economics of Non-Market Goods and Resources*, vol 14. Springer, Dordrecht

Moeltner, K. and R. Rosenberger. 2014. Cross-Context Benefit Transfer: A Bayesian Search for Information Pools. *American Journal of Agricultural Economics*, V96.2, pg. 469-488.

Moeltner, K., J. Balukas, E. Besedin, and B. Holland. 2019. Waters of the United States: Upgrading wetland valuation via benefit transfer. *Ecological Economics* 164: 106336.

Moeltner, K., K.J. Boyle, and R.W. Paterson. 2007. "Meta-Analysis and Benefit Transfer for Resource Valuation—Addressing Classical Challenges with Bayesian Modeling." *Journal of Environmental Economics and Management* 53(2): 250-269.

Mullarkey, D.J. and R.C. Bishop. 1999. Sensitivity to Scope: Evidence from a CVM Study of Wetlands. Working paper presented at the American Agricultural Economics Association Annual Meetings, Nashville, TN.

Neitsch, S.L., J.G. Arnold, J.R. Kiniry, and J.R. Williams. 2011. Soil & Water Assessment Tool: Theoretical Documentation, Version 2009. Texas Water Resources Institute. TR-406

New Mexico Environment Department. 2019. Public comment re: proposed rulemaking defining the scope of waters federally regulated under the Clean Water Act, Docket ID No. EPA-HQ-OW-2018-0149.

New York Department of Environmental Conservation. 2018. Spill Response & Remediation FAQ. https://www.dec.ny.gov/chemical/8692.html. Accessed May 1, 2018.

Niemiller, M.L. 2006. Status and Distribution of the Streamside Salamander, *Ambystoma barbouri*, in Middle Tennessee. Notes and Discussion. *The American Midland Naturalist* 156:394-399

Oates W.E. and R. M. Schwab. 1988. Economic competition among jurisdictions: efficiency-enhancing or distortion-inducing. *J Public Econ* 35:333–354

Oates, W.E. 2001. A Reconsideration of Environmental Federalism. Resources for the Future Discussion Paper 01-54.

Ohio Development Services Agency. 2018. Ohio Development Services Agency Population Projections: County Totals. Retrieved from: https://development.ohio.gov/files/research/P6090.pdf

Pate, J., and J. Loomis. 1997. The effect of distance on willingness to pay values: a case study of wetlands and salmon in California. *Ecological economics* 20(3): 199-207.

Pipeline and Hazardous Material Safety Agency (PHMSA). 2013. Report to Congress: Results of Hazardous Liquid Incidents at Certain Inland Water Crossings Study. August 2013.

Poor, P.J. 1999. The Value of Additional Central Flyway Wetlands: The Case of Nebraska's Rainwater Basin Wetland. Faculty Publication: *Agricultural Economics*. 112.

Randle, T., S. Kimbrel, and K. Collins, Bureau of Reclamation; P. Boyd, M. Jonas, R. Vermeeren, D. Eidson, D. Cooper, and J. Shelley, U.S. Army Corps of Engineers; K. Juracek, U.S. Geological Survey; J. Fripp, USDA-Natural Resource Conservation Service; M. Altinakar, University of Mississippi; R. Hotchkiss, Brigham Young University; M. Kondolf, University of California, Berkeley; P. Nelson, Colorado State University; F. Weirich, University of Iowa; G. Morris, Gregory Morris Consultants; G. Annandale, Consultant; K. Jensen, McMillen Jacobs Associates; and M. Whelan, Anchor QEA, L.L.C. 2017. Frequently Asked Questions about Reservoir Sedimentation and Sustainability. Contribution and review by the Subcommittee on Sedimentation National Reservoir Sedimentation and Sustainability Team. April 9, 2017.

Rosenberger, R.S. and T.D. Stanley. 2006. "Measurement, Generalization, and Publication: Sources of Error in Benefit Transfers and Their Management." *Ecological Economics* 60(2): 372-378.

Rosenberger, R.S. and T.T. Phipps. 2007. "Correspondence and Convergence in Benefit Transfer Accuracy: Meta-Analytic Review of the Literature." In: Navrud, S. and R. Ready (eds.), *Environmental Value Transfer: Issues and Methods*. Dordrecht, The Netherlands: Springer. pp.23-43.

Schneider, D.R. 2010. "Salamander Communities Inhabiting Ephemeral Streams in a Mixed Mesophytic Forest of Southern Appalachia+ Theses and Dissertations (All). 1005. Retrieved from: https://knowledge.library.iup.edu/etd/1005

Seabright, P. 1996. Accountability and Decentralisation in Government: an Incomplete Contracts Model. *European Economic Review* 40:61–89.

Semlitsch R.D., and D.K. Skelly. 2007. Ecology and Conservation of Pool Breeding Amphibians, in *Science and Conservation of Vernal Pools in Northeastern North America*. 127-148.

Sjöberg, E. 2016. An Empirical Study of Federal Law Versus Local Environmental Enforcement. *Journal of Environmental Economics and Management* 76:14-31.

Society for Human Resource Management (SHRM). 2016. 2016 Human Capital Benchmarking Report. Retrieved from https://www.shrm.org/hr-today/trends-and-forecasting/research-and-surveys/Documents/2016-Human-Capital-Report.pdf

State of Colorado. 2018. "Population Projections in Colorado." *Colorado Information Marketplace*. Retrieved from: https://data.colorado.gov/Demographics/Population-Projections-in-Colorado/q5vp-adf3/data

Sunding D. 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.

Train, K. E. 2009. Discrete Choice Methods with Simulation. Cambridge University Press, New York, NY.

U.S. Army Corps of Engineers, Kansas City District. 2013. *State of Missouri Stream Mitigation Method.* April 2013.

U.S. Army Corps of Engineers, Kansas City District. 2017. *Missouri River Bed Degradation Feasibility Study Technical Report.* May 2017.

U.S. Army Corps of Engineers, Ohio River Basin Alliance. 2017. Ohio River Basin - Formulating Climate Change Mitigation/Adaptation Strategies through Regional Collaboration with the ORB Alliance. May 2017. Retrieved from U.S. Army Corps of Engineers: http://www.corpsclimate.us/docs/USACE%20Ohio%20River%20Basin%20CC%20Report_MAY%202017.pdf

U.S. Army Corps of Engineers. 1987. Corps of Engineers Wetlands Delineation Manual. Wetlands Research Program Technical Report Y-87-1. Department of the Army, Vicksburg, VA.

U.S. Army Corps of Engineers. 2002. Final Dredged Material Management Plan and Environmental Impact Statement: McNary Reservoir and Lower Snake River Reservoirs. Final. July 2002.

U.S. Army Corps of Engineers. 2014. Ratios for Compensatory Mitigation. April 2014. Retrieved from U.S. Army Corps of Engineers: http://www.poa.usace.army.mil/Portals/34/docs/regulatory/HOWWetlandCategoriesRatios.pdf

U.S. Census Bureau. 2015. Quick Facts. Retrieved from 2011-2015 American Community Survey: https://www.census.gov/quickfacts/fact/table/US/PST045217

U.S. Department of Agriculture (USDA). 2005. "Memorandum to the Field: Guidance on Conducting Wetland Determinations for the Food Security Act of 1985 and Section 404 of the Clean Water Act," Natural Resources Conservation Service. February 25, 2005. Available at https://prod.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_007869.pdf

U.S. Department of Agriculture (USDA). 2015. National Agricultural Statistics Service (NASS). Land Use - Cropland Data Layer (agricultural). Retrieved from: http://nassgeodata.gmu.edu/CropScape/ (Accessed on 1 January 2015).

U.S. Environmental Protection Agency (U.S. EPA). 2007. Considerations for the Regulation of Onshore Oil Exploration and Production Facilities under the Spill Prevention, Control and Countermeasure Regulation.

U.S. Environmental Protection Agency (U.S. EPA). 2008a. Regulatory Impact Analysis for the Final Amendments to the Oil Pollution Prevention Regulations (40 CFR PART 112): Volume I

U.S. Environmental Protection Agency (U.S. EPA). 2008b. *State Program Requirements; Application to Administer the National Pollutant Discharge Elimination System (NPDES) Program; Alaska*. Retrieved from Federal Register: https://www.federalregister.gov/documents/2008/06/18/E8-13831/state-program-requirements-application-to-administer-the-national-pollutant-discharge-elimination

U.S. Environmental Protection Agency (U.S. EPA). 2010. NPDES Permit Writers' Manual. EPA-833-K-10-001, September 2010.

U.S. Environmental Protection Agency (U.S. EPA). 2013. SPCC Guidance for Regional Inspectors, EPA 550-B-13-002. December 16, 2013.

U.S. Environmental Protection Agency (U.S. EPA). 2015a. Benefit and Cost Analysis for the Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category. EPA-821-R-15-005.

U.S. Environmental Protection Agency (U.S. EPA). 2015b. Connectivity of Streams and Wetlands to Downstream Waters: A Review and Synthesis of the Scientific Evidence (Final Report). EPA/600/R-14/475F. January 15, 2015. Available at: https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=296414

U.S. Environmental Protection Agency (U.S. EPA). 2015c. 2011 National Wetland Condition Assessment: A Collaborative Survey of the Nation's Wetlands. October 2015.

U.S. Environmental Protection Agency (U.S. EPA). 2016a. Spill Prevention, Control, and Countermeasure (SPCC) Plans Supporting Statement for Information Collection Request Renewal (EPA ICR No. 0328.17, OMB No. 2050-0021). May 2016.

U.S. Environmental Protection Agency (U.S. EPA). 2016b. Spill Prevention, Control, and Countermeasure (SPCC) Plans Supporting Statement for Information Collection Request Renewal (EPA ICR No. 0328.17, OMB No. 2050-0021): Calculation Workbook. May 2016.

U.S. Environmental Protection Agency (U.S. EPA). 2017. Supporting Statement for ICR 0220.13 Clean Water Act 404 State-Assumed Programs. Retrieved from: https://www.regulations.gov/document?D=EPA-HQ-OW-2005-0023-0026

U.S. Environmental Protection Agency (U.S. EPA). 2018. Why are wetlands important? Updated 13 June 2018. Available at: https://www.epa.gov/wetlands/why-are-wetlands-important

U.S. Environmental Protection Agency (U.S. EPA). 2019. *NPDES State Program Authorization Information*. Retrieved from: https://www.epa.gov/npdes/npdes-state-program-information

U.S. Environmental Protection Agency and U.S. Department of the Army (U.S. EPA and Army). 2015. Economic Analysis of the EPA-Army Clean Water Rule.

U.S. Environmental Protection Agency and U.S. Department of the Army (U.S. EPA and Army). 2018a. Resource and Programmatic Assessment for the Revised Definition of "Waters of the United States" Proposed Rule.

U.S. Environmental Protection Agency and U.S. Department of the Army (U.S. EPA and Army), 2018b. Economic Analysis for the Proposed Revised Definition of "Waters of the United States." December 14, 2018.

U.S. Environmental Protection Agency and U.S. Department of the Army (U.S. EPA and Army). 2020. Resource and Programmatic Assessment for the Navigable Waters Protection Rule: Definition of "Waters of the United States" Final Rule.

U.S. Fish and Wildlife Service (U.S. FWS). 2005. Pecos Sunflower recover plan. South West Region FWS, Albuquerque, New Mexico. Retrieved from: https://www.fws.gov/southwest/es/Documents/R2ES/Pecos_Sunflower_FINAL_Recovery_Plan.pdf

U.S. Fish and Wildlife Service (U.S. FWS). 2018a. National Wetlands Inventory Wetlands Mapper. Retrieved from: https://www.fws.gov/wetlands/

U.S. Fish and Wildlife Service (U.S. FWS). 2018b. "NWI Program Overview." Retrieved from: https://www.fws.gov/wetlands/nwi/overview.html

University of California Association of Natural Resource Extension Professionals. 2014. Ohio River Basin Wetland Conservation Planning Project.

University of Virginia Weldon Cooper Center, Demographics Research Group. 2017. Virginia Population Projections. Retrieved from: https://demographics.coopercenter.org/virginia-population-projections

Virginia Department of Environmental Quality (Virginia DEQ). 2012. Study of the Costs and Benefits of State Assumption of the Federal 404 Clean Water Act Permitting Program. Retrieved from: https://www.deq.virginia.gov/Portals/0/DEQ/LawsAndRegulations/GeneralAssemblyReports/404_Feasibility_Study_2012.pdf

Warren, P.L. and L.S. Anderson. 1985. Gradient analysis of a Sonoran Desert wash. In: Riparian Ecosystems and Their Management: Reconciling Conflicting Uses. First North American Riparian Conference, April 16-18, 1985. USDA Forest Service General Technical Report RM-120, p. 150-155.

West Virginia Interagency Review Team. 2010. West Virginia Stream and Wetland Valuation Metric. February 2010.

West Virginia University, College of Business and Economics. 2014. Population Trends in West Virginia through 2030. Retrieved from: http://busecon.wvu.edu/bber/pdfs/BBER-2014-04.pdf

White House Office on Environmental Policy. 1993. Protecting America's Wetlands: A Fair, Flexible, and Effective Approach. August 24, 1993.

Whitehead, J., P. Groothuis, R. Southwick, and P. Foster Turley, 2009. Measuring the economic benefits of Saginaw Bay coastal marsh with revealed and stated preference methods. *Journal of Great Lakes Research*. 35, pp 430-437.

Whitehead, J.C. and G.C. Blomquist. 1991. Measuring Contingent Values for Wetlands: Effects of Information About Related Environmental Goods. *Water Resources Research*. Vol 27.10, pp 2523-2531.

Zaimes, G., M. Nichols, and D.Green. 2007. Characterization of Riparian Areas in Zaimes G.N. (editor). Understanding Arizona's Riparian Areas. Univeristy of Arizona Cooperative Extension, Publication # az1432.

Appendix A: Mapped NHD Stream Mileage and NWI Wetland Acreage by State

Table A-1: Mapped NHD Stream Mileage and NWI Wetland Acreage by State: The numbers and percentages of streams and wetlands by category do not equate to a quantification of waters that will or will not be jurisdictional under the final rule nor do they equate to a quantification of waters that are or are not jurisdictional under the 2019 Rule. The data are presented to illustrate the incomplete national coverage of the NHD data, particularly with regard to ephemeral streams.

State	NHD Streams								NWI Wetlands
	Perennial		Intermittent		Ephemeral[1]		Other[2]		
	Miles	% of Total	Miles	% of Total	Miles	% of Total	Miles	% of Total	Acres
AK	666,417	48%	18,624	1%	82	0%	700,893	51%	-
AL	48,075	23%	69,415	33%	0	0%	95,602	45%	4,203,980
AR	20,915	9%	89,091	40%	30	0%	111,599	50%	2,408,523
AZ	4,194	1%	35,305	7%	249,591	51%	202,384	41%	354,060
CA	44,290	7%	85,290	13%	213,359	34%	291,058	46%	3,028,618
CO	32,715	7%	151,915	34%	66,955	15%	197,296	44%	2,002,309
CT[3]	7,593	35%	1,892	9%	-	0%	12,035	56%	310,505
DC[3]	26	19%	6	4%	-	0%	103	76%	319
DE[3]	2,404	26%	1,112	12%	-	0%	5,838	62%	263,327
FL	19,337	12%	8,123	5%	2	0%	127,332	82%	12,183,132
GA[3]	44,081	23%	53,965	28%	-	0%	93,464	49%	6,548,298
HI									
IA	27,730	15%	72,310	39%	2,396	1%	82,259	45%	1,088,441
ID	54,355	30%	96,072	53%	8,551	5%	22,010	12%	1,324,822
IL	26,033	22%	78,490	65%	287	0%	15,676	13%	1,301,283
IN[3,4]	15,030	6%	33,453	13%	-	0%	217,363	82%	1,055,925
KS	19,065	10%	153,419	83%	316	0%	11,687	6%	1,899,863
KY	26,118	26%	59,695	60%	3	0%	13,133	13%	465,603
LA	34,365	25%	59,755	44%	24	0%	41,649	31%	8,028,273
MA[3]	8,519	51%	3,734	23%	-	0%	4,328	26%	695,752
MD[3]	13,399	53%	3,872	15%	-	0%	8,191	32%	814,720
ME	25,864	50%	13,413	26%	0	0%	12,893	25%	2,548,325
MI[3]	29,251	36%	15,136	18%	-	0%	37,753	46%	7,796,982
MN	26,461	26%	38,028	37%	1	0%	38,269	37%	10,854,648
MO[3]	22,323	12%	141,077	76%	-	0%	21,160	11%	1,386,533

Table A-1: Mapped NHD Stream Mileage and NWI Wetland Acreage by State: The numbers and percentages of streams and wetlands by category do not equate to a quantification of waters that will or will not be jurisdictional under the final rule nor do they equate to a quantification of waters that are or are not jurisdictional under the 2019 Rule. The data are presented to illustrate the incomplete national coverage of the NHD data, particularly with regard to ephemeral streams.

State	NHD Streams								NWI Wetlands
	Perennial		Intermittent		Ephemeral[1]		Other[2]		
	Miles	% of Total	Miles	% of Total	Miles	% of Total	Miles	% of Total	Acres
MS[3]	24,376	15%	114,831	70%	-	0%	23,982	15%	3,968,569
MT	49,899	13%	304,329	78%	3,627	1%	32,901	8%	3,227,102
NC[4]	43,069	31%	49,442	35%	1	0%	47,726	34%	4,366,486
ND	5,926	7%	73,640	81%	0	0%	11,165	12%	1,508,999
NE	13,472	11%	98,408	77%	521	0%	15,144	12%	1,314,903
NH	8,281	44%	6,861	37%	3	0%	3,592	19%	310,193
NJ[3]	12,834	54%	1,064	4%	-	0%	10,081	42%	889,188
NM	7,124	3%	60,237	25%	156,822	66%	13,182	6%	363,015
NV	10,741	3%	26,141	8%	267,153	85%	11,487	4%	1,033,171
NY[3]	56,516	57%	20,921	21%	-	0%	21,236	22%	2,207,886
OH	26,905	29%	53,172	58%	9	0%	11,627	13%	538,919
OK	33,924	20%	115,235	69%	482	0%	17,777	11%	1,379,591
OR	77,102	24%	192,672	61%	23,402	7%	22,322	7%	1,895,761
PA[3]	43,800	51%	30,131	35%	-	0%	12,065	14%	544,458
RI[3]	1,224	62%	92	5%	-	0%	647	33%	60,714
SC[3]	25,819	33%	31,934	41%	-	0%	19,731	25%	3,932,560
SD	12,070	7%	135,766	82%	2,809	2%	13,957	8%	2,065,241
TN	68,240	60%	32,065	28%	254	0%	12,984	11%	1,165,666
TX	36,044	7%	346,494	65%	84,783	16%	62,472	12%	4,630,573
UT	15,117	8%	83,888	45%	71,561	39%	13,927	8%	758,798
VA	36,123	33%	55,846	51%	4	0%	17,581	16%	1,454,954
VT[3]	22,677	86%	11	0%	-	0%	3,757	14%	86,122
WA	69,058	29%	148,082	62%	2,330	1%	21,204	9%	959,626
WI[3]	27,876	32%	42,114	49%	-	0%	16,745	19%	6,868,324
WV	21,230	39%	27,505	50%	11	0%	6,220	11%	57,052
WY	34,404	12%	197,979	69%	35,683	12%	20,774	7%	1,852,425
WA	2,002,413	21%	3,532,050	37%	1,191,051	12%	2,828,260	30%	959,626

Table A-1: Mapped NHD Stream Mileage and NWI Wetland Acreage by State: The numbers and percentages of streams and wetlands by category do not equate to a quantification of waters that will or will not be jurisdictional under the final rule nor do they equate to a quantification of waters that are or are not jurisdictional under the 2019 Rule. The data are presented to illustrate the incomplete national coverage of the NHD data, particularly with regard to ephemeral streams.

State	NHD Streams								NWI Wetlands
	Perennial		Intermittent		Ephemeral[1]		Other[2]		
	Miles	% of Total	Miles	% of Total	Miles	% of Total	Miles	% of Total	Acres

Source: Based on analysis of NHD at high resolution and NWI data. See Section II.C for a description of the limitations of the NHD and NWI data in characterizing the waters that may be potentially affected by the changes to the definition of "waters of the United States." The numbers and percentages of streams and wetlands by category do not equate to a quantification of waters that will or will not be jurisdictional under the final rule nor do they equate to a quantification of waters that are or are not jurisdictional under the 2019 Rule.

[1] The percentages for this category represent the percentages of streams in each state that the NHD at high resolution maps as ephemeral. Zero percent for this category does not mean that the state has no ephemeral streams. Ephemeral streams are not independently mapped in many states. Often ephemeral streams are mapped in the intermittent stream category or are not mapped at all, which can result in an overstatement of intermittent streams and an understatement of ephemeral streams. This table is a summary of the available NHD data and is not likely to accurately represent the types of waters in any given state.

[2] Includes unclassified streams, artificial paths, canal, ditches, aqueducts, and other feature without attributes.

[3] NHD has no stream miles mapped as ephemeral for these states. See FN 1 above.

[4] NHD has a high percentage of streams that are not classified as perennial, intermittent, or ephemeral (unclassified streams) for these states.

Appendix B: Current CWA Section 404 Permit Impacts by State

Table B-1: Authorized impact of CWA section 404 permits issued in 2011-2015, excluding mitigation type permits and permits affecting resources categorized as "ocean" or "tidal."

State	Number of Permits (Per Year)		Permanent Impacts		Temporary Impacts (Per Year)		Mitigation Required (Per Year)		
	General	Individual	Acres	Length Feet	Acres	Length Feet	Acres	Length Feet	Permits Using Credits[1]
AK	377	60	4,003	78,117	261	17,294	306	10,886	52
AL	450	33	623	492,030	103	56,431	106	77,765	111
AR	1,333	26	763	460,637	46	171,979	191	35,702	53
AZ	355	9	357	34,970	35	8,631	5	0	16
CA	2,216	58	2,934	917,071	242	178,621	909	102,694	305
CO	918	15	329	346,971	41	37,438	31	3,952	35
CT	142	7	65	11,572	33	413	186	3,635	2
DE	48	4	81	26,185	4	823	64	221	1
FL	959	248	12,897	391,027	207	93,558	9,301	51,244	241
GA	614	31	880	354,335	33	16,514	23	558	233
HI	7	1	3	5,840	0	64	0	0	0
IA	827	27	726	848,952	19	19,074	145	13,447	26
ID	451	7	185	402,565	6	16,945	41	6,441	6
IL	1,379	32	561	872,731	116	46,765	191	36,610	41
IN	882	21	1,410	1,853,584	38	55,780	637	303,744	10
KS	939	18	313	1,177,940	38	40,795	28	55,620	34
KY	546	37	460	1,048,935	19	38,482	106	67,359	43
LA	1,697	188	7,189	338,458	1,031	162,411	1,424	17,184	246
MA	259	8	61	351,513	84	63,825	132	538	1
MD	586	50	2,898	612,839	25	32,609	40	25,732	4
ME	260	5	305	4,260	20	0	1,079	656	12
MI	740	80	299	224,696	21	20,747	19	254	0
MN	951	107	2,030	820,610	173	55,308	173	505	214
MO	1,749	29	286	535,159	44	1,553,311	88	14,052	39
MS	479	30	1,320	155,233	75	25,930	283	15,507	89
MT	513	8	162	342,901	5	12,995	64	34,335	7
NC	1,369	31	991	558,106	209	51,530	265	13,765	242
ND	621	11	468	206,064	76	23,163	63	31,646	16

Table B-1: Authorized impact of CWA section 404 permits issued in 2011-2015, excluding mitigation type permits and permits affecting resources categorized as "ocean" or "tidal."

State	Number of Permits (Per Year)		Permanent Impacts		Temporary Impacts (Per Year)		Mitigation Required (Per Year)		
	General	Individual	Acres	Length Feet	Acres	Length Feet	Acres	Length Feet	Permits Using Credits[1]
NE	528	9	337	401,360	13	16,094	52	5,707	30
NH	305	1	144	9,024	4	230	149	0	9
NJ	43	9	64	13,346	24	4,945	5	15	1
NM	256	5	110	12,298	23	8,811	13	50	0
NV	72	3	55	28,466	7	2,069	11	2,377	1
NY	1,458	29	337	532,679	55	50,906	359	13,187	16
OH	1,251	44	485	697,993	37	38,712	196	144,507	64
OK	487	9	181	145,259	16	10,235	70	32,118	4
OR	348	37	516	1,056,724	35	31,093	72	1,776	52
PA	6,258	21	457	692,703	301	252,293	95	43,486	6
RI	35	1	12	501	7	0	1	200	0
SC	310	42	853	195,391	24	3,751	2,162	88,406	69
SD	319	14	245	319,605	11	16,511	43	1,673	10
TN	1,153	22	205	647,128	12	33,668	71	20,961	38
TX	2,992	75	2,965	1,226,870	793	256,874	1,451	283,408	381
UT	278	6	149	193,037	96	54,587	47	22,873	6
VA	1,182	37	1,545	629,912	455	138,279	239	145,197	107
VT	269	5	100	15,410	27	1,244	109	9	6
WA	400	33	450	150,438	69	98,635	225	60,594	25
WI	1,610	48	953	819,980	125	192,441	157	2,398	90
WV	1,793	14	130	444,982	34	85,090	21	90,871	21
WY	179	1	125	98,781	6	2,030	26	230	0

Source: EPA analysis of data from USACE ORM2 database (2018).

[1] Mitigation credits are the trading medium that is used to represent the ecological gains at mitigation bank sites. The number of credits available from a mitigation bank depends on the quantity and quality of the resources that are restored, created, enhanced, or preserved. The number of acres or linear feet per credit varies among and within U.S. Army Corps districts. This variability makes summing credits across regions inappropriate, so the number of permits utilizing mitigation credits is provided instead of total mitigation credits.

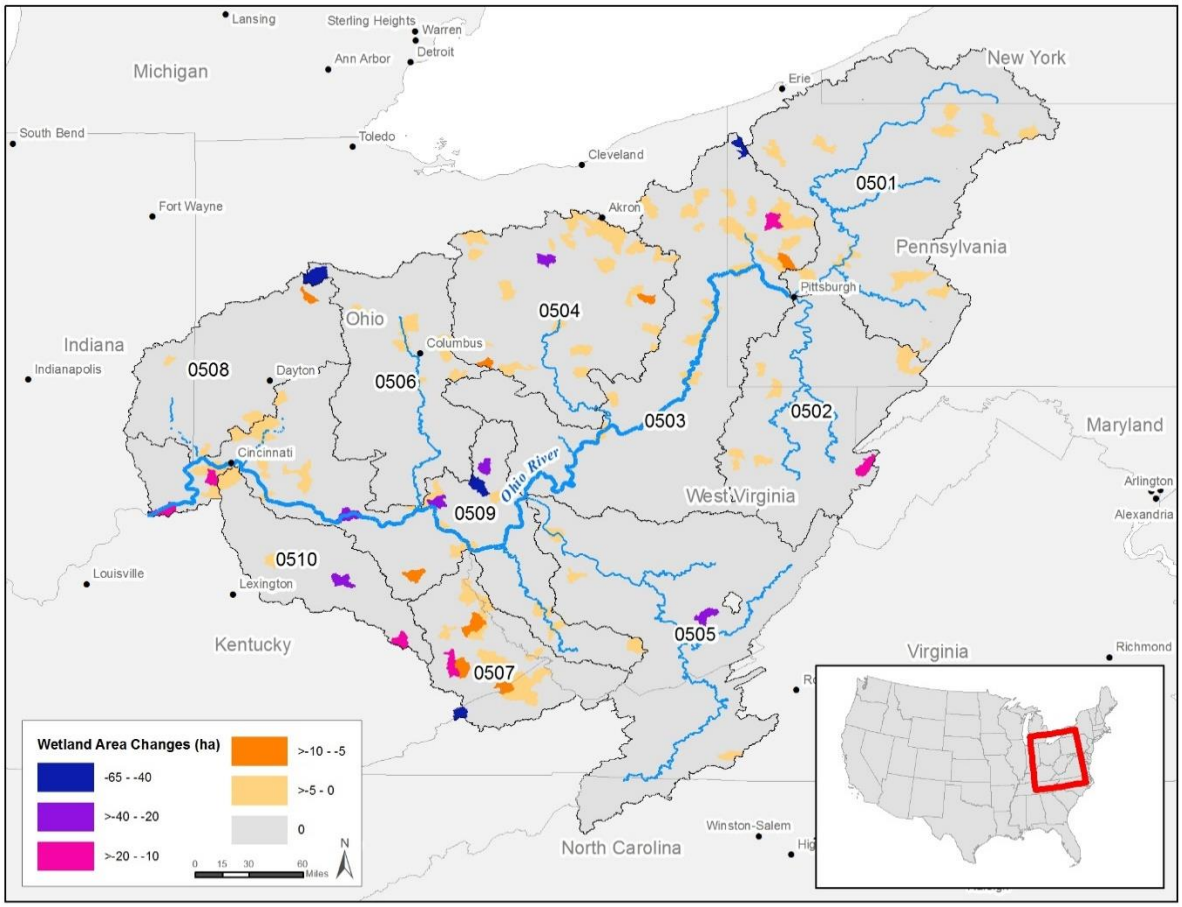
Appendix C: SWAT Modeling Results

This appendix presents more detailed SWAT outputs of modeled changes due to the final rule. These results complement the summaries presented for case studies 1 and 2 in Sections III.B.2.3.1 and III.B.3.3.1, respectively. For each case study, we provide details on the magnitude and distribution of wetland changes modeled between the baseline and final rule scenarios. We then summarize the distribution of reach-level changes resulting from the land use changes and reduced wetland functions across watersheds included in the case study.

1. Ohio River Basin

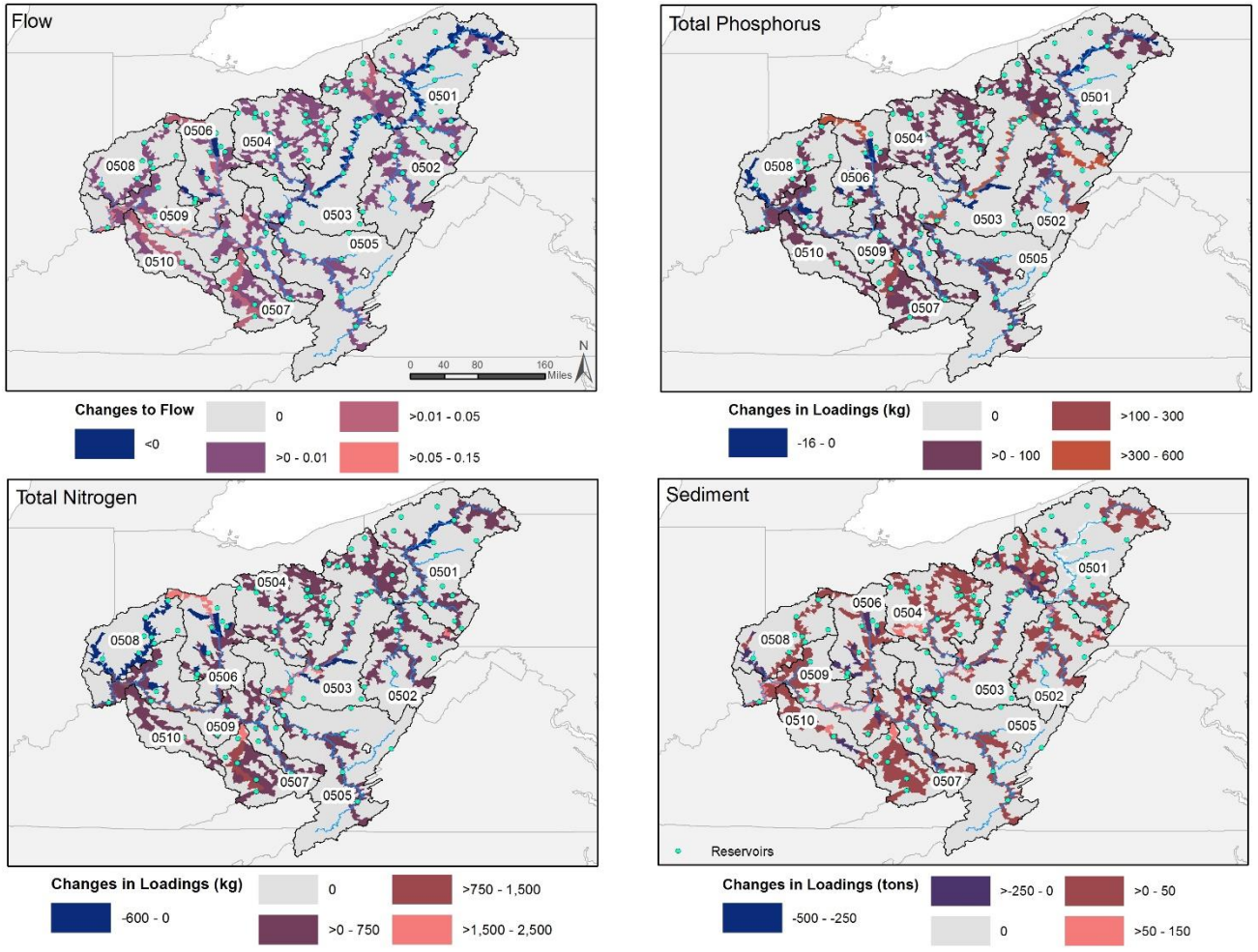
The map of Figure C-1 shows the distribution of modeled wetland changes, whereas Figure C-2 shows the distribution of resulting potential changes in annual average flows, sediment loads, and nutrient loads over the modeled watersheds.

Figure C-1: Map showing distribution of predicted wetland changes across the HUC 05 case study watersheds.



The watershed boundaries represented in this map are derived from the SWAT model directly and would not necessarily concord with WBD boundaries.

Figure C-2: Map showing distribution of modeled changes in annual average flows, sediment loads, and nutrient loads in modeled reaches of the Ohio River Basin watersheds under the final rule scenario.

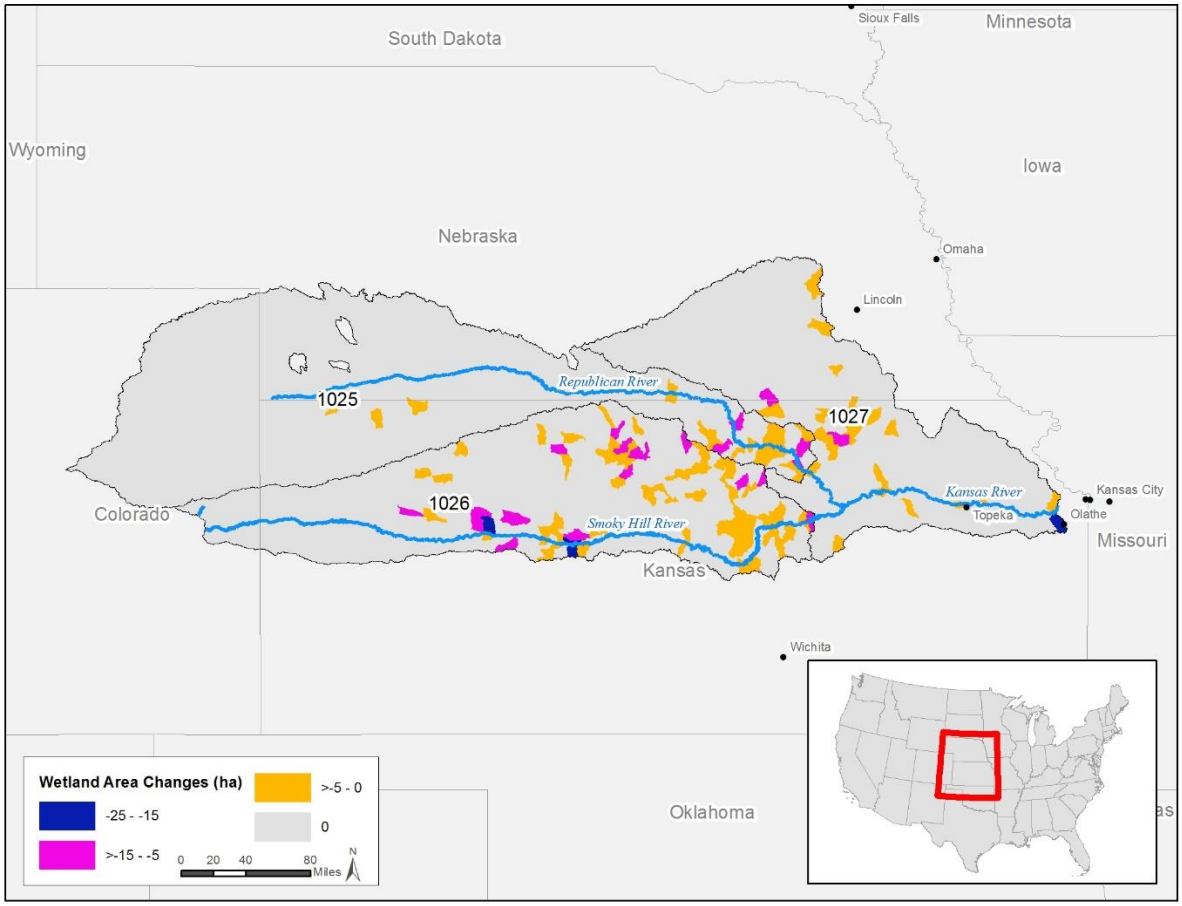


Note: The watershed boundaries represented in this map are derived from the SWAT model directly and would not necessarily concord with WBD boundaries.

2. Lower Missouri River Basin

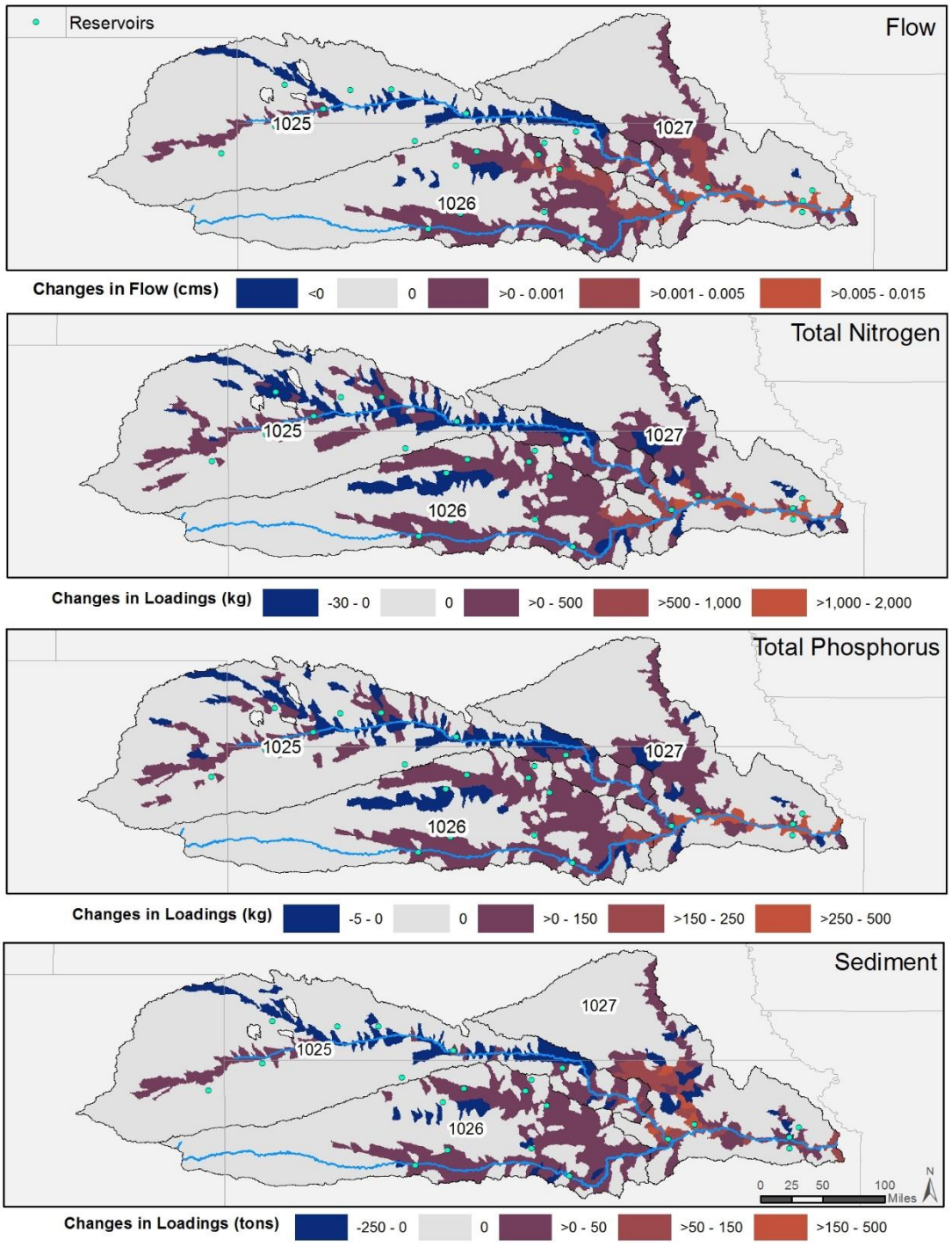
Figure C-3 shows the distribution of wetland changes in modeled watersheds within the Lower Missouri River Basin. The map in Figure C-4 shows the distribution of resulting predicted changes in annual average flows, sediment loads, and nutrient loads over the modeled watersheds.

Figure C-3: Map showing distribution of predicted wetland changes across the HUC 10 case study watersheds.



Note: The watershed boundaries represented in this map are derived from the SWAT model directly and would not necessarily concord with WBD boundaries.

Figure C-4: Map showing distribution of modeled changes in annual average flows, sediment loads, and nutrient loads in modeled reaches of the Lower Missouri River Basin watersheds under the final rule.



Note: The watershed boundaries represented in this map are derived from the SWAT model directly and would not necessarily concord with WBD boundaries.

Appendix D: Wetland Meta-Analysis

The analysis of the forgone benefits of reducing wetland mitigation requirements resulting from the final rule follows the same approach the agencies used in the proposed rule analysis (U.S. EPA and Army, 2018b). This approach relies on a meta-analysis of wetland valuation studies that provide data on the public's WTP for wetland preservation by Moeltner et al. (2019). Moeltner et al. (2019) performs a meta-analysis of wetland valuation studies to estimate a benefit function for preserving or restoring acres of wetlands. The study is an application of the methodologies developed in Moeltner et al. (2007), Moeltner and Rosenberger (2014), and Moeltner (2015). The study performs a Bayesian non-linear meta-regression that ensures the benefits function meets a set of utility theoretic validity criteria. Those criteria are: concavity of the benefits function over wetland acres, sensitivity to scope, a scope elasticity that is not restricted by the functional form of the benefit function, and the adding up condition which ensures dividing a change up into smaller increments does not affect the total benefit.

The data for the meta-regression consist of 38 observations from 17 stated preference studies identified in the 2017 Abt Associates wetlands literature review that contained WTP estimates potentially useful in a meta-analysis. The meta-data include 21 observations from 11 studies associated with freshwater wetlands. The remaining 17 cases target salt marshes or, more broadly, "coastal wetlands." The memorandum to Todd Doley and Steve Whitlock, U.S. EPA, Office of Water, entitled "Notes on inclusion of source studies and data preparation for wetlands meta-data," details reasons for selecting or excluding specific wetland valuation studies from meta-data and subsequent development of meta-regression (December 10, 2018, DCN# EPA-HQ-OW-2018-0149-0053).

The following discussion focuses on the freshwater wetlands only. Moeltner et al. (2019) provides detail on the full dataset. Six of the studies value state-wide changes in wetland area and five focus on wetlands at the sub-state level. Given that the plurality of the observations in the meta-analysis are from studies conducted at the state level, the agencies estimate changes in benefits at the state level, assuming WTP for out of state changes is zero, and aggregate WTP across states ex post.

Table D-1: Studies used in the freshwater only meta-regression model in Moeltner et al. (2019)

Author	Year	Target Population	Wetland Type	Acres	WTP (2018$)
Awondo et al.	2011	Maumee Bay SP, OH, visitors	freshwater, unspec.	2,499	$198
Beran, L.J.	1995	all SC HHs	freshwater, forested	2,500	$37
Beran, L.J.	1995	all SC HHs	freshwater, forested	2,500	$28
Beran, L.J.	1995	all SC HHs	freshwater, forested	2,500	$34
Blomquist & Whitehead	1998	all KY HHs	freshwater	500	$3
Blomquist & Whitehead	1998	all KY HHs	freshwater, forested	500	$8
Blomquist & Whitehead	1998	all KY HHs	freshwater, forested	500	$6
Blomquist & Whitehead	1998	all KY HHs	freshwater, forested	500	$20
deZoysa	1995	selected MSAs, OH	freshwater, unspec.	3,000	$112
Loomis et al.	1991	all CA HHs	freshwater, unspec.	58,000	$264
Loomis et al.	1991	all CA HHs	freshwater, unspec.	40,000	$437
MacDonald et al.	1998	Atlanta region, GA	freshwater, unspec.	330	$111
Mullarkey & Bishop	1999	all WI HHs	freshwater, forested	110	$66
Newell & Swallow	2013	Two townships, RI	freshwater, forested	29	$9
Newell & Swallow	2013	Two townships, RI	freshwater, forested	45	$12

Table D-1: Studies used in the freshwater only meta-regression model in Moeltner et al. (2019)

Author	Year	Target Population	Wetland Type	Acres	WTP (2018$)
Newell & Swallow	2013	Two townships, RI	freshwater, forested	60	$16
Poor	1999	all NE HHs	freshwater, unspec.	16,000	$48
Poor	1999	all NE HHs	freshwater, unspec.	41,000	$43
Poor	1999	all NE HHs	freshwater, unspec.	66,000	$48
Whitehead et al.	2009	selected counties, MI	freshwater, unspec.	1,125	$75
Whitehead & Blomquist	1991	all KY HHs	freshwater, forested	5,000	$19

HHs = Households

The dependent variable in the meta-regression is the natural log of household WTP for the specified change. Willingness to pay is modeled as a function of "context-defining" and "moderator" variables in the non-linear regression equation. Context-defining variables are those that are relevant to the final rule including the baseline number of acres, the number of acres preserved or restored, whether those acres are forested wetlands, and whether they were described by the primary study to provide several specific ecosystem services. Moderating variables generally refer to details on how the study was conducted and are not relevant to benefit transfer but are included to avoid omitted variable bias and/or to adjust for the study characteristics (*e.g.*, voluntary payment, a study is not peer-reviewed) to ensure that the meta-regression function used in benefit transfer reflects the best benefit transfer practices and desired study characteristics (*e.g.*, a peer reviewed study and non-voluntary payment such as income tax). The means and standard deviations of all explanatory variables are reported in Table D-2. The model specification used to estimate the benefit parameters for transfer (called Model M1c in Moeltner et al., 2019) is

$$y_s = X_s\beta + ln\left(\gamma^{-1}\left(exp(\gamma q_{1,s}) - exp(\gamma q_{0,s})\right)\right) + \varepsilon_s$$

$$\varepsilon_s \sim n(0, \sigma_\varepsilon^2 I_s)$$

where y_s is the natural log of WTP from study s, X_s is a vector of moderator variables from study s, $q_{1,s}$ is the post-final rule wetland area, $q_{0,s}$ is the baseline wetland area, β and γ are vectors of estimated parameters, σ_ε^2 is the variance of the error term and I_s is an s-dimensional identity matrix. Moeltner et al. (2019) tested other specifications that allow for unobserved study-level heterogeneity and observation-level heteroskedasticity but found that the model with spherical, idiosyncratic errors performed best.

Table D-2: Meta-regression variable summary from Moeltner et al. (2019)[1]

	Description	Mean	Min	Max
Lnwtp	log(total wtp in 2017 dollars)	3.56	1.05	6.06
Lnyear	log(year of data collection - oldest year +1)	1.57	0.00	2.89
Lninc	log(income in 2017 dollars)	10.97	10.64	11.48
Sagulf	1 = S-Atlantic/Gulf (AL,GA,SC,LA)	0.19	0.00	1.00
Nema	1 = NE/mid-Atlantic,(DE,MD,NJ,PA,RI)	0.14	0.00	1.00
Nmw	N/Mid-West (KY,MI,NE,OH,WI)	0.57	0.00	1.00
Local	1 = target population at sub-state level	0.33	0.00	1.00
Prov	1 = provisioning function affected	0.24	0.00	1.00
Reg	1 = regulating function affected	0.52	0.00	1.00
Cult	1 = cultural function affected	0.76	0.00	1.00
Forest	1 = forested wetland	0.52	0.00	1.00

Table D-2: Meta-regression variable summary from Moeltner et al. (2019)[1]				
	Description	**Mean**	**Min**	**Max**
q0	baseline acres (1000s)	40	0	220
q1	final rule acres (1000s)	51	1	220
Volunt	1 = payment mechanism = voluntary contribution	0.43	0.00	1.00
lumpsum	1 = payment frequency = lump sum (single payment)	0.43	0.00	1.00
Ce	1 = elicitation method = choice experiment	0.14	0.00	1.00
Nrev	1 = study was not peer-reviewed	0.24	0.00	1.00
median	1 = wtp estimate = median	0.33	0.00	1.00

[1] Summary statistics are based on the freshwater studies only. See Moeltner et al. (2019) for saltwater and combined freshwater and saltwater datasets.

The Bayesian estimation routine provides distributions for each of the estimated parameters and is performed using Gibbs sampling (Train, 2009). An additional feature of the Moeltner et al. (2019) estimation algorithm is that primary studies that do not closely match the final rule context can be included and evaluated to determine if they provide useful information to estimating the parameters of the benefits function. The algorithm which evaluates the efficiency of pooling data across different types of studies is called stochastic search variable selection (SSVS). In this application the studies being evaluated for inclusion value acres of saltwater wetlands while the most relevant studies value freshwater wetlands. The author finds that values from saltwater studies diverge significantly from freshwater studies, so while that information will not contribute to the benefits function, it is an indication of validity in the primary studies in that somewhat different environmental services are valued differently by respondents to the stated preference surveys.

The posterior means and standard deviations for the parameters of the meta-regression are reported in Table D-3. Based on the estimated distributions of the parameters, the variables *local*, *regulating*, *forested*, and *provisioning*, are the strongest predictors of WTP with more than 90% of their probability mass on one side of zero. These are followed by variables for year of the study, income of the sample, and the regional variables for northeast/mid-Atlantic and midwest with more than 70% of their probability mass on one side of zero.

Table D-3: Meta-regression results from Moeltner et al. (2019)			
	mean	**std.**	**p(> 0)[1]**
Constant	-0.546	3.097	0.430
context-specific			
Lnyear	-0.359	0.667	0.281
Lninc	0.211	0.363	0.723
Sagulf	-0.406	1.743	0.405
Nema	-0.784	1.538	0.295
Nmw	-1.073	1.556	0.244
Local	3.130	0.895	0.999
Prov	-2.273	0.876	0.009
Reg	1.632	0.850	0.970
Cult	-0.317	1.563	0.413
Forest	1.118	0.726	0.937
Moderators			
Volunt	-0.016	1.038	0.495

Table D-3: Meta-regression results from Moeltner et al. (2019)			
	mean	**std.**	**p(> 0)[1]**
lumpsum	1.486	0.771	0.968
ϒ	0.008	0.007	0.883
σ_{ϵ}^2	0.474	0.260	1.000

[1] Prob(>0) equals the share of the posterior density to the right of zero.

Using the results of the meta-analysis to estimate a change in benefits for each state resulting from a change in wetland area requires the following state-specific variables: change in wetland acres because of CWA jurisdictional changes, median household income[151], number of households, proportion of change in acres that is forested, and region of the United States. The baseline acres in the primary studies generally referred to an area that was under consideration for restoration or preservation and is a small fraction of total statewide acres. As such, the mean value for baseline acres from the primary studies is used for q_0 which is 10,000 acres to avoid predicting out of sample. The value for q_1 for each state is 10,000 acres plus the expected change in jurisdictional wetland acres for each state. Settings for the remaining variables are chosen as follows: *lnyear* = 3.4 (log of (2018-1988), plus 1); variables *reg* and *prov* are set to zero and *cult* is set to "1" to indicate that the affected wetlands primarily provide supporting services[152] such as species habitat and biodiversity support and cultural services such as recreation and sense of place; *lumpsum* is set to "1" to allow the benefit transfer estimates to be interpreted as one-time annual value. We average the predictions over both possible settings ("0" and "1") for indicator *volunt*, giving equal weight to voluntary and non-voluntary payments mechanisms. Table D-4 lists the values for each state-specific variable used in the benefit transfer.

The agencies use the variable settings described above to develop the posterior mean of the predictive WTP distribution, as well as the lower and upper bound of the corresponding highest posterior density interval. Following the best practices from the economic literature, the agencies truncated the WTP distribution at the 99th percentile prior to estimating both mean and low and upper bounds of WTP.[153]

Table D-4: State-specific benefit transfer variables						
State	**Average Income (2016$)**	**South Atlantic/Gulf**	**Northeast/Mid-Atlantic**	**Northern/Mid-West**	**Proportion of Forested Acres**	**Change in Wetland Acres**
AL	47,221	1	0	0	0.9632	48.9
AK	75,723	0	0	0	0.4291	13.7
AZ	57,100	0	0	0	0.8201	16.8
AR	45,907	1	0	0	0.9676	37.1
CA	66,637	0	0	0	0.2856	62.2
CO	70,566	0	0	0	0.1648	1.8

[151] The agencies evaluated WTP for avoiding wetland losses using both mean and median income values, the resulting WTP estimates were nearly identical.

[152] All wetlands included in meta-data provided supporting services. Therefore, the default value for ecosystem services provided by a wetland is "supporting." Because more than 76 percent of wetlands included in meta-data provided cultural services, the agencies set this variable to "1." Regulating and provisioning services were provided by 52 percent and 24 percent of wetlands respectively.

[153] *See* Moeltner K. and R. Woodward. 2009. Meta-Functional Benefit Transfer for Wetland Valuation: Making the Most of Small Samples. *Environmental and Resource Economics*, 42:89-108.

Table D-4: State-specific benefit transfer variables

State	Average Income (2016$)	South Atlantic/Gulf	Northeast/Mid-Atlantic	Northern/Mid-West	Proportion of Forested Acres	Change in Wetland Acres
CT	75,923	0	1	0	0.9141	2.7
DE	58,046	1	0	0	0.9311	2.3
DC	70,982	1	0	0	0.9425	0.0
FL	51,176	1	0	0	0.6875	439.8
GA	53,527	1	0	0	0.9456	37.7
HI	72,133	0	0	0	0.8991	0.0
ID	56,564	0	0	0	0.2339	0.8
IL	61,386	0	0	1	0.8032	17.3
IN	56,094	0	0	1	0.7774	75.4
IA	59,094	0	0	1	0.5192	2.7
KS	56,810	0	0	1	0.3633	91.4
KY	45,369	1	0	0	0.9157	91.2
LA	42,196	1	0	0	0.6932	87.2
ME	50,856	0	1	0	0.8966	2.4
MD	73,760	1	0	0	0.9210	2.2
MA	72,266	0	1	0	0.9060	0.6
MI	57,091	0	0	1	0.9027	0.0
MN	70,218	0	0	1	0.7107	32.9
MS	41,099	1	0	0	0.9573	25.0
MO	55,016	0	0	1	0.8054	18.7
MT	57,075	0	0	0	0.1435	1.6
NE	59,374	0	0	1	0.1765	1.8
NV	55,431	0	0	0	0.2464	3.4
NH	76,260	0	1	0	0.8448	0.1
NJ	68,468	0	1	0	0.9025	0.0
NM	48,451	0	0	0	0.4369	1.4
NY	61,437	0	1	0	0.8394	3.9
NC	53,764	1	0	0	0.9703	4.8
ND	60,184	0	0	1	0.0156	3.1
OH	53,985	0	0	1	0.7972	38.2
OK	50,943	1	0	0	0.8142	4.2
OR	59,135	0	0	0	0.2044	10.5
PA	60,979	0	1	0	0.8350	10.6
RI	61,528	0	1	0	0.9471	0.5
SC	54,336	1	0	0	0.9384	2.8
SD	57,450	0	0	1	0.0266	3.6
TN	51,344	1	0	0	0.9368	8.3
TX	58,146	1	0	0	0.4585	211.4
UT	67,481	0	0	0	0.1108	4.6
VT	60,837	0	1	0	0.7913	0.6
VA	66,451	1	0	0	0.8946	10.2
WA	70,310	0	0	0	0.4797	10.5
WV	44,354	1	0	0	0.6375	11.0
WI	59,817	0	0	1	0.7921	27.1
WY	57,829	0	0	0	0.2138	0.5

Source: EPA analysis

Appendix E: Final Rule Analysis State-level Results

This appendix provides state-level results of the agencies' quantitative assessment of the final rule. Table E-1 presents average annual reductions in CWA section 404 program related permit and mitigation requirements under the final rule, by potential state response scenario and state. Table E-2, Table E-3, and Table E-4 present permit cost savings, mitigation cost savings, and total cost savings (sum of permit cost savings and mitigation cost savings), respectively, by potential state response scenario and state.

Table E-5, Table E-6, and Table E-7 present forgone benefits from reduced CWA section 404 related mitigation requirements by potential state response scenario and state for Scenarios 0, 1 and 2, and 3, respectively.

Table E-1: Estimated average annual reductions in CWA section 404 related permit and mitigation requirements under the final rule, by potential state response scenario and state

State	Annual average reduction in permits under final rule[1]						Average annual mitigation reduction under final rule[2]					
	Individual Permits			General Permits			Acres			Linear Feet		
	Sc. 0[3]	Sc. 1 & 2[4]	Sc. 3[5]	Sc. 0[3]	Sc. 1 & 2[4]	Sc. 3[5]	Sc. 0[3]	Sc. 1 & 2[4]	Sc. 3[5]	Sc. 0[3]	Sc. 1 & 2[4]	Sc. 3[5]
AK	1.6	1.6	1.6	21.4	21.4	21.4	13.74	13.74	13.74	0	0	0
AL	1.0	1.0	1.0	29.8	29.8	29.8	15.25	15.25	15.25	29,318	29,318	29,318
AR	2.2	2.2	2.2	312.2	312.2	312.2	19.44	19.44	19.44	15,430	15,430	15,430
AZ	5.0	5.0	5.0	240.0	240.0	240.0	14.45	14.45	14.45	2,033	2,033	2,033
CA	5.0	0.0	0.0	1,049.2	0.0	0.0	18.76	0.00	0.00	37,848	0	0
CO	0.2	0.2	0.2	109.0	109.0	109.0	1.28	1.28	1.28	472	472	472
CT	0.0	0.0	0.0	41.8	0.0	0.0	2.72	0.00	0.00	0	0	0
DE	0.0	0.0	0.0	2.2	2.2	0.0	2.33	2.33	0.00	0	0	0
FL	17.8	0.0	0.0	54.6	0.0	0.0	439.15	0.00	0.00	591	0	0
GA	1.8	1.8	0.0	49.2	49.2	0.0	35.53	35.53	0.00	1,886	1,886	0
IA	0.2	0.2	0.0	27.4	27.4	0.0	0.74	0.74	0.00	1,699	1,699	0
ID	0.4	0.4	0.4	5.8	5.8	5.8	0.60	0.60	0.60	140	140	140
IL	0.2	0.0	0.0	125.0	0.0	0.0	4.79	0.00	0.00	10,903	0	0
IN	0.8	0.0	0.0	85.0	0.0	0.0	16.26	0.00	0.00	51,528	0	0
KS	2.6	2.6	0.0	351.2	351.2	0.0	7.86	7.86	0.00	72,741	72,741	0
KY	1.2	1.2	1.2	141.6	141.6	141.6	13.52	13.52	13.52	67,657	67,657	67,657
LA	3.2	3.2	3.2	265.6	265.6	265.6	85.82	85.82	85.82	1,223	1,223	1,223
MA	0.4	0.0	0.0	14.8	0.0	0.0	0.59	0.00	0.00	0	0	0
MD	0.0	0.0	0.0	11.6	0.0	0.0	0.83	0.00	0.00	1,218	0	0
ME	0.2	0.0	0.0	32.2	0.0	0.0	2.43	0.00	0.00	0	0	0
MI	0.0	0.0	0.0	0.6	0.0	0.0	0.00	0.00	0.00	0	0	0
MN	10.0	0.0	0.0	103.0	0.0	0.0	32.86	0.00	0.00	55	0	0
MO	2.6	2.6	2.6	245.8	245.8	245.8	6.77	6.77	6.77	10,404	10,404	10,404
MS	2.6	2.6	2.6	72.4	72.4	72.4	21.19	21.19	21.19	3,329	3,329	3,329
MT	0.0	0.0	0.0	8.4	8.4	0.0	1.22	1.22	0.00	347	347	0
NC	0.0	0.0	0.0	15.2	15.2	0.0	4.83	4.83	0.00	0	0	0
ND	0.0	0.0	0.0	14.6	14.6	14.6	2.70	2.70	2.70	313	313	313
NE	0.2	0.2	0.2	31.4	31.4	31.4	1.14	1.14	1.14	593	593	593
NH	0.0	0.0	0.0	3.4	0.0	0.0	0.09	0.00	0.00	0	0	0
NJ	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0	0	0
NM	1.0	1.0	1.0	153.0	153.0	153.0	1.36	1.36	1.36	0	0	0

Table E-1: Estimated average annual reductions in CWA section 404 related permit and mitigation requirements under the final rule, by potential state response scenario and state

State	Annual average reduction in permits under final rule[1]						Average annual mitigation reduction under final rule[2]					
	Individual Permits			General Permits			Acres			Linear Feet		
	Sc. 0[3]	Sc. 1 & 2[4]	Sc. 3[5]	Sc. 0[3]	Sc. 1 & 2[4]	Sc. 3[5]	Sc. 0[3]	Sc. 1 & 2[4]	Sc. 3[5]	Sc. 0[3]	Sc. 1 & 2[4]	Sc. 3[5]
NV	0.4	0.4	0.4	37.6	37.6	37.6	2.29	2.29	2.29	924	924	924
NY	0.4	0.0	0.0	18.4	0.0	0.0	2.36	0.00	0.00	1,323	0	0
OH	0.8	0.0	0.0	185.2	0.0	0.0	13.95	0.00	0.00	21,088	0	0
OK	0.2	0.2	0.2	50.8	50.8	50.8	0.55	0.55	0.55	3,212	3,212	3,212
OR	3.4	0.0	0.0	18.8	0.0	0.0	9.96	0.00	0.00	504	0	0
PA	0.2	0.0	0.0	436.8	0.0	0.0	6.92	0.00	0.00	3,235	0	0
RI	0.2	0.0	0.0	10.0	0.0	0.0	0.53	0.00	0.00	0	0	0
SC	0.4	0.4	0.4	5.4	5.4	5.4	2.71	2.71	2.71	50	50	50
SD	0.6	0.6	0.6	39.4	39.4	39.4	2.62	2.62	2.62	885	885	885
TN	0.6	0.0	0.0	25.2	0.0	0.0	2.49	0.00	0.00	5,054	0	0
TX	4.8	4.8	4.8	733.6	733.6	733.6	112.18	112.18	112.18	86,485	86,485	86,485
UT	0.4	0.4	0.0	71.8	71.8	0.0	2.08	2.08	0.00	2,193	2,193	0
VA	1.4	0.0	0.0	17.4	0.0	0.0	5.90	0.00	0.00	3,718	0	0
VT	0.0	0.0	0.0	1.6	0.0	0.0	0.50	0.00	0.00	43	0	0
WA	1.6	0.0	0.0	27.6	0.0	0.0	10.15	0.00	0.00	281	0	0
WI	5.2	5.2	0.0	84.6	84.6	0.0	27.07	27.07	0.00	0	0	0
WV	0.2	0.0	0.0	380.0	0.0	0.0	3.03	0.00	0.00	6,919	0	0
WY	0.0	0.0	0.0	21.6	0.0	0.0	0.39	0.00	0.00	107	0	0
Total	**81.0**	**37.8**	**27.6**	**5,783.2**	**3,119.4**	**2,509.4**	**973.97**	**399.29**	**317.61**	**445,749**	**301,335**	**222,469**

[1] Annual average permit reductions based on permits issued in years 2011-2015 estimated to only affect RPWWN-type wetlands or ephemeral streams.

[2] Annual average mitigation reduction based on permits issued in years 2011-2015 with mitigation requirements on waterways determined to be RPWWN-type wetlands or interpreted to be ephemeral streams. Excludes permits issued for mitigation or restoration activities because the main purpose of these activities is to restore or enhance ecosystem services provided by water resources as opposed to dredged and fill activities that lead to permanent or temporary losses of ecosystem services.

[3] Includes all states except Hawaii.

[4] Scenario 1 and 2 are identical for the CWA section 404 program analysis. These scenarios include Alaska, Alabama, Arkansas, Arizona, Colorado, Delaware, Georgia, Iowa, Idaho, Kansas, Kentucky, Louisiana, Missouri, Mississippi, Montana, North Carolina, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, South Carolina, South Dakota, Texas, Utah, and Wisconsin.

[5] Includes Alaska, Alabama, Arkansas, Arizona, Colorado, Idaho, Kentucky, Louisiana, Missouri, Mississippi, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, South Carolina, South Dakota, and Texas.

Table E-2: Estimated average annual reduction in CWA section 404 permit application costs under the final rule, by potential state response scenario and state (millions 2018$)

State	Scenario 0[1,2]			Scenarios 1 & 2[1,3]			Scenario 3[1,4]		
	Individual	General	Total	Individual	General	Total	Individual	General	Total
AK	$0.02	$0.10	$0.12	$0.02	$0.10	$0.12	$0.02	$0.10	$0.12
AL	$0.02	$0.13	$0.15	$0.02	$0.13	$0.15	$0.02	$0.13	$0.15
AR	$0.03	$1.40	$1.44	$0.03	$1.40	$1.44	$0.03	$1.40	$1.44
AZ	$0.08	$1.08	$1.16	$0.08	$1.08	$1.16	$0.08	$1.08	$1.16
CA	$0.08	$4.72	$4.80	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
CO	$0.00	$0.49	$0.49	$0.00	$0.49	$0.49	$0.00	$0.49	$0.49
CT	$0.00	$0.19	$0.19	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
DE	$0.00	$0.01	$0.01	$0.00	$0.01	$0.01	$0.00	$0.00	$0.00
FL	$0.27	$0.25	$0.51	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
GA	$0.03	$0.22	$0.25	$0.03	$0.22	$0.25	$0.00	$0.00	$0.00
IA	$0.00	$0.12	$0.13	$0.00	$0.12	$0.13	$0.00	$0.00	$0.00
ID	$0.01	$0.03	$0.03	$0.01	$0.03	$0.03	$0.01	$0.03	$0.03
IL	$0.00	$0.56	$0.57	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
IN	$0.01	$0.38	$0.39	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
KS	$0.04	$1.58	$1.62	$0.04	$1.58	$1.62	$0.00	$0.00	$0.00
KY	$0.02	$0.64	$0.66	$0.02	$0.64	$0.66	$0.02	$0.64	$0.66
LA	$0.05	$1.20	$1.24	$0.05	$1.20	$1.24	$0.05	$1.20	$1.24
MA	$0.01	$0.07	$0.07	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
MD	$0.00	$0.05	$0.05	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
ME	$0.00	$0.14	$0.15	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
MI	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
MN	$0.15	$0.46	$0.61	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
MO	$0.04	$1.11	$1.15	$0.04	$1.11	$1.15	$0.04	$1.11	$1.15
MS	$0.04	$0.33	$0.37	$0.04	$0.33	$0.37	$0.04	$0.33	$0.37
MT	$0.00	$0.04	$0.04	$0.00	$0.04	$0.04	$0.00	$0.00	$0.00
NC	$0.00	$0.07	$0.07	$0.00	$0.07	$0.07	$0.00	$0.00	$0.00
ND	$0.00	$0.07	$0.07	$0.00	$0.07	$0.07	$0.00	$0.07	$0.07
NE	$0.00	$0.14	$0.14	$0.00	$0.14	$0.14	$0.00	$0.14	$0.14
NH	$0.00	$0.02	$0.02	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
NJ	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
NM	$0.02	$0.69	$0.70	$0.02	$0.69	$0.70	$0.02	$0.69	$0.70
NV	$0.01	$0.17	$0.18	$0.01	$0.17	$0.18	$0.01	$0.17	$0.18

Table E-2: Estimated average annual reduction in CWA section 404 permit application costs under the final rule, by potential state response scenario and state (millions 2018$)

State	Scenario 0[1,2]			Scenarios 1 & 2[1,3]			Scenario 3[1,4]		
	Individual	General	Total	Individual	General	Total	Individual	General	Total
NY	$0.01	$0.08	$0.09	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
OH	$0.01	$0.83	$0.85	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
OK	$0.00	$0.23	$0.23	$0.00	$0.23	$0.23	$0.00	$0.23	$0.23
OR	$0.05	$0.08	$0.14	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
PA	$0.00	$1.97	$1.97	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
RI	$0.00	$0.05	$0.05	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
SC	$0.01	$0.02	$0.03	$0.01	$0.02	$0.03	$0.01	$0.02	$0.03
SD	$0.01	$0.18	$0.19	$0.01	$0.18	$0.19	$0.01	$0.18	$0.19
TN	$0.01	$0.11	$0.12	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
TX	$0.07	$3.30	$3.37	$0.07	$3.30	$3.37	$0.07	$3.30	$3.37
UT	$0.01	$0.32	$0.33	$0.01	$0.32	$0.33	$0.00	$0.00	$0.00
VA	$0.02	$0.08	$0.10	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
VT	$0.00	$0.01	$0.01	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
WA	$0.02	$0.12	$0.15	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
WI	$0.08	$0.38	$0.46	$0.08	$0.38	$0.46	$0.00	$0.00	$0.00
WV	$0.00	$1.71	$1.71	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
WY	$0.00	$0.10	$0.10	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total	**$1.22**	**$26.02**	**$27.25**	**$0.57**	**$14.04**	**$14.61**	**$0.42**	**$11.29**	**$11.71**

[1] For each state, permit cost savings are calculated by multiplying the number of individual and general permit reductions (*see* Table E-1) by the unit costs from the Corps NWP analysis ($15,100 per individual permit; $4,500 per general permit). *But see supra* at footnote 117.

[2] Includes all states except Hawaii.

[3] Scenario 1 and 2 are identical for the CWA section 404 program analysis. These scenarios include Alaska, Alabama, Arkansas, Arizona, Colorado, Delaware, Georgia, Iowa, Idaho, Kansas, Kentucky, Louisiana, Missouri, Mississippi, Montana, North Carolina, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, South Carolina, South Dakota, Texas, Utah, and Wisconsin.

[4] Includes Alaska, Alabama, Arkansas, Arizona, Colorado, Idaho, Kentucky, Louisiana, Missouri, Mississippi, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, South Carolina, South Dakota, and Texas.

Table E-3: Estimated average annual reduction in CWA section 404 related mitigation requirement costs under the final rule, by potential state response scenario and state

State	Cost per acre (2018$)		Cost per LF (2018$)		Scenario 0[1,2] (millions 2018$)		Scenarios 1 & 2[1,3] (millions 2018$)		Scenario 3[1,4] (millions 2018$)	
	Low	High	Low	High	Low	High	Low	High	Low	High
AK	$55,635	$108,590	$303	$695	$0.76	$1.49	$0.76	$1.49	$0.76	$1.49
AL	$55,635	$108,590	$274	$695	$8.88	$22.04	$8.88	$22.04	$8.88	$22.04
AR	$30,949	$56,043	$249	$556	$4.45	$9.67	$4.45	$9.67	$4.45	$9.67
AZ	$55,635	$86,543	$303	$695	$1.42	$2.66	$1.42	$2.66	$1.42	$2.66
CA	$216,357	$395,881	$303	$695	$15.52	$33.75	$0.00	$0.00	$0.00	$0.00
CO	$53,419	$74,684	$93	$371	$0.11	$0.27	$0.11	$0.27	$0.11	$0.27
CT	$339,130	$484,875	$303	$695	$0.92	$1.32	$0.00	$0.00	$0.00	$0.00
DE	$35,029	$257,567	$386	$721	$0.08	$0.60	$0.08	$0.60	$0.00	$0.00
FL	$55,635	$108,590	$303	$695	$24.61	$48.10	$0.00	$0.00	$0.00	$0.00
GA	$177,206	$280,233	$905	$1,005	$8.00	$11.85	$8.00	$11.85	$0.00	$0.00
IA	$37,887	$83,154	$93	$395	$0.19	$0.73	$0.19	$0.73	$0.00	$0.00
ID	$43,529	$83,539	$303	$695	$0.07	$0.15	$0.07	$0.15	$0.07	$0.15
IL	$66,405	$108,545	$235	$617	$2.88	$7.25	$0.00	$0.00	$0.00	$0.00
IN	$51,513	$73,149	$303	$655	$16.45	$34.95	$0.00	$0.00	$0.00	$0.00
KS	$55,635	$108,590	$93	$371	$7.18	$27.83	$7.18	$27.83	$0.00	$0.00
KY	$113,346	$170,019	$309	$778	$22.44	$54.93	$22.44	$54.93	$22.44	$54.93
LA	$10,303	$61,816	$303	$695	$1.25	$6.16	$1.25	$6.16	$1.25	$6.16
MA	$614,083	$640,137	$103	$206	$0.37	$0.38	$0.00	$0.00	$0.00	$0.00
MD	$64,564	$233,528	$569	$786	$0.75	$1.15	$0.00	$0.00	$0.00	$0.00
ME	$258,501	$385,955	$0	$0	$0.63	$0.94	$0.00	$0.00	$0.00	$0.00
MI	$54,364	$134,759	$237	$1,023	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
MN	$9,575	$78,757	$303	$695	$0.33	$2.63	$0.00	$0.00	$0.00	$0.00
MO	$27,817	$83,452	$93	$417	$1.15	$4.91	$1.15	$4.91	$1.15	$4.91
MS	$26,787	$33,484	$274	$695	$1.48	$3.02	$1.48	$3.02	$1.48	$3.02
MT	$30,908	$38,120	$303	$695	$0.14	$0.29	$0.14	$0.29	$0.00	$0.00
NC	$27,245	$73,430	$306	$403	$0.13	$0.35	$0.13	$0.35	$0.00	$0.00
ND	$41,211	$61,816	$303	$695	$0.21	$0.38	$0.21	$0.38	$0.21	$0.38
NE	$55,635	$108,590	$93	$371	$0.12	$0.34	$0.12	$0.34	$0.12	$0.34
NH	$161,014	$227,028	$252	$757	$0.01	$0.02	$0.00	$0.00	$0.00	$0.00
NJ	$39,150	$309,081	$303	$695	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
NM	$53,419	$74,684	$303	$695	$0.07	$0.10	$0.07	$0.10	$0.07	$0.10

Table E-3: Estimated average annual reduction in CWA section 404 related mitigation requirement costs under the final rule, by potential state response scenario and state

State	Cost per acre (2018$)		Cost per LF (2018$)		Scenario 0[1,2] (millions 2018$)		Scenarios 1 & 2[1,3] (millions 2018$)		Scenario 3[1,4] (millions 2018$)	
	Low	High	Low	High	Low	High	Low	High	Low	High
NV	$109,381	$203,793	$303	$695	$0.53	$1.11	$0.53	$1.11	$0.53	$1.11
NY	$74,179	$94,352	$319	$433	$0.60	$0.79	$0.00	$0.00	$0.00	$0.00
OH	$38,635	$222,538	$170	$1,391	$4.12	$32.43	$0.00	$0.00	$0.00	$0.00
OK	$51,204	$62,825	$242	$572	$0.81	$1.87	$0.81	$1.87	$0.81	$1.87
OR	$56,150	$128,959	$43,621	$84,069	$22.54	$43.66	$0.00	$0.00	$0.00	$0.00
PA	$68,770	$202,855	$413	$891	$1.81	$4.29	$0.00	$0.00	$0.00	$0.00
RI	$476,607	$562,506	$303	$695	$0.25	$0.30	$0.00	$0.00	$0.00	$0.00
SC	$102,226	$176,832	$606	$704	$0.31	$0.52	$0.31	$0.52	$0.31	$0.52
SD	$41,211	$61,816	$303	$695	$0.38	$0.78	$0.38	$0.78	$0.38	$0.78
TN	$38,635	$38,635	$247	$373	$1.35	$1.98	$0.00	$0.00	$0.00	$0.00
TX	$55,635	$108,590	$541	$927	$53.02	$92.37	$53.02	$92.37	$53.02	$92.37
UT	$55,635	$108,590	$303	$695	$0.78	$1.75	$0.78	$1.75	$0.00	$0.00
VA	$30,908	$206,054	$386	$721	$1.62	$3.90	$0.00	$0.00	$0.00	$0.00
VT	$113,330	$135,531	$303	$695	$0.07	$0.10	$0.00	$0.00	$0.00	$0.00
WA	$71,422	$1,148,229	$303	$695	$0.81	$11.85	$0.00	$0.00	$0.00	$0.00
WI	$72,943	$108,590	$303	$695	$1.97	$2.94	$1.97	$2.94	$0.00	$0.00
WV	$123,632	$185,448	$750	$851	$5.56	$6.45	$0.00	$0.00	$0.00	$0.00
WY	$42,928	$52,201	$303	$695	$0.05	$0.09	$0.00	$0.00	$0.00	$0.00
Total					**$217.20**	**$485.46**	**$115.95**	**$249.14**	**$97.47**	**$202.78**

[1] For each state, cost savings are calculated by multiplying the cost of each mitigation acre or linear foot (low and high estimates) by the expected reduction in annual mitigation requirements (*see* Table E-1), and summing the acreage and linear feet values for each scenario.

[2] Includes all states except Hawaii.

[3] Scenario 1 and 2 are identical for the CWA section 404 program analysis. These scenarios include Alaska, Alabama, Arkansas, Arizona, Colorado, Delaware, Georgia, Iowa, Idaho, Kansas, Kentucky, Louisiana, Missouri, Mississippi, Montana, North Carolina, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, South Carolina, South Dakota, Texas, Utah, and Wisconsin.

[4] Includes Alaska, Alabama, Arkansas, Arizona, Colorado, Idaho, Kentucky, Louisiana, Missouri, Mississippi, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, South Carolina, South Dakota, and Texas.

Table E-4: Total national estimated CWA section 404 related annual cost savings, by potential state response scenario and state (millions 2018$)

State	Scenario 0[1]		Scenarios 1 & 2[2]		Scenario 3[3]	
	Low	High	Low	High	Low	High
AK	$0.89	$1.61	$0.89	$1.61	$0.89	$1.61
AL	$9.03	$22.19	$9.03	$22.19	$9.03	$22.19
AR	$5.89	$11.11	$5.89	$11.11	$5.89	$11.11
AZ	$2.58	$3.82	$2.58	$3.82	$2.58	$3.82
CA	$20.32	$38.55	$0.00	$0.00	$0.00	$0.00
CO	$0.61	$0.76	$0.61	$0.76	$0.61	$0.76
CT	$1.11	$1.51	$0.00	$0.00	$0.00	$0.00
DE	$0.09	$0.61	$0.09	$0.61	$0.00	$0.00
FL	$25.13	$48.61	$0.00	$0.00	$0.00	$0.00
GA	$8.25	$12.10	$8.25	$12.10	$0.00	$0.00
IA	$0.31	$0.86	$0.31	$0.86	$0.00	$0.00
ID	$0.10	$0.18	$0.10	$0.18	$0.10	$0.18
IL	$3.44	$7.81	$0.00	$0.00	$0.00	$0.00
IN	$16.84	$35.35	$0.00	$0.00	$0.00	$0.00
KS	$8.80	$29.45	$8.80	$29.45	$0.00	$0.00
KY	$23.10	$55.58	$23.10	$55.58	$23.10	$55.58
LA	$2.50	$7.40	$2.50	$7.40	$2.50	$7.40
MA	$0.44	$0.45	$0.00	$0.00	$0.00	$0.00
MD	$0.80	$1.20	$0.00	$0.00	$0.00	$0.00
ME	$0.78	$1.09	$0.00	$0.00	$0.00	$0.00
MI	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
MN	$0.95	$3.24	$0.00	$0.00	$0.00	$0.00
MO	$2.30	$6.05	$2.30	$6.05	$2.30	$6.05
MS	$1.85	$3.39	$1.85	$3.39	$1.85	$3.39
MT	$0.18	$0.33	$0.18	$0.33	$0.00	$0.00
NC	$0.20	$0.42	$0.20	$0.42	$0.00	$0.00
ND	$0.27	$0.45	$0.27	$0.45	$0.27	$0.45
NE	$0.26	$0.49	$0.26	$0.49	$0.26	$0.49
NH	$0.03	$0.03	$0.00	$0.00	$0.00	$0.00
NJ	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
NM	$0.78	$0.81	$0.78	$0.81	$0.78	$0.81
NV	$0.71	$1.29	$0.71	$1.29	$0.71	$1.29
NY	$0.69	$0.88	$0.00	$0.00	$0.00	$0.00
OH	$4.97	$33.28	$0.00	$0.00	$0.00	$0.00
OK	$1.04	$2.10	$1.04	$2.10	$1.04	$2.10
OR	$22.68	$43.79	$0.00	$0.00	$0.00	$0.00
PA	$3.78	$6.26	$0.00	$0.00	$0.00	$0.00
RI	$0.30	$0.35	$0.00	$0.00	$0.00	$0.00
SC	$0.34	$0.55	$0.34	$0.55	$0.34	$0.55
SD	$0.56	$0.96	$0.56	$0.96	$0.56	$0.96
TN	$1.47	$2.10	$0.00	$0.00	$0.00	$0.00
TX	$56.39	$95.75	$56.39	$95.75	$56.39	$95.75
UT	$1.11	$2.08	$1.11	$2.08	$0.00	$0.00

Table E-4: Total national estimated CWA section 404 related annual cost savings, by potential state response scenario and state (millions 2018$)

State	Scenario 0[1]		Scenarios 1 & 2[2]		Scenario 3[3]	
	Low	High	Low	High	Low	High
VA	$1.72	$4.00	$0.00	$0.00	$0.00	$0.00
VT	$0.08	$0.11	$0.00	$0.00	$0.00	$0.00
WA	$0.96	$12.00	$0.00	$0.00	$0.00	$0.00
WI	$2.43	$3.40	$2.43	$3.40	$0.00	$0.00
WV	$7.28	$8.16	$0.00	$0.00	$0.00	$0.00
WY	$0.15	$0.19	$0.00	$0.00	$0.00	$0.00
Total	**$244.45**	**$512.71**	**$130.56**	**$263.74**	**$109.17**	**$214.49**

[1] Includes all states except Hawaii.

[2] Scenario 1 and 2 are identical for the CWA section 404 program analysis. These scenarios include Alaska, Alabama, Arkansas, Arizona, Colorado, Delaware, Georgia, Iowa, Idaho, Kansas, Kentucky, Louisiana, Missouri, Mississippi, Montana, North Carolina, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, South Carolina, South Dakota, Texas, Utah, and Wisconsin.

[3] Includes Alaska, Alabama, Arkansas, Arizona, Colorado, Idaho, Kentucky, Louisiana, Missouri, Mississippi, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, South Carolina, South Dakota, and Texas.

Table E-5: Total annual national forgone benefit estimate of reduced CWA section 404 related mitigation requirements, Scenario 0

State	Households (HH)	Annual forgone mitigation acres[1]	Mean WTP /HH/acre (2018$)	Mean estimate of forgone benefits (Thous 2018$)	Lower 5th WTP/HH/acre (2018$)	Lower 5th estimate of forgone benefits (Thous 2018$)	Upper 95th WTP WTP/HH/acre (2018$)	Upper 95th estimate of forgone benefits (Thous 2018$)
AK	250,235	13.74	$0.02	$83.25	<$0.01	$3.35	$0.10	$334.22
AL	1,851,061	48.90	$0.04	$3,297.29	<$0.01	$69.37	$0.16	$14,697.27
AR	1,141,480	37.15	$0.04	$1,554.67	<$0.01	$31.78	$0.16	$6,948.09
AZ	2,448,919	16.79	$0.04	$1,506.12	<$0.01	$52.75	$0.15	$6,159.94
CA	12,807,387	62.21	$0.02	$16,152.06	<$0.01	$632.50	$0.08	$65,275.39
CO	2,051,616	1.82	$0.02	$66.82	<$0.01	$2.55	$0.07	$271.61
CT	1,354,713	2.72	$0.03	$99.77	<$0.01	$2.06	$0.12	$445.12
DE	348,051	2.33	$0.03	$28.35	<$0.01	$0.70	$0.15	$124.52
FL	7,393,262	439.83	$0.03	$82,139.23	<$0.01	$2,066.51	$0.11	$360,332.41
GA	3,611,706	37.70	$0.04	$4,838.28	<$0.01	$109.32	$0.16	$21,405.13
IA	1,242,641	2.69	$0.01	$32.45	<$0.01	$1.11	$0.04	$137.73
ID	596,107	0.76	$0.02	$8.41	<$0.01	$0.31	$0.08	$34.36
IL	4,802,124	17.31	$0.01	$1,158.12	<$0.01	$36.87	$0.06	$4,933.95
IN	2,513,828	75.41	$0.01	$2,550.02	<$0.01	$76.55	$0.06	$10,954.94
KS	1,115,858	91.36	$0.01	$822.88	<$0.01	$28.68	$0.03	$3,487.57
KY	1,718,217	91.18	$0.03	$5,345.61	<$0.01	$115.78	$0.15	$23,771.71
LA	1,731,398	87.23	$0.03	$3,836.39	<$0.01	$93.32	$0.11	$16,893.51
MA	2,558,889	0.59	$0.03	$40.96	<$0.01	$0.84	$0.12	$182.93
MD	2,177,492	2.23	$0.03	$168.34	<$0.01	$4.53	$0.15	$732.66
ME	551,109	2.43	$0.03	$36.13	<$0.01	$0.62	$0.12	$163.49
MI	3,860,394	0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
MN	2,135,310	32.93	$0.01	$868.70	<$0.01	$29.72	$0.05	$3,672.49
MO	2,372,362	18.71	$0.01	$619.53	<$0.01	$18.19	$0.06	$2,668.11
MS	1,098,803	25.01	$0.04	$993.97	<$0.01	$20.03	$0.16	$4,450.28
MT	412,653	1.62	$0.02	$11.34	<$0.01	$0.41	$0.07	$46.48
NC	3,815,392	4.83	$0.04	$677.75	<$0.01	$14.70	$0.16	$3,010.28
ND	305,163	3.06	$0.01	$5.19	<$0.01	$0.18	$0.02	$21.92
NE	741,581	1.82	$0.01	$8.84	<$0.01	$0.31	$0.03	$37.48
NH	521,373	0.09	$0.03	$1.16	<$0.01	$0.02	$0.12	$5.23
NJ	3,195,014	0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
NM	762,551	1.36	$0.02	$23.77	<$0.01	$0.88	$0.09	$97.17
NV	1,030,701	3.35	$0.02	$65.69	<$0.01	$2.48	$0.08	$267.42

Table E-5: Total annual national forgone benefit estimate of reduced CWA section 404 related mitigation requirements, Scenario 0

State	Households (HH)	Annual forgone mitigation acres[1]	Mean WTP /HH/acre (2018$)	Mean estimate of forgone benefits (Thous 2018$)	Lower 5th WTP/HH/acre (2018$)	Lower 5th estimate of forgone benefits (Thous 2018$)	Upper 95th WTP WTP/HH/acre (2018$)	Upper 95th estimate of forgone benefits (Thous 2018$)
NY	7,266,187	3.88	$0.03	$724.54	<$0.01	$12.98	$0.12	$3,270.57
OH	4,601,449	38.15	$0.01	$2,424.00	<$0.01	$72.22	$0.06	$10,419.39
OK	1,461,500	4.23	$0.03	$183.87	<$0.01	$4.35	$0.13	$811.28
OR	1,545,745	10.54	$0.02	$296.84	<$0.01	$11.11	$0.07	$1,210.14
PA	4,961,929	10.63	$0.03	$1,357.20	<$0.01	$23.04	$0.12	$6,152.95
RI	410,240	0.53	$0.03	$6.03	<$0.01	$0.12	$0.12	$27.07
SC	1,839,041	2.77	$0.04	$179.31	<$0.01	$3.92	$0.16	$796.42
SD	333,536	3.64	$0.01	$6.82	<$0.01	$0.23	$0.02	$29.07
TN	2,522,204	8.29	$0.04	$734.00	<$0.01	$16.00	$0.16	$3,261.60
TX	9,289,554	211.45	$0.02	$37,366.14	<$0.01	$1,053.77	$0.08	$161,933.55
UT	918,367	4.60	$0.02	$71.49	<$0.01	$2.69	$0.07	$291.19
VA	3,090,178	10.16	$0.03	$1,044.69	<$0.01	$27.12	$0.15	$4,565.87
VT	257,107	0.55	$0.02	$3.55	<$0.01	$0.06	$0.11	$16.11
WA	2,696,606	10.47	$0.03	$705.86	<$0.01	$27.77	$0.10	$2,845.34
WI	2,310,246	27.07	$0.01	$857.87	<$0.01	$26.51	$0.06	$3,672.04
WV	739,397	10.98	$0.02	$192.19	<$0.01	$4.61	$0.10	$847.61
WY	226,985	0.51	$0.02	$2.17	<$0.01	$0.08	$0.08	$8.80
Total[2]	**116,987,661**	**1,485.62**		**$173,197.66**		**$28,619.20**		**$554,941.68**

[1] Annual average forgone mitigation acres (*see* Table E-1) based on permits issued in years 2011-2015 with mitigation requirements on waterways determined to be RPWWN-type wetlands or interpreted to be ephemeral streams. Excludes permits issued for mitigation or restoration activities because the main purpose of these activities is to restore or enhance ecosystem services provided by water resources as opposed to dredge and fill activities that lead to permanent or temporary losses of ecosystem services. Linear feet are converted to acres by multiplying total linear feet by an average total buffer width of 50 feet (25 feet on each side of the stream) and converting square feet to acres.

[2] Totals for the 5th and 95th percentiles are generated at the national level and are not equal to the sum of the state-level estimates.

Table E-6: Total annual national forgone benefit estimate of reduced CWA section 404 related mitigation requirements, Scenario 1 & 2[1]

State	Households (HH)	Annual forgone mitigation acres[2]	Mean WTP /HH/acre (2018$)	Mean estimate of forgone benefits (Thous 2018$)	Lower 5th WTP/HH/acre (2018$)	Lower 5th estimate of forgone benefits (Thous 2018$)	Upper 95th WTP WTP/HH/acre (2018$)	Upper 95th estimate of forgone benefits (Thous 2018$)
AK	250,235	13.74	$0.02	$83.25	$0.00	$3.35	$0.10	$334.22
AL	1,851,061	48.90	$0.04	$3,297.29	$0.00	$69.37	$0.16	$14,697.27
AR	1,141,480	37.15	$0.04	$1,554.67	$0.00	$31.78	$0.16	$6,948.09
AZ	2,448,919	16.79	$0.04	$1,506.12	$0.00	$52.75	$0.15	$6,159.94
CO	2,051,616	1.82	$0.02	$66.82	$0.00	$2.55	$0.07	$271.61
DE	348,051	2.33	$0.03	$28.35	$0.00	$0.70	$0.15	$124.52
GA	3,611,706	37.70	$0.04	$4,838.28	$0.00	$109.32	$0.16	$21,405.13
IA	1,242,641	2.69	$0.01	$32.45	$0.00	$1.11	$0.04	$137.73
ID	596,107	0.76	$0.02	$8.41	$0.00	$0.31	$0.08	$34.36
KS	1,115,858	91.36	$0.01	$822.88	$0.00	$28.68	$0.03	$3,487.57
KY	1,718,217	91.18	$0.03	$5,345.61	$0.00	$115.78	$0.15	$23,771.71
LA	1,731,398	87.23	$0.03	$3,836.39	$0.00	$93.32	$0.11	$16,893.51
MO	2,372,362	18.71	$0.01	$619.53	$0.00	$18.19	$0.06	$2,668.11
MS	1,098,803	25.01	$0.04	$993.97	$0.00	$20.03	$0.16	$4,450.28
MT	412,653	1.62	$0.02	$11.34	$0.00	$0.41	$0.07	$46.48
NC	3,815,392	4.83	$0.04	$677.75	$0.00	$14.70	$0.16	$3,010.28
ND	305,163	3.06	$0.01	$5.19	$0.00	$0.18	$0.02	$21.92
NE	741,581	1.82	$0.01	$8.84	$0.00	$0.31	$0.03	$37.48
NM	762,551	1.36	$0.02	$23.77	$0.00	$0.88	$0.09	$97.17
NV	1,030,701	3.35	$0.02	$65.69	$0.00	$2.48	$0.08	$267.42
OK	1,461,500	4.23	$0.03	$183.87	$0.00	$4.35	$0.13	$811.28
SC	1,839,041	2.77	$0.04	$179.31	$0.00	$3.92	$0.16	$796.42
SD	333,536	3.64	$0.01	$6.82	$0.00	$0.23	$0.02	$29.07
TX	9,289,554	211.45	$0.02	$37,366.14	$0.00	$1,053.77	$0.08	$161,933.55
UT	918,367	4.60	$0.02	$71.49	$0.00	$2.69	$0.07	$291.19
WI	2,310,246	27.07	$0.01	$857.87	$0.00	$26.51	$0.06	$3,672.04
Total[3]	**44,798,739**	**745.18**		**$62,492.10**		**$8,224.41**		**$206,695.30**

Table E-6: Total annual national forgone benefit estimate of reduced CWA section 404 related mitigation requirements, Scenario 1 & 2[1]

State	Households (HH)	Annual forgone mitigation acres[2]	Mean WTP /HH/acre (2018$)	Mean estimate of forgone benefits (Thous 2018$)	Lower 5th WTP/HH/acre (2018$)	Lower 5th estimate of forgone benefits (Thous 2018$)	Upper 95th WTP WTP/HH/acre (2018$)	Upper 95th estimate of forgone benefits (Thous 2018$)

[1] Scenarios 1 and 2 are identical for dredged and fill practices (Section 404 program).

[2] Annual average forgone mitigation acres (*see* Table E-1) based on permits issued in years 2011-2015 with mitigation requirements on waterways determined to be RPWWN-type wetlands or interpreted to be ephemeral streams. Excludes permits issued for mitigation or restoration activities because the main purpose of these activities is to restore or enhance ecosystem services provided by water resources as opposed to dredge and fill activities that lead to permanent or temporary losses of ecosystem services. Linear feet are converted to acres by multiplying total linear feet by an average total buffer width of 50 feet (25 feet on each side of the stream) and converting square feet to acres.

[3] Totals for the 5th and 95th percentiles are generated at the national level and are not equal to the sum of the state-level estimates.

Table E-7: Total annual national forgone benefit estimate of reduced CWA section 404 related mitigation requirements, Scenario 3

State	Households (HH)	Annual Forgone Mitigation Acres[1]	Mean WTP /HH/acre (2018$)	Mean Estimate of Forgone Benefits (Thous 2018$)	Lower 5th WTP/HH/acre (2018$)	Lower 5th Estimate of Forgone Benefits (Thous 2018$)	Upper 95th WTP WTP/HH/acre (2018$)	Upper 95th Estimate of Forgone Benefits (Thous 2018$)
AK	250,235	13.74	$0.02	$83.25	$0.00	$3.35	$0.10	$334.22
AL	1,851,061	48.90	$0.04	$3,297.29	$0.00	$69.37	$0.16	$14,697.27
AR	1,141,480	37.15	$0.04	$1,554.67	$0.00	$31.78	$0.16	$6,948.09
AZ	2,448,919	16.79	$0.04	$1,506.12	$0.00	$52.75	$0.15	$6,159.94
CO	2,051,616	1.82	$0.02	$66.82	$0.00	$2.55	$0.07	$271.61
ID	596,107	0.76	$0.02	$8.41	$0.00	$0.31	$0.08	$34.36
KY	1,718,217	91.18	$0.03	$5,345.61	$0.00	$115.78	$0.15	$23,771.71
LA	1,731,398	87.23	$0.03	$3,836.39	$0.00	$93.32	$0.11	$16,893.51
MO	2,372,362	18.71	$0.01	$619.53	$0.00	$18.19	$0.06	$2,668.11
MS	1,098,803	25.01	$0.04	$993.97	$0.00	$20.03	$0.16	$4,450.28
ND	305,163	3.06	$0.01	$5.19	$0.00	$0.18	$0.02	$21.92
NE	741,581	1.82	$0.01	$8.84	$0.00	$0.31	$0.03	$37.48
NM	762,551	1.36	$0.02	$23.77	$0.00	$0.88	$0.09	$97.17
NV	1,030,701	3.35	$0.02	$65.69	$0.00	$2.48	$0.08	$267.42
OK	1,461,500	4.23	$0.03	$183.87	$0.00	$4.35	$0.13	$811.28
SC	1,839,041	2.77	$0.04	$179.31	$0.00	$3.92	$0.16	$796.42
SD	333,536	3.64	$0.01	$6.82	$0.00	$0.23	$0.02	$29.07
TX	9,289,554	211.45	$0.02	$37,366.14	$0.00	$1,053.77	$0.08	$161,933.55
Total[2]	**31,023,825**	**572.97**		**$55,151.69**		**$6,041.00**		**$192,314.92**

[1] Annual average forgone mitigation acres (*see* Table E-1) based on permits issued in years 2011-2015 with mitigation requirements on waterways determined to be RPWWN-type wetlands or interpreted to be ephemeral streams. Excludes permits issued for mitigation or restoration activities because the main purpose of these activities is to restore or enhance ecosystem services provided by water resources as opposed to dredge and fill activities that lead to permanent or temporary losses of ecosystem services. Linear feet are converted to acres by multiplying total linear feet by an average total buffer width of 50 feet (25 feet on each side of the stream) and converting square feet to acres.

[2] Totals for the 5th and 95th percentiles are generated at the national level and are not equal to the sum of the state-level estimates.

Appendix F: Sensitivity Analysis of National Forgone Benefits from Reduced Mitigation Requirements

To address public comments on the EA supporting the proposed rule, the agencies analyzed sensitivity of the estimated national forgone benefits from reduced mitigation requirements to the extent of market and use of median versus mean income in the function transfer analysis. Results of these analyses are summarized below.

Sensitivity analysis with respect to the extent of market. In the primary analysis, the agencies estimate changes in benefits at the state level, assuming WTP for out of state changes is zero, and aggregate WTP across states ex post. However, several studies have found that WTP for wetland benefits crosses state boundaries (Pate and Loomis, 1997; Eastern Research Group, 2016). To account for WTP values of nearby households outside of the state boundary, the agencies performed a sensitivity analysis that adds households residing in counties adjacent to the state boundary to the number of affected households for each state. For example, the number of affected households for Rhode Island includes the number of Rhode Island households as well as the number of households in the six counties adjacent to the state boundary (Bristol County, MA; Norfolk County, MA; Worcester County, MA; New London County, CT; Windham County, CT; Suffolk County, NY). This analysis uses a number of simplifying assumptions:

- Households in the adjacent counties have the same WTP as state residents where wetland losses occur. This assumption follows the methodology used by Blomquist and Whitehead (1998) and is consistent with the approach used in estimating forgone benefits from wetland mitigation requirements for the case study locations (*see* Section 0 for detail). However, this assumption may overstate the estimated per household WTP for residents of the adjacent counties because WTP for resource preservation may decline as the distance between affected wetlands and affected population increases (Pate and Loomis, 1997; Eastern Research Group, 2016).
- Household in the adjacent counties value wetlands in their home state and the neighboring state independently and the total WTP for preventing wetland losses is the sum of the estimated WTP values for each state. For cost-benefit analysis, multiple effects of environmental policy on the affected resources should be valued in a single scenario by a holistic willingness-to-pay (WTP) measure. Evidence can be found that the sum of WTP for separately estimated environmental effects is likely to overestimate a single holistic WTP estimate, *i.e.* the holistic WTP is sub-additive (Hanneman, 1994). Table F-1 summarizes sensitivity analysis results of forgone benefit estimates from reduced CWA section 404 related mitigation requirements under each of the state response scenarios. The mean estimate of forgone benefits under Scenario 0 is $199.8 million based on the market extent assumptions used in the sensitivity analysis, while the Scenario 0 estimate for the main analysis is $173.2 million.

Table F-1: Sensitivity analysis estimate of annual forgone benefits from reduced mitigation requirements resulting from the definitional change with respect to the extent of market, by potential state response scenario

Scenario	Households	Annual Forgone Mitigation Acres	Mean WTP per household per acre (2018$)	Mean Estimate of Forgone Benefits (millions 2018$)	Lower 5th WTP per household per acre (2018$)	Lower 5th Estimate of Forgone Benefits (millions 2018$)	Upper 95th WTP per household per acre (2018$)	Upper 95th Estimate of Forgone Benefits (millions 2018$)
Scenario 0[1,2]	172,525,076	1,485.62	$0.02	$199.83	<$0.01	$36.02	$0.10	$611.67
Scenarios 1 & 2[1,3]	63,552,167	745.18	$0.02	$76.98	<$0.01	$11.03	$0.10	$248.13
Scenario 3[1,4]	43,567,194	572.97	$0.02	$67.06	<$0.01	$8.20	$0.10	$225.30

[1] Annual average mitigation reduction based on permits issued in years 2011-2015 with mitigation requirements on waterways determined to be RPWWN-type wetlands or interpreted to be ephemeral streams. Excludes permits issued for mitigation or restoration activities because the main purpose of these activities is to restore or enhance ecosystem services provided by water resources as opposed to dredge and fill activities that lead to permanent or temporary losses of ecosystem services.

[2] Includes all states except Hawaii.

[3] Includes Alaska, Alabama, Arkansas, Arizona, Colorado, Delaware, Georgia, Iowa, Idaho, Kansas, Kentucky, Louisiana, Missouri, Mississippi, Montana, North Carolina, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, South Carolina, South Dakota, Texas, Utah, and Wisconsin.

[4] Includes Alaska, Alabama, Arkansas, Arizona, Colorado, Idaho, Kentucky, Louisiana, Missouri, Mississippi, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, South Carolina, South Dakota, and Texas.

Sensitivity analysis with respect to income measures. In the primary analysis, the agencies relied on the median household income in estimating WTP for avoiding wetland losses (*see* Appendix D for detail on variable settings in function transfer). To assess whether the use of median income biases the estimated national benefits downward, the agencies conducted a sensitivity analysis using mean income in function transfer. As shown in Table F-2 , use of mean income instead of median income produces similar results (*i.e.*, $175.1 million versus $173.2 million).[154]

Table F-2: Sensitivity analysis estimate of annual forgone benefits from reduced mitigation requirements resulting from the definitional change with respect to income measures, Scenario 0.

Income Metric	Mean	Lower 5th	Upper 95th	Average Income
Mean Income	$175.07	$32.29	$541.70	$77,734.06
Median Income	$173.20	$28.62	$554.94	$57,396.05

[154] These estimates are based on the definition of the extent of market used in the main analysis (*i.e.*, only state households are assumed to be affected by changes in wetland areas in a given state.