

Clean Water Act Implementation: Revisiting State Resource Needs

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Executive Summary

For the Association of Clean Water Administrators (ACWA), a team of George Washington University researchers examined Actual and Ideal resources states have and need for Clean Water Act (CWA) program administration, drawing on the following:

- Original online survey of ACWA members
 - Regression analysis of state characteristics to identify potential drivers of funding
1. What are the primary sources of funding for state implementation of CWA obligations?
 - Federal funding
 - State funding through taxes, general funds, and NPDES permit fees
 - Enforcement funding penalties were not a predominant source at the state level
 2. How much state and federal money is provided in total for state implementation of CWA obligations?
 - \$5.6 million median gap between federal funding and state spending on CWA programs
 - \$4.2 million median gap between Actual and Ideal state spending on CWA programs to meet state water quality goals
 - Cautiously generalized total national gap of \$490 million and 1,150 full-time employees between Actual and Ideal state resources
 3. What are the variables and/or criteria that drive any identified trends in resources and funding?
 - 2016 Presidential Election: Voting Democrat was associated with an increased a gap of almost \$40 million
 - Section 404 Authority: Authority was associated with a decreased gap of \$33 million

A funding gap persists between state CWA needs and resources; the gap was larger when accounting for Ideal programs. The totality of the research suggested the need for further research for a more detailed picture of the CWA resource landscape.

Clean Water Act Implementation: Revisiting State Resource Needs

Since 1972, U.S. states have assumed increasingly complex compliance and enforcement responsibilities under the Clean Water Act (CWA). In 2002, the U.S. Environmental Protection Agency (EPA) convened a State Water Quality Management Resource Analysis Task Force (“Task Force”) that found an estimated annual gap ranging from \$735 million to \$960 million between state expenditures and state resource needs for managing water programs under the CWA (National Academy of Public Administration [NAPA], 2002). In the 17 years since, CWA regulations and the universe of regulated entities have changed. Consequently, the Task Force’s 2002 *State Water Quality Resource Management Analysis* likely does not represent the current status of state expenditures and needs; the 2002 report has not been replicated. Additionally, states use different financial reporting systems for their CWA programs, and some information about state CWA needs and expenditures is not available at all. To determine the present nature of the state CWA funding landscape, researchers at the George Washington University (GW) conducted a study on behalf the Association of Clean Water Administrators (ACWA).

Scope of the Study

About the Association of Clean Water Administrators

The Association of Clean Water Administrators, a 501(c)(3) organization founded in 1961, provides tools, resources, and collaborative spaces for state, interstate, and territorial officials engaged in clean water protection in their respective jurisdictions (ACWA, 2019b). ACWA’s membership roster comprises at least one state agency—including state departments of health and state departments of environmental quality—from each of the fifty states and the District of Columbia (ACWA, 2019c).

With its focus on CWA implementation at the state level, ACWA (2019a) has a strong interest in understanding the resources states need to comply with the CWA and to what extent state and federal resources meet those needs. This study provides ACWA with information to better understand the needs of its member agencies, assist members in advocating for increased support when and where it is needed, and find ways to maximize water quality outcomes under fiscal constraints. More broadly, quantifying the gap between resource needs and a state’s ability

to implement CWA mandates may assist policymakers to ensure that compliance is feasible under amended or expanded provisions of the Act.

Research Questions

This study addressed three research questions related to states' administration of CWA programs:

1. What are the primary sources of funding for state implementation of CWA obligations?
2. How much state and federal money is provided in total for state implementation of CWA obligations?
3. What are the variables and/or criteria that drive any identified trends in resources and funding?

The scope of this study entailed state needs and expenditures associated with administering CWA programs and explicitly excluded physical infrastructure spending. Section 516(b)(1)(B) of the CWA mandates that the EPA periodically survey states to gather a “detailed estimate...of the cost of construction of all needed publicly owned treatment works in each of the States.” The results of this *Clean Watershed Needs Survey* are reported to Congress every four years, though the statute technically calls for a survey every two years (Congressional Research Service, 2010). Because this information is already publicly available, asking states to provide it would have been duplicative. However, no similar mandates exist to collect data on the costs to states to administer other components of the Act.

With the assistance of ACWA and informed by the EPA's 2002 analysis, we designed a targeted survey for ACWA's members. The survey aimed to shed light on the overall landscape of state CWA expenditures in the present day by answering three key research questions. Our findings provide a broad, self-reported starting point for understanding persisting funding gaps at a time when the EPA's enacted budget has stagnated (EPA, 2018a).

Literature Review

A Brief Introduction to the Clean Water Act

In 1948, Congress passed the Federal Water Pollution Control Act to address water quality in the United States (EPA, 2018b). When Congress expanded the Federal Water Pollution

Control Act in 1972 to enact what is now called the Clean Water Act, it established the basic structure of regulating water quality and pollutant discharges into waters of the United States. As codified in 33 USC § 1251, the CWA specifically sought to “restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.” To achieve this goal, the structure of the legislation allows states to take control of certain aspects of the CWA, given approval from the Environmental Protection Agency. The CWA allows states to set water quality standards that states themselves enforce by setting designated uses of bodies of water and then using water quality criteria to monitor progress. The Act also includes an anti-degradation policy to protect existing use of water bodies.

The EPA’s State Water Quality Resource Management Analysis

Understanding the extent to which states have the resources to implement the provisions of the CWA is crucial for ensuring its efficacy. The most comprehensive attempt to date to characterize and quantify the gap between state resource needs and actual expenditures is the State Water Quality Management Resource Analysis Task Force’s 2002 *State Water Quality Resource Management Analysis*. This report was the result of a three-year collaboration between EPA, the Association of State and Interstate Water Pollution Control Administrators, and the Environmental Council of States.

The *Resource Management Analysis* comprised two components: first, a survey of state CWA expenditures, and second, a collaboratively developed Needs Model. The survey and the Needs Model both focused on the same 14 CWA programs, 4 directly related to point source pollution and the 10 addressing other provisions of the CWA (for descriptions of these programs, see *Appendix A*). These survey questions did not address infrastructure improvements, state revolving funds, Section 319 grants, or local or nongovernmental organization activities relevant to the CWA (NAPA, 2002).

The survey asked states to describe what they spent to implement CWA’s 14 programs. States were required to report these expenditures as shares of total CWA spending rather than dollar amounts (Task Force, 2002). The survey also “asked States to identify the sources of funding for their water quality management programs” (Task Force, 2002, p.3). Meanwhile, the Needs Model established a framework for consistent estimation of resource needs at the state level, accounting for different levels of state authority to enforce various components of CWA

(Task Force, 2002). Using this spreadsheet model, states described full-time employees and other resources necessary to carry out 14 different program areas. When analyzed together, the Needs Model and the state expenditure survey demonstrated that “states are spending just under half of what they need to achieve the objectives of CWA” and estimated a budget shortfall between \$735 million and \$960 million annually (Task Force, 2002, p. 7).

Subsequently, the National Academy of Public Administration reviewed the *Resource Management Analysis* report at EPA’s request and found that the Task Force’s estimate was “reasonable” but likely a lower bound (NAPA, 2002, p. 23). Moreover, NAPA noted that its own efforts to locate state CWA spending data from government databases and professional associations only yielded information that was “highly aggregated or combined in ways that were unrelated to the narrow scope of the State Expenditures Survey” (p. 25). Consequently, NAPA concluded that in addition to providing a reasonable estimate, the Task Force’s effort contributed uniquely useful information. Indeed, in conducting our own research, we found that information on this topic continues to be difficult to locate, and any available information regarding state funding gaps was often aggregated across states, CWA programs, or broad environmental programs. Our survey intended to begin closing this knowledge gap by focusing on gathering data about state and federal resources at the state level and focusing specifically on CWA programs. NAPA’s (2002) Finding 2-12 recommended that any amendments to the Needs Model “should focus on modules that cover newer programs, such as Total Maximum Daily Loads (TMDL), nonpoint sources, and some aspects of the wetlands program because that is where resource needs are most likely to grow” (p. 5). These elements of CWA expenditures were included in our survey, discussed in the Methodology.

Summary of Relevant Findings From Research Since 2002

States face mounting fiscal constraints and increasingly extensive responsibilities under the CWA (U.S. Government Accountability Office [GAO], 2009). In 2009, the Government Accountability Office reported that between 1996 and 2006, funding increases to regional and state offices with enforcement authority under the CWA “had not keep pace with inflation” (GAO, 2009, “Highlights”). EPA’s CWA-associated grants “declined by 9 percent in inflation-adjusted terms while enforcement and other environmental program responsibilities increased” (GAO, 2007, “Highlights”). GAO’s (2007) interviews with state officials revealed that meeting

new mandates with reduced financial resources poses a challenge to states; this problem is not new. After Congress amended the CWA in 1987—which expanded the Act by classifying discharged stormwater runoff from rain or snow as a point source pollutant— states, particularly Minnesota and Arkansas, struggled to comply with the statute while maintaining their existing permitting and enforcement responsibilities (GAO, 2007).

In conducting our literature review, we did not find quantitative estimates of the funding gap in the years since the Task Force’s 2002 *Resource Management Analysis*. Notwithstanding, we found substantial anecdotal evidence of concerns from states and environmental organizations regarding the shortage of funding for states to implement federally mandated CWA programs. For example, the National Conference of State Legislatures (2019) opposed a 10 September 2008 rule promulgated by EPA regarding incentives for the CWA Section 106 Grants program. The opposition asserted that the rule would burden states with the cost of a new federally mandated program and necessitate shifting funds away from the actual administration of these programs. In this same vein, a Virginia Department of Environmental Quality (2012) feasibility study regarding one of CWA’s permitting programs found that states—Montana, Minnesota, and New Jersey, among others— faced challenges due to the “lack of dedicated federal funding specifically for Section 404 program administration” (p. 2). Moreover, in a November 2010 analysis of states’ role in implementing CWA, the Association of State Wetland Managers (2010) recognized Congress’s intent for the states to play an active role in the implementation of CWA programs while failing to provide the necessary funds.

State implementation funding gaps are not unique to the CWA. Similar funding gaps have been identified in EPA’s implementation of the Safe Drinking Water Act (SDWA). In 2013, the Association of State Drinking Water Administrators (2013) published a resource analysis that compared needed and actual state-level resources for compliance with the SDWA. This analysis utilized a similar methodology to EPA’s 2002 model, surveying states and developing a model to “assess current and projected future state resource needs” through the next decade (Association of Safe Drinking Water Administrators, 2013, p. v). They found that in fiscal year 2012-2013, states were short \$240 million and 2,700 full-time employees in order to fulfill their legal obligations under SDWA. This work offered a more recent attempt to gather state-level data that informed our methodology.

While there is evidence of a funding gap for the federally mandated CWA programs, these programs are not considered unfunded mandates because states voluntarily participate. The Unfunded Mandate Reform Act of 1996 established that the Congressional Budget Office was responsible for estimating the fiscal implications of proposed rules and laws to determine whether the budgetary burden on local, state, and tribal governments and private entities would exceed established cost thresholds. Critically, the Act also established that voluntary adoption of a federal mandate—through participation in federal grant or other funding programs—causes the mandate to be ineligible for unfunded mandate status (Congressional Research Service, 2019). As a result, states implementing CWA programs with federal grant money are subject to its impositions.

With EPA's 2002 findings as a benchmark, our study facilitated a comparison of the funding landscape over the last 17 years, contributing new targeted estimates of national CWA funding. The narrower scope of our research—focused squarely on a self-reported survey—allowed us to complete our study over the course of four months compared to the Task Force's three-year multi-stakeholder process, providing unique, self-reported information about funding gaps. Based on NAPA recommendations, our survey asked states about Section 319 grants, as well as programs for TMDLs, nonpoint sources, and wetlands management.

Methodology

Our study aimed to examine how much money states spent over the last two fiscal years to implement their CWA programs and how much they ideally needed. We used an online survey to collect information on the sources of state CWA funding in order and to characterize the resource landscape and performed a regression analysis to identify potential drivers of the magnitude of any revealed funding gaps.

As discussed in the literature review, state-level physical infrastructure spending is well documented, aggregated every four years by the EPA. Additionally, information about funding allocated to the states for CWA implementation can be found in state and national budget data. Information about how states spent allocated funding and how this differed from estimated needs to meet water protection goals was unavailable; this was the focus of our research.

Population of Participants

The population for our survey comprised water program experts from each of the 50 states and the District of Columbia who belong to one of ACWA's 51 member organizations; ACWA provided one point of contact for each member organization. The limited number of member organizations dictated that we survey the entire contact list to be as comprehensive as possible. We included the District of Columbia in our population and no other non-state jurisdictions because DC is the only non-state member, and ACWA asked that we include DC in our population. The vast majority of these member organizations are state departments of environment, health, or natural resources, making the leaders of these departments ideal survey respondents for our research (for a full list of the member organizations, see *Appendix B*). In distributing the survey, we did not require the official receiving the survey to take full responsibility for responding; in fact, some officials delegated this activity to other officials with more detailed budget knowledge.

Survey

Designing the Survey Instrument

Our primary research instrument was a 17 question survey designed and delivered electronically through Qualtrics, a survey software (for the full survey, see *Appendix C*). A survey was a natural choice for our research because it allowed us to collect detailed financial information over a short period of time. Focus groups and interviews would have been time-consuming for both the respondents and our team without providing any additional benefits. Additionally, the survey format ensured that all respondents received the same questions in the same format while providing flexibility to respondents as they gathered the necessary information.

Our team carefully considered the wording of each survey question to elicit responses that reflected each state's actual needs rather than inflated estimates. We also worked closely with ACWA to ensure that the language of the questions would be intelligible and universal to respondents and to refine survey design elements aimed at maximizing response rates. In developing the questions, we carefully balanced the need to keep the survey length as short as possible while still collecting the level of detail necessary to draw conclusions. Importantly, we anticipated that state officials may have had data at different levels of detail regarding spending

on various programs and that not all states spent money on all of the categories listed in the survey. Consequently, we designed the questions regarding spending and funding numbers so that only the “total funding” field was required to continue to the next question in the survey. This design choice enabled state officials to provide information at the level available to them, facilitating survey completion.

Justification of Methodological Choices in Survey Development

We used the first few survey questions as concurrent validation that we verified against readily available online information to ensure that the respondents were familiar with basic elements of their state’s CWA programs. Respondents were asked to verify that their agency was the primary state agency managing CWA programs, indicate whether another state agency managed any aspect of CWA programs, and indicate whether the state was authorized to administer the NPDES permit program.

The *Handbook for Practical Program Evaluation* (Newcomer, Hatry, & Wholey, 2015) recommends that researchers place demographic questions at the end of online surveys (p. 483). However, our team decided to collect each respondent’s first name, last name, and job title at the beginning of the survey in order to be able to conduct follow-up interviews with respondents, as well as inquire about incomplete or unclear responses. Collecting this information upfront was critical because ACWA informed us that initial survey recipients may delegate to a financial representative or other member of the agency with the requisite knowledge. These three questions did not concern potentially sensitive information such as race, ethnicity, age, religion, or sex, but rather asked information that is typically publicly available on state websites. We do not believe these questions deterred respondents from completing the survey, and any risk was outweighed by the benefit of being able to follow up with respondents.

Some portions of the survey allowed respondents to enter qualitative information such as additional programs that received federal or state funding and additional information explaining their responses. These open-ended responses prompted us to look more closely at certain states’ data. The research team also conducted informal interviews with some ACWA members while making reminder phone calls to request rationales for non-response. The team found that several states declined to participate due to the complexity of how CWA programs are administered and funded and the complexity of how resources are divided and accounted for by each state.

The aim of the survey was to understand each state's capacity to implement CWA programs. To operationalize this, we asked about Actual state expenditures and the Ideal resources that states needed to meet the requirements of the CWA. We requested information from fiscal year 2017-2018 (FY17-18) and fiscal year 2018-2019 (FY18-19) in order to observe major differences between two years and develop a general sense for whether spending and resources needs are consistent year to year. The potential insight provided by this additional information outweighed the cost of adding length to the survey.

Maximizing Response Rates

Our research team implemented a number of strategies to achieve the highest response rate possible. Along with an electronic link to the survey, respondents received an email (see *Appendix D*) including an explanation of the project and an attachment that provided an overview of each survey question. This overview was important because respondents could only view a few questions at a time in the electronic survey. The overview allowed respondents to gather all of the necessary information before beginning the electronic survey and to develop an idea of the duration of the survey before getting started. We expected this to improve response rates and limit the number of incomplete or partial responses. We also added a "percentage completed" bar to the top of the survey so that respondents could track their progress.

To build credibility with respondents and allow officials to plan ahead, ACWA sent an initial introductory email to their members announcing the survey and introducing the research team. We also reached out by phone to states that had not yet responded as the deadline approached. ACWA also reminded members to complete the survey at their annual meeting, which took place March 18-20. Ultimately, we received 22 responses, a response rate of 43 percent; though, some of these responses did not contain information about Ideal spending.

Regression on State Characteristics

In addition to surveying ACWA members, we collected data about state characteristics for two purposes. First, we identified datasets pertinent to variables that might be associated with CWA spending to include in our regression. These data include:

- Percent area water, drawn from the U.S. Census Bureau's (2012) Master Address File/Topologically Integrated Geographic Encoding and Referencing database;^[1]_{SEP}
- State population data from the Census Bureau (2017);^[1]_{SEP}

- Total state budget;^{[[L]]}_{[[SEP]]}
- 2016 presidential election state voting results (The New York Time, 2017);^{[[L]]}_{[[SEP]]}
- Political party affiliation for each governor (or equivalent; DC Board of Elections, 2018; National Governors Association, 2019); and^{[[L]]}_{[[SEP]]}
- Median household income from the Census Bureau (2018).^{[[L]]}_{[[SEP]]}

These datasets were selected for analysis due to their potential correlation with the amount of funding available for CWA administration from both federal and state sources. Moreover, factors such as water per state and the political leanings of the state had the potential to impact the goals of state CWA administration. These factors could directly affect responses to our questions regarding Ideal funding.

Secondly, we identified a list of states and programs they are authorized to implement (e.g., NPDES permitting and Section 404 federal permitting) for the purpose of validating survey responses (EPA, 2019).

Analysis of Results

This section discusses our survey results and simple regression analysis to answer our primary research questions concerning the nature of the gap between federal funding and CWA administration spending. We also considered how respondents compared to the nation as a whole across several relevant variables to contextualize our findings and determine the representativeness of our participants, and therefore, the generalizability of our results. In order to preserve the confidentiality of participating states, we discuss these findings in the aggregate.

Survey Results

Response Rates

The population for this survey was 51, which included all 50 US states and the District of Columbia. Of the 51, 22 responded for a response rate of 43 percent (see *Table 1*). This section focuses on descriptive statistics, including both the mean and the median. The mean was included for budgetary estimates because it can be multiplied by the quantity of states to give a more accurate picture of total need—an important consideration given our research questions and an extrapolation that should be made cautiously. The median was included, along with the range, to provide an indication of the distribution of the data that may be obscured by the mean.

Table 1: Response Rate

	Count	Rate
Responded	22	43%
Non-Response	29	57%
Total	51	100%

As summarized in *Table 2*, all of the respondents indicated that their agency manages CWA programs, demonstrating that they had adequate knowledge and resources to complete the survey. Five of the 22 respondents indicated that another agency was involved in managing CWA programs, confirming the complex nature of state CWA management. Three states indicated the presence of another agency involved in NPDES management. Finally, all but two states indicated non-involvement in Section 404.

Table 2: Response to Yes/No Survey Questions

Question	Yes		No	
	Count	Rate	Count	Rate
Is your agency the primary state agency that manages the core CWA programs?	22	100.0%	0	0.0%
Does another state agency manage some aspect of the core CWA Programs?	5	22.7	17	77.3
Is your state authorized to administer the NPDES Permit Program?	21	95.5	1	4.5
Is any part of the NPDES program managed by another state agency?	3	13.6	18	81.8
Has your state been authorized to assume administration of Section 404 Federal permit program?	1	4.5	20	90.9

Note: For the questions “Is any part of the NPDES program managed by another state agency?” and “Has your state been authorized to assume administration of Section 404 Federal permit program?” there was one response for each that indicated Other. This response option has been omitted from this table.

What are the primary sources of funding for state implementation of CWA obligations?

Federal Funding Sources

First, we present survey insights regarding sources of federal funding for state CWA programs. The Section 106 Grant Fund appeared to be the most widely used source of federal funding, with all respondents reporting receipt of Section 106 Grants in both FY17-18 and FY18-19. The second most widely used source specifically indicated in the survey was the 319

Nonpoint Source Grant Funds; 19 of the 22 respondents reported receiving funding from this source.

In terms of dollar amounts, Other was the largest source of federal funding with a mean representing 77 percent of the total in FY17-18 and 82 percent of the total in FY18-19. The mean amount for Other sources was approximately \$10 million for both fiscal years, about \$8 million more than the Section 106 and 319 Grant Funds. The nearly \$9 million difference between the mean and the median for Other sources for both fiscal years indicated a relative outlier receiving funds in this category not found in either the Section 106 or 319 Nonpoint Source Grant Funds. The size of the Other category may have been due to its relatively broad definition.

Table 3: Federal Funding Sources

Funding Source	FY 2017-2018				
	Mean	Standard Deviation	Minimum	Maximum	Count
Section 106 Grant Funds	\$2,551,883	\$1,264,184	\$126,441	\$5,900,000	21
319 Nonpoint Source Grant Funds	2,368,000	1,021,986	767,000	4,600,000	19
Other Sources	9,430,232	24,400,000	100,000	97,800,000	17
Total Federal Funding	12,300,000	23,700,000	2,100,000	108,000,000	21

Funding Source	FY 2018-2019				
	Mean	Standard Deviation	Minimum	Maximum	Count
Section 106 Grant Funds	\$2,589,163	\$1,187,991	\$446,416	\$5,841,000	21
319 Nonpoint Source Grant Funds	2,387,385	1,044,514	654,000	4,554,000	19
Other Sources	10,300,000	25,600,000	100,000	96,800,000	16
Total Federal Funding	12,600,000	24,200,000	552,141	107,000,000	21

Most but not all states received funds via Other sources; 5 of the 22 states in FY17-18 and 6 states in FY18-19 did not receive federal funds from Other sources. As demonstrated by the minimum value in *Table 3*, one of our respondents did not report any federal funding for either fiscal year. Here, a comparison of the mean to the median suggests a relative outlier. The median decreased from FY17-18 to FY18-19 by about \$1 million, while the maximum amount of funding decreased by \$1 million and the minimum by about \$0.5 million. This general decrease in funding was consistent with anecdotal evidence some states provided in the open-

ended questions of the survey. Several states reported that the change in the federal administration in 2017 resulted in a reduction of federal funding for state CWA programs.

State Funding Sources

When evaluating state funding sources, summarized in *Table 4*, our findings showed that states increased mean total funding allocated to CWA programs between the two surveyed years. The median value also supported this with an increase of almost \$1 million in state funding from FY17-18 to FY18-19. The sources of state funding used by most states were state general funds and NPDES permit fees, though similarly to the federal funding sources, the largest mean dollar amount comprised Other sources. The median of Other sources indicated a relative outlier, since the difference between the mean and median was approximately \$8 million for both fiscal years. State general funds also appeared to have a relative outlier, though less extreme than Other sources, with the difference between the mean and median at approximately \$2 million for both fiscal years.

Table 4: State Funding Sources

	FY 2017-2018				
Funding Source	Mean	Standard Deviation	Minimum	Maximum	Count
State General Funds	\$6,277,137	\$5,170,253	\$302,500	\$17,000,000	15
NPDES Permit Fees	3,573,673	2,710,204	683,250	10,700,000	15
Enforcement Penalties	705,606	491,627	8,902	1,072,255	4
Special State Tax	8,673,218	-	8,673,218	8,673,218	1
Other Sources	9,847,057	25,700,000	657,949	94,800,000	13
Total State Funding	13,800,000	22,100,000	946,000	104,000,000	21

	FY 2018-2019				
Funding Source	Mean	Standard Deviation	Minimum	Maximum	Count
State General Funds	\$5,837,346	\$5,558,603	\$322,500	\$17,000,000	16
NPDES Permit Fees	3,377,376	2,116,056	862,783	7,918,425	16
Enforcement Penalties	513,613	441,726	13,115	1,081,500	5
Special State Tax	6,131,295	-	6,131,295	6,131,295	1
Other Sources	10,400,000	26,600,000	548,484	102,000,000	14
Total State Funding	14,500,000	24,300,000	870,984	111,000,000	20

As it turned out, states did not compensate for federal funding gaps by allocating additional state resources to CWA implementation. The research team found that some states had limited options for covering funding gaps. Some respondents noted that their states' laws mandated that fees and penalties collected as part of programs administration and enforcement go to the general fund instead of directly to funding CWA programs administration. These laws were enacted in several states to ensure that fees and penalties were not increased solely for the purpose of raising funds.

How much state and federal money is provided in total for state implementation of CWA obligations?

Actual and Ideal Program Spending

In addition to determining the sources of state and federal funding for state CWA programs, the survey gathered information about Actual and Ideal CWA program spending. *Figure 1* shows the three programs with the most Actual spending: traditional NPDES, assessment/TMDLs/nonpoint source, and monitoring programs. Of the 18 respondents who provided program-level data, 13 reported spending on these three programs. Least common was the Section 404 wetlands program, with no responding states reporting spending on this program in FY17-18 and only one reporting spending on this program in FY18-19. The number and amount of spending on Other programs may be misleading as some states may not have categorized spending in the same way as our survey, which may have resulted in inflated numbers. Traditional NPDES had the second highest use of funds with a median representing 22 percent of the total (*Figure 2*).

Figure 1

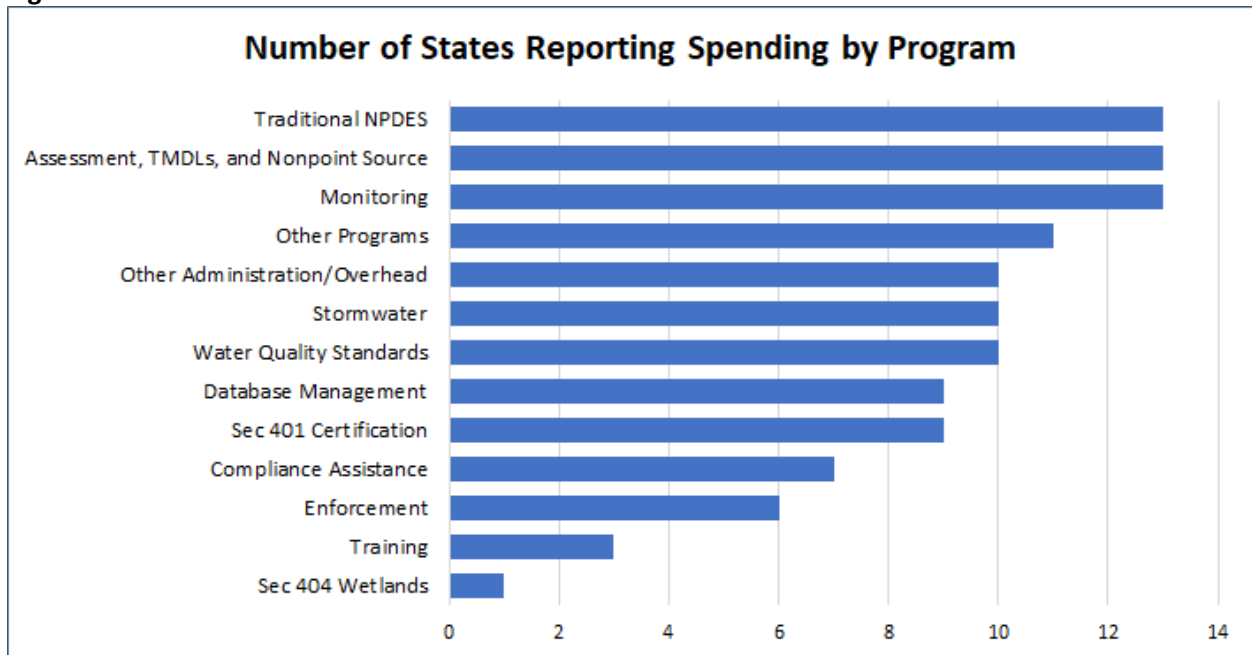
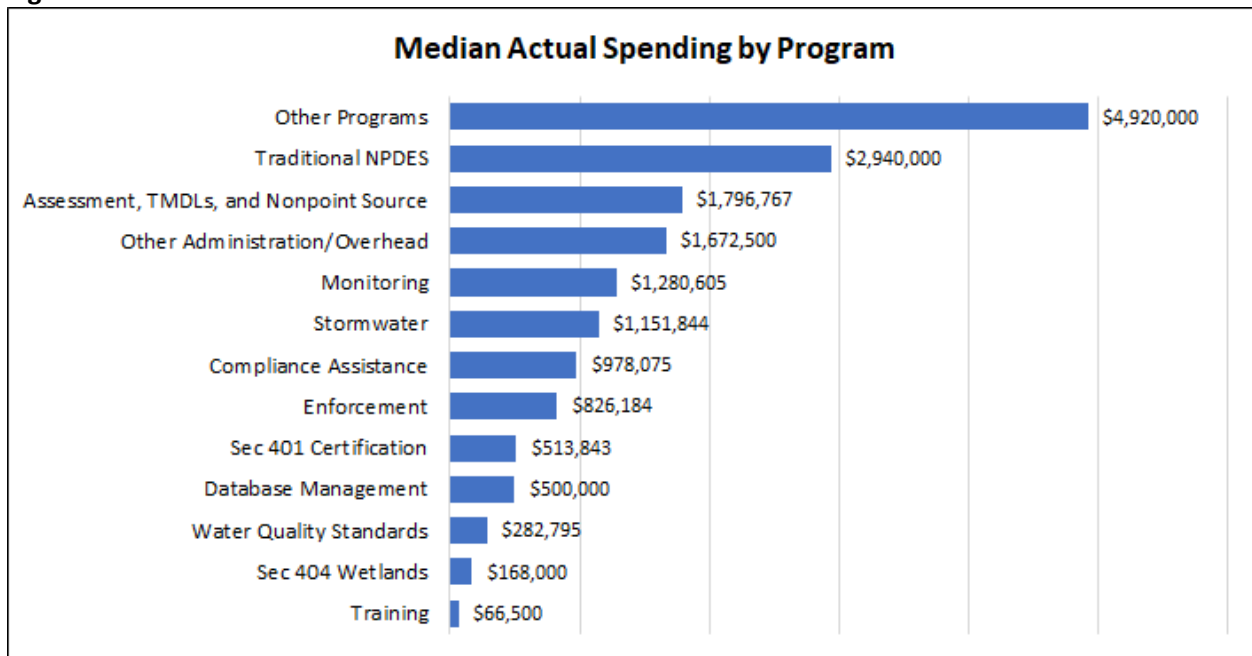


Figure 2



Note: Spending on Other Programs is omitted from this graph as an extreme outlier.

In contrast, the Ideal spending reported by 15 states illustrated a different trend. We asked respondents to estimate what level of funding would be sufficient for programs to meet all obligations under the Clean Water Act and all related water quality priorities of the state. While only one state reported actual funding for Section 404 wetlands programs in FY18-19, four other

states responded that they would ideally spend on this program (see *Figure 3* and *Table 5*). As expected, a majority of states responded that they would need an increase in funding. The mean value was misleading as it was about the same as the Actual funding; however, the median indicated a perceived need of at least \$1 million in additional program funding to meet our definition of Ideal CWA administration—defined in the survey as “funding sufficient for model programs to meet all obligations under the Clean Water Act and all related water quality priorities of the state.” *Figure 4* visualizes the differences between states’ reported Actual spending and their Ideal spending.

Table 5: Ideal Program Spending

CWA Program	FY 2017-2018				
	Mean	Standard Deviation	Minimum	Maximum	Count
Monitoring	\$3,426,650	\$3,054,678	\$267,916	\$10,100,000	12
Water Quality Standards	947,310	812,460	200,000	2,600,000	8
Assessment, TMDLs, and Nonpoint Source	4,368,746	3,162,171	400,000	10,000,000	12
Traditional NPDES	4,051,348	4,247,184	1,132,272	15,600,000	12
Stormwater	1,901,545	2,734,732	240,000	9,049,619	9
Compliance Assistance	921,800	989,104	109,000	2,100,000	5
Enforcement	2,384,434	2,711,872	800,000	8,457,499	7
Sec 401 Certification	852,229	1,124,942	111,236	3,389,137	9
Sec 404 Wetlands	275,000	35,355	250,000	300,000	2
Training	170,756	168,715	59,535	500,000	6
Database Management	381,925	227,277	100,000	726,023	9
Other Administration/Overhead	2,593,906	3,260,418	200,000	10,800,000	9
Other Programs	2,834,180	2,319,891	500,000	5,029,975	4
Total Ideal Program Spending	21,000,000	16,500,000	7,679,911	56,200,000	14

CWA Program	FY 2018-2019				
	Mean	Standard Deviation	Minimum	Maximum	Count
Monitoring	\$3,633,534	\$2,680,173	\$700,000	\$10,100,000	12
Water Quality Standards	1,000,461	863,077	200,000	2,600,000	7
Assessment, TMDLs, and Nonpoint Source	4,214,126	3,238,542	500,000	10,000,000	12
Traditional NPDES	4,514,126	4,185,308	1,400,000	15,600,000	12
Stormwater	2,173,085	2,652,655	240,000	9,049,619	9
Compliance Assistance	1,377,059	1,324,655	200,000	3,321,297	5
Enforcement	2,709,250	2,839,137	1,000,000	8,457,499	6
Sec 401 Certification	1,039,358	1,091,440	111,236	3,389,137	9
Sec 404 Wetlands	746,500	903,022	250,000	2,100,000	4
Training	193,000	178,522	75,000	500,000	5
Database Management	444,847	257,419	100,000	749,652	10
Other Administration/Overhead	3,052,011	3,318,428	200,000	10,800,000	8
Other Programs	3,445,684	2,111,255	600,000	5,547,387	6
Total Ideal Program Sending	21,800,000	15,600,000	7,679,911	56,200,000	15

Figure 3

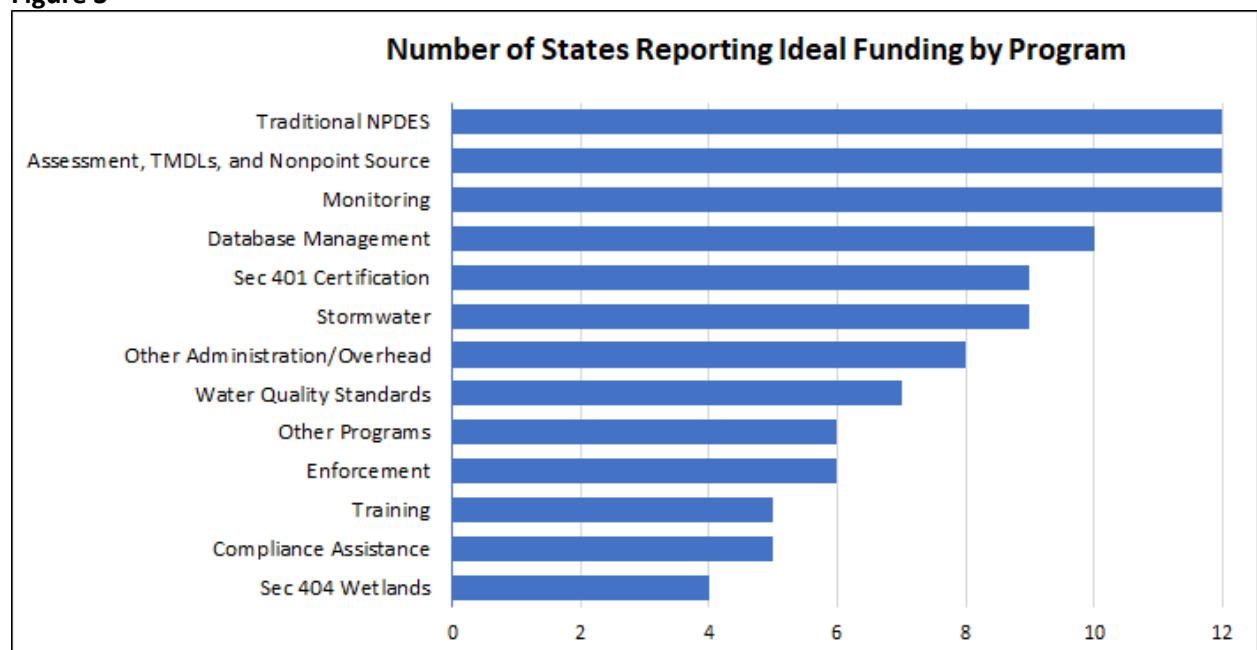
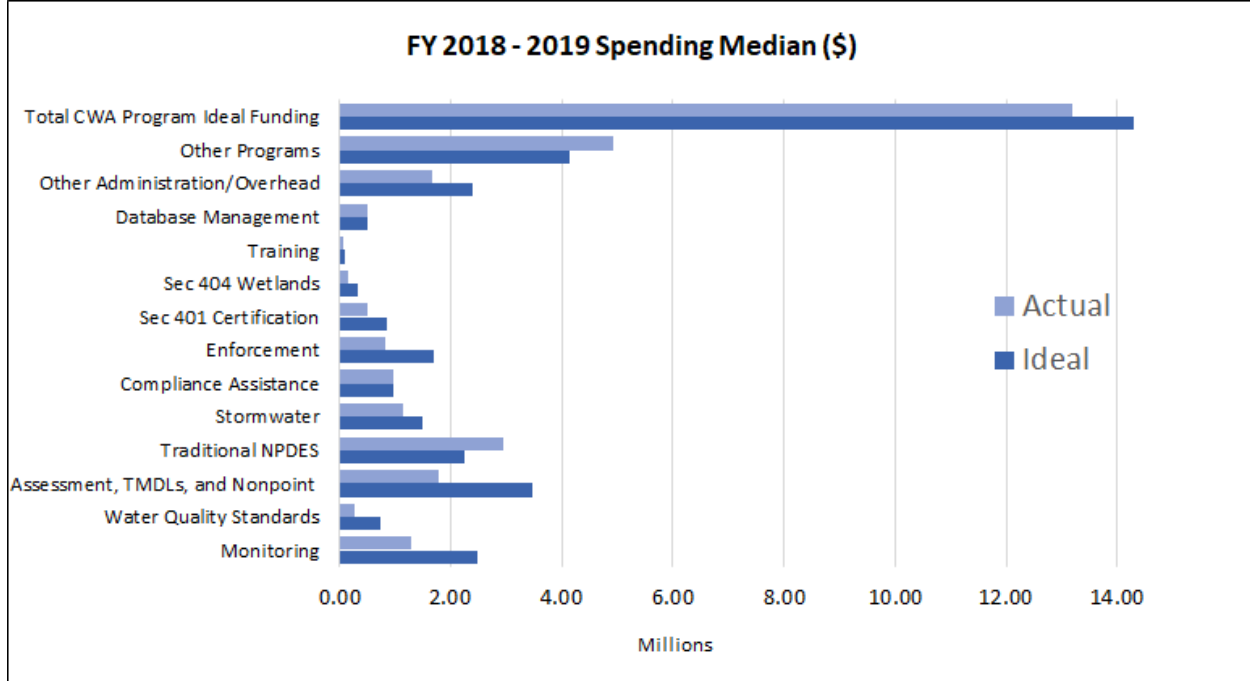


Figure 4



Examining the Funding Gaps for Program Administration

The goal of this survey was to examine the gap in federal funding for CWA programs that states must bridge to fulfill the requirements of CWA. To estimate this gap, we compared Actual and Ideal spending amounts. We reported several different gaps in *Table 6*; however, we focused on the gap between federal funding and Actual spending on programs. The mean gap between federal funding and Actual spending programs for our respondents was nearly \$10 million dollars. The median showed a slightly lower gap, around \$6 million.

Table 6: Gaps in Funding

Variable	Mean	Standard Deviation	Minimum	Maximum
Total Funds (State + Federal)	\$28,100,000	\$41,500,000	\$4,764,000	\$164,000,000
Percent State Funds (of Total Funds)	49%	23%	13%	83%
Percent Federal Funds (of Total Funds)	51%	23%	17%	87%
Total Funds - Actual Spending	\$4,382,745	\$25,700,000	-\$38,100,000	\$94,300,000
Federal Funds - Actual Spending	-\$9,817,960	\$32,000,000	-\$128,000,000	\$77,300,000

N= 36 (combined FY 2017-2018 and FY 2018-2019)

Variable	Mean	Standard Deviation	Minimum	Maximum
Total Funds - Ideal Spending	-\$860,160	\$25,400,000	-\$48,400,000	\$76,600,000
Actual Spending - Ideal Spending	-\$6,494,009	\$5,866,722	-\$21,700,000	\$0

N= 27(combined FY 2017-2018 and FY 2018-2019)

Note: A larger negative value indicates a higher gap in funding and vice versa.

Our analysis demonstrated that a funding gap persists nearly two decades after the EPA conducted its resource needs assessment. Surprisingly, our results showed a smaller gap between funding availability and needs than the EPA found in 2002. This may have been influenced by our respondent states being more arid— in other words, our respondents may have smaller CWA programs than other states. This finding would seem to conflict with anecdotal and quantitative evidence recounted in our literature review that suggested a widening needs gap.

On average, the difference between Actual spending and Ideal spending indicated an average need of nearly \$6.5 million or a median need greater than \$4 million. We noted that the maximum of zero indicated that all states that responded with information on both Actual and Ideal spending would require the same or more amounts of funding to meet the definition of Ideal specified in the survey.

If we used medians to extrapolate to the national level, our data suggested a national gap of approximately \$280 million between federal spending and Actual spending; in other words, states were hundreds of millions of dollars short of what they needed to meet their minimum obligations under the CWA. Extrapolating to the national level also suggested a national gap of approximately \$210 million between Actual and Ideal spending. Together, these approximations totaled a national gap of \$490 million between what states actually spent and what they needed to meet their CWA goals. However, we extrapolated with caution due to limitations discussed under Limitations.

To contextualize the funding gap, our survey collected information indicating a gap in the number of individuals employed to administer CWA programs, as demonstrated in *Table 7*. The states reported a wide range of Actual full-time employees, from 16 to 332, as expected given the wide range of CWA budgets and sizes of programs. Unsurprisingly, 16 of the 22 states reported that their Ideal number of employees was greater than Actual numbers, ranging from 52 to 393.

Table 7: Employment Gaps

Variable	Mean	Standard Deviation	Minimum	Maximum	Count
Actual Number of Full-Time Employees	131	94	16	332	22
Ideal Number of Full-Time Employees	147	101	52	393	16
Actual - Ideal Number of Full-Time Employees	-29	23	-75	0	16

For states that reported Ideal numbers, the mean gap between Actual and Ideal employees was 29 people. This gap indicated that, on average, respondents needed approximately 30 additional full-time employees to meet the survey's definition of Ideal. The largest gap reported was 75 employees, indicating at least a perceived lack of manpower and resources that warrants further investigation. These findings also provided insight into our response rate; we surmised that many states did not have the manpower to complete a voluntary report on tasks of this nature. The lack of funding to hire the necessary personnel for the CWA programs was also reflected in the hesitation of some states to allocate resources in collecting the financial data asked for as part of the survey.

What are the variables and/or criteria that drive any identified trends in resources and funding?

Predicting the Federal Funding Gap

Another goal of our analysis was to determine whether it was possible to identify key drivers of funding availability for CWA programs. To this end, we ran a multiple regression analysis of the following model:

$$\text{Gap} = \beta_0 + \text{State Descriptors} \beta_1 + \text{State Political Indicators} \beta_2 + \text{CWA Authorities} \beta_3$$

Where:

- *Gap* was the difference between the federal funds allocated and the reported actual spending on CWA administration from our survey. ^{[[1]]}_{SEP}
- *State Descriptors* includes state population, percent area water of the state, and median family income. The total state budget was not included as it was highly correlated with both state population and median family income, providing no additional explanatory power.
- *State Political Indicators* included the political party of the state's governor and how the state voted in the 2016 presidential election. For both variables, Republican was coded as zero and Democrat as one. ^{[[1]]}_{SEP}
- *CWA Authorities* included the response to two of our survey questions regarding whether the state has NPDES authority and Section 404 authority. In both questions, No was coded as zero and Yes as one. ^{[[1]]}_{SEP}

In *Table 8*, we present the correlation matrix of our variables. One potential concern was the multicollinearity (i.e., relatively high correlation) we observed between the two state political party indicators. Nonetheless, we included both of these political variables in the final regression because they both had their own relationship with the gap variable.

Table 8: Correlation Matrix

	Federal Funding - Actual Spending	Population	Percent Area, Water	Median Family Income	Governor Political Party	Vote in 2016 Presidential Election	NPDES Authority	Sec 404 Authority
Federal Funding - Actual Spending	1.000							
Population	0.142	1.000						
Percent Area, Water	0.049	-0.240	1.000					
Median Family Income	-0.072	-0.112	0.484	1.000				
Governor Political Party	0.340	-0.185	0.205	-0.018	1.000			
Vote in 2016 Presidential Election	-0.110	-0.281	0.284	0.364	0.620	1.000		
NPDES Authority	-0.083	0.202	0.151	0.270	-0.243	-0.287	1.000	
Sec 404 Authority	0.628	0.403	-0.014	-0.085	0.333	-0.056	0.081	1.000

Table 9 presents the regression results of our model, where one of our political indicators, how the state voted in the 2016 presidential election, and the Section 404 authority variable were significant (i.e., $p > .05$). Our findings indicated that Democratic governorship corresponded with a decrease in the funding gap by \$25 million. Unexpectedly, voting Democrat in the 2016 presidential election corresponded with a funding gap increase of \$30 million. While the reason for this inconsistency was unclear, one contributing factor may have been differing interpretations of Ideal and different financial priorities resulting in different perceptions of resource needs.

Table 9: Regression Analysis

Variables	Models	
	Basic State Descriptors	Full Model
Constant	1,916,000 (34,800,000)	-18,500,000 (31,700,000)
Population	1.522 (1.664)	-.556 (1.485)
Percent Area, Water	50,800,000 (69,100,000)	13,300,000 (54,200,000)
Median Family Income	-381.437 (599.465)	565.555 (548.147)
Political Indicators		
Governor Political Party		25,000,000 (13,400,000)
Vote in 2016 Presidential Election		-30,900,000** (13,800,000)
Authorities		
NPDES Authority		-29,100,000 (21,200,000)
Sec 404 Authority		33,200,000*** (10,700,000)
Adjusted R-Squared	-0.0506	0.3953
F-Value	0.44	4.27***

** $p < 0.05$, *** $p < 0.01$

Our regression analysis showed a stronger relationship between the funding gap and Section 404 authority than any other variable we included; this relationship was statistically significant. The regression results indicated that if a state had Section 404 authority, it was related to a reduced funding gap of \$33 million. States with NPDES authority experienced a gap increase by almost \$30 million, although this relationship was not statistically significant. This finding was consistent with the nature of the NPDES permitting program, a large and costly program for states to administer.

Discussion

Survey Respondents Generally Represent the Population (Generalizability Considerations)

In general, we found that the characteristics of the participating states were varied, as would be expected from a basic knowledge of the range of land areas and populations of states. Our analysis used t-tests to compare means to confirm that our respondents were typical of the nation in the aggregate. That being said, we are cautious about the generalizability of survey responses given that not all respondents provided answers to every survey question. Additionally, selection bias may have impacted our results because respondent states tended to be more arid, geographically smaller, similarly wealthy, and less populated than the national average.

The percent land area covered by water ranged from less than 1 percent to over 40 percent in our respondent pool (*Table 10*), which we reasonably expected to inform the amount of water resources a state must manage under the CWA in relation to the size of the state. Total state budgets for CWA program administration ranged from less than \$500,000 to over \$7 million. The total state budget indicated the total funding each state may allocate and took into account CWA program budgets in relation to the overall state budget. Meanwhile, state population and household income helped identify the capacity for initial spending in each state.

Table 10: Descriptive Data

Variable	Mean	Standard Deviation	Minimum	Maximum
Population	4,796,263	3,243,955	739,795	12,800,000
State Area (Sq. Mi.)	92,361	132,085	5,543	665,384
Water Area (Sq. Mi.)	4,813	14,173	171	68,624
Percent Area, Water	5.4%	8.7%	0.2%	41.2%
Total State Budget (in \$10,000)	\$2,919,091	\$1,826,324	\$460,000	\$7,570,000
Median Household Income	58,083	10,334	46,535	78,916

Table 11 summarizes the political leanings of each state using two indicators. We chose the political party of the state' governor because of the power this office exerts over the state budget. Among our respondents, this indicator was evenly split between Democrats and Republicans, compared to 24 Democrats and 27 Republicans nationally. Our second political indicator, how the state voted in the 2016 presidential election, demonstrated some variation with

the majority of states voting Republican as observed on the national level. Nationwide, 36 percent of states voted Democrat and 64 percent voted Republican in 2016 (The New York Times, 2017). Survey respondents mirrored this voting pattern almost exactly, with 59 percent of respondent states voting Republican and 41 percent of states voting Democrat in the 2016 presidential election.

Table 11: State Political Leanings

	Respondents Count	Respondents Rate	National Rate
<i>Political Party of the State Governor</i>			
Republican	11	50%	53%
Democrat	11	50%	47%
<i>How the state voted in the 2016 presidential election</i>			
Republican	13	59%	59%
Democrat	9	41%	41%

For three of the variables of interest (population, total state budget, and percent area water), the mean for each participating jurisdiction was lower than the national mean. The percent area water mean for our participants was more than one-percent lower than the national mean; the total state budget mean for our participants was more than \$600,000 lower than the national mean, a 20 percent difference; and the state population mean for our participants was over 1.5 million lower than the national mean, a 25 percent difference. For the initial test we performed a t-test of means for the survey respondents against the whole population of 51. This tested whether the differences between the respondents' mean and the population mean were statistically significant. The results in *Table 12.A* show that the differences between the participants' mean and the population mean for state population, percent area water, and total state budget were statistically significant at the .01 level (i.e., the respondents' mean and the population mean were significantly different). While there was some variation in the median household income and two political variables in the respondents' mean and the national mean, our test determined that the differences were not statistically significant. Given that three of our variables were significantly different from the national mean, our respondents were not statistical representatives of the states as a whole, so the conclusions of our analysis would not be generalizable.

Table 12.A: T-Test of Descriptive Data

Variable	Respondents Mean	National Mean	T-Value
Population	4,796,263	6,386,651	-3.252***
Percent Area, Water	5.4%	6.7%	-510***
Total State Budget (in \$10,000)	\$2,919,091	\$3,588,039	-2.429***
Median Household Income	58,083	58,236	-0.0988

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

We then re-ran the t-test removing the outliers (the three most populous states: Florida, California, and Texas) to see if that changed the comparison for external validity. In this analysis, we found that for state population and total state budget the means were no longer statistically significantly different; however, the percent area water mean differences were still found to be statistically significant (*Table 12.B*). This improved the generalizability of our results, though the difference in percent area water means (an indicator of the amount of water state CWA programs must cover) indicated we must proceed with caution. Additionally, removing three major states that potentially had large CWA programs limited the generalizability of our results, so we cannot claim that our findings were representative of the states as a whole.

Table 12.B: T-Test of Descriptive Data

Variable	Respondents Mean	National Mean (Minus California, Florida, and Texas)	T-Value
Population	4,796,263	4,935,282	-0.284
Percent Area, Water	5.4%	0.7%	-47.078***
Total State Budget (in \$10,000)	\$2,919,091	\$3,011,250	-0.333
Median Household Income	58,083	58,228	-0.0933

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

For the median values we performed the Wilcoxon rank-sum test to compare the respondents' median to the national median. The results of this test in *Table 12.C* show that the difference between the respondents' median and the national median were not statistically significant. This indicated that we do, indeed, have generalizability to the states as a whole. Due to the divergent conclusions between the original t-test, the second t-test, and the Wilcoxon test, we claim that the data can be cautiously generalized.

Table 12.C: Wilcoxon Rank-Sum Test of Descriptive Data

Variable	Respondents Median	National Median	W-Value
Population	4,298,483	4,454,189	0.053
Percent Area, Water	0.0%	0.0%	-0.035
Total State Budget (in \$10,000)	\$2,835,000	\$2,740,000	0.012
Median Household Income	\$53,818	\$56,570	0.105

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Limitations

Our study conveyed a broad overview of the current funding landscape states face as they work to implement the CWA and suggested several key variables that may drive funding gap magnitude. We concluded that our findings are cautiously generalizable. Next, we describe several key limitations that contextualize these findings and provide important considerations that can enhance the quality of future research.

Short Timeline to Conduct Research Project

Our study was necessarily developed and conducted within a 4-month university semester. The time given to ACWA members to respond to the survey was three weeks, including a one-week extension. Some states emphasized the shortage of personnel's time to collect the necessary data to participate in the survey. Several respondents clarified that due to lack of time their responses were the most accurate "estimates" possible as they did not have enough time to collect exact data. *Table 13* shows that half of the states took more than four hours to complete the survey and five states spent more than eight hours on the task. While our survey still provided important insights, future research may benefit from providing respondents with substantial periods of time to gather relevant information and complete a survey.

Table 13: Time Spent to Complete the Survey

Time to Complete	Count	Rate
Less than 1 hour	1	4.5%
1-2 hours	2	9.1
2-4 hours	8	36.4
4-8 hours	6	27.3
8+ hours	5	22.7

Decentralization of CWA Program Implementation

We found that even though states are the main administrators of CWA programs, in some instances, responsibilities were delegated to several agencies and organizations without centralized data reporting. Collecting information from all relevant entities was not feasible on our timeline. Additionally, even when all CWA functions were housed in one state agency, the responsibility for carrying out such a function was spread between bureaus and several decentralized regional offices.

Budget Data Tracking is Inconsistent Across States

The complexity of state implementation of CWA programs represented one of the biggest challenges to successful data collection and analysis. Once more, given the short time available to conduct the research project, the level of survey complexity was necessarily limited. The lack of a standardized financial reporting system for CWA programs likely also contributed to the non-response rate. Every state seemed to use different practices to register how resources were distributed, and information consolidation to mirror our survey structure required more man-hours than some states could dedicate to the task.

Political Implications

Environmental policies and the implementation of CWA programs are political in nature. One of the most discussed issues with ACWA members during our outreach efforts to increase survey participation was the political sensitivity of the requested information. Several states opted out of participating due to the high-level policy implications of the CWA programs. Some states that participated in the survey did not provide information regarding Ideal funding, characterizing it as subjective and political in nature. Some ACWA members stated their concerns more broadly, noting that “funds would need to double for adequate CWA programs implementation” and that “CWA programs are just surviving rather than thriving.” In summary, the inherently politicized nature of the research topic impacted response rates and completion rates.

Some Respondents Did Not Fully Complete the Survey

Throughout our analysis, we adjusted the N to accurately reflect the number of respondents that provided the requested data. For example, some respondents were only able to

provide information for one fiscal year, while some refused to provide Ideal funding estimates (e.g., for political reasons). We used all available information in each part of the analysis, providing the *Ns* where necessary in the relevant tables.

Recommendations for Future Research

Our research demonstrated the presence of a gap between federal funding, state spending, and Ideal funding. We found a median gap between federal funding and state need of \$5.6 million and a median gap between Actual and Ideal spending of \$4.2 million. Extrapolating with caution, we found an estimated \$490 million total gap between what states need to accomplish CWA programmatic goals and current resources. Where federal funding stops, state governments may choose to work with the funding they have or explore other venues to reach spending needs. Further research may provide a more detailed understanding of funding gap trends over time by administering a similar survey and perhaps even replicating the EPA's 2002 Needs Model approach over a regular interval. Future research should follow our lead in ensuring complete respondent confidentiality to encourage state administrators to freely provide the necessary data quality.

This study provides ACWA with information needed to better understand the challenges its member agencies face, enabling them to more effectively assist members in finding ways to maximize water quality outcomes under fiscal constraints. Our findings also provide ACWA with data they can share to characterize the nature of constraints faced by member states in external communications with stakeholders and policymakers as they seek to equip their members to implement the CWA and protect water quality across the nation.

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Appendix A: Clean Water Act Program Glossary

319 Nonpoint Source Grant Funds - Grants administered by the EPA that provides funding to states to reduce nonpoint source pollution.

National Pollution Discharge Elimination System Permit Program - (NPDES) Prohibits the discharge of pollutants into waters of the United States without a permit from either the EPA or the state, if they hold authorization power. The program is divided into non-point sources and point sources.

Pollution - Any foreign body that enters a water body and impairs the quality. Examples: trash, litter, nutrients, chemicals.

Section 106 - Provides the EPA authorization to administer grants to assist states with reduction, prevention, and elimination of water pollution.

Section 401 Certification Program - Requirement for permit applicants that ensures facilities comply with the Clean Water Act and any existing state water quality standards.

Section 404 Wetlands Program - Regulates the discharge of dredge and fill material into waters of the United States— including wetlands as waters of the United States—without a permit.

Total Maximum Daily Load - (TMDLs) Maximum amount of pollution a water body can handle while still meeting water quality standards.

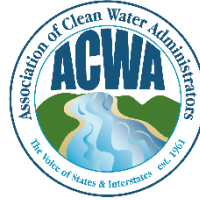
Water Quality Standards - Numeric or qualitative standards for both chemical and physical characteristics of individual water bodies. These are set by states, territories, tribes, or federal law and are approved by the EPA.

Appendix B: ACWA's Member Organizations

State	Member Organization
Alabama	Alabama Department of Environmental Management
Alaska	Alaska Department of Environmental Conservation
Arizona	Arizona Department of Environmental Quality
Arkansas	Arkansas Department of Environmental Quality
California	California State Water Resources Control Board
Colorado	Colorado Department of Public Health & Environment
Connecticut	Connecticut Department of Energy and Environmental Protection
Delaware	Delaware Department of Natural Resources & Environmental Control
District of Columbia	District Department of Energy and Environment
Florida	Florida Department of Environmental Protection
Georgia	Georgia Department of Natural Resources
Hawaii	Hawaii Department of Health
Idaho	Idaho Department of Environmental Quality
Illinois	Illinois Environmental Protection Agency
Indiana	Indiana Department of Environmental Management
Iowa	Iowa Department of Natural Resources
Kansas	Kansas Department of Health & Environment
Kentucky	Kentucky Department for Environmental Protection
Louisiana	Louisiana Department of Environmental Quality
Maine	Maine Department of Environmental Protection
Maryland	Maryland Department of the Environment
Massachusetts	Massachusetts Department of Environmental Protection
Michigan	Michigan Department of Environmental Quality
Minnesota	Minnesota Pollution Control Agency
Mississippi	Mississippi Department of Environmental Quality

Missouri	Missouri Department of Natural Resources
Montana	Montana Department of Environmental Quality
Nebraska	Nebraska Department of Environmental Quality
Nevada	Nevada Division of Environmental Protection
New Jersey	New Jersey Department of Environmental Protection
New Mexico	New Mexico Environment Department
New York	New York State Department of Environmental Conservation
North Carolina	North Carolina Department of Environment & Natural Resources
North Dakota	North Dakota Department of Health
Ohio	Ohio Environmental Protection Agency
Oklahoma	Oklahoma Department of Environmental Quality
Oregon	Oregon Department of Environmental Quality
Pennsylvania	Pennsylvania Department of Environmental Protection
Rhode Island	Rhode Island Department of Environmental Management
South Carolina	South Carolina Department of Health & Environmental Control
South Dakota	South Dakota Department of Environment & Natural Resources
Tennessee	Tennessee Department of Environment & Conservation
Texas	Texas Commission on Environmental Quality
Utah	Utah Department of Environmental Quality
Vermont	Vermont Department of Environmental Conservation
Virginia	Virginia Department of Environmental Quality
Washington	Washington Department of Ecology
West Virginia	West Virginia Department of Environmental Protection
Wisconsin	Wisconsin Department of Natural Resources
Wyoming	Wyoming Department of Environmental Quality

Appendix C: Survey



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& Public Administration

THE GEORGE WASHINGTON UNIVERSITY

Overview of Clean Water Funding Survey

This short survey for the Association of Clean Water Administrators asks about your state's Clean Water Act (CWA) expenditures and resource demands for FY2017 and FY2018. It contains 17 questions. Your participation is greatly appreciated and extremely important for this voluntary survey. **You are being provided this advance copy of the survey questions so you know exactly what questions are going to be asked and to assist with identifying information that may need to be collected in advance of responding.** If you have any questions about the study, please contact kamiehrich@gmail.com at the George Washington University.

1. Is your agency the primary state agency that manages the core CWA programs?
2. Does another state agency manage some aspect of the core CWA Programs?
3. Is your state authorized to administer the NPDES Permit Program?
4. Is any part of the NPDES program managed by another state agency?
5. Has your state been authorized to assume administration of Section 404 Federal permit program?

You will be asked the following questions separately for FY2017 (fiscal year ending in 2017) and FY2018 (fiscal year ending in 2018) for the listed programs.

6. Please list below the dollar amounts from the following sources of **federal** funding that support implementation of all of your state's Clean Water Act obligations:

- Section 106 Grant Funds
- 319 Nonpoint Source Grant Funds
- OTHER
- TOTAL Federal Funding

7. Please list below the dollar amounts from the following sources of **state** funding that support implementation of all of your state's Clean Water Act obligations:

- General Funds
- NPDES Permit Fees
- Enforcement Penalties
- Special State Tax
- OTHER
- TOTAL State Funding

8. Please provide the **actual** spending on all of your state's Clean Water Act Programs:

- Monitoring Program
- Water Quality Standards Program
- Assessment, TMDLs, and Nonpoint Source Programs
- Traditional NPDES Programs
- Stormwater Programs
- Compliance Assistance Program
- Enforcement Program
- Sec 401 Certification Program
- Sec 404 Wetlands Program
- Training Programs
- Database Management
- Other Administration/Overhead
- OTHER
- TOTALS

9. Please provide the **ideal** spending on all of your state's Clean Water Act Programs:

“Ideal” for this survey is defined as funding sufficient for model programs to meet all obligations under the Clean Water Act and all related water quality priorities of the state.

- | | |
|---|-----------------------------------|
| • Monitoring Program | • Water Quality Standards Program |
| • Assessment, TMDLs, and Nonpoint Source Programs | • Traditional NPDES Programs |
| • Stormwater Programs | • Compliance Assistance Program |
| • Enforcement Program | • Sec 401 Certification Program |
| • Sec 404 Wetlands Program | • Training Programs |
| • Database Management | • Other Administration/Overhead |
| • OTHER | • TOTALS |

10. Roughly, how many state full time employees are currently dedicated to federal Clean Water Act programs?

11. How many total state full time employees would be ideal to manage the federal Clean Water Act programs?

12. How long did it take you to gather the information and complete this survey?

13. Please describe additional details that you would like to provide that would help inform this research.

Appendix D: Original Email to Respondents and Attached Survey Overview

Good morning all,

As recently communicated in an ACWA email, GWU is working on a new project to update some of the information generated by ASIWPCA's *2002 State Water Quality Management Resource Analysis*.

This survey is 17 questions long. We recommend this survey be assigned to a staff person very familiar with the state's budgeting process. The survey questions have also been provided as part of this email to help you consider the best approach for responding to this online survey. We strongly recommend collecting as much data as you are able prior to beginning the online survey.

The survey link:

https://columbiangwu.col.qualtrics.com/jfe/form/SV_08N4xmYCZnGF1rL

ACWA is hopeful that updated information regarding state program costs/needs to implement the CWA will provide the organization and states themselves an important tool for communication. Timely state participation is vital to this research effort and we appreciate your efforts to respond to the research team's messages.

As always, we appreciate your assistance and welcome any questions you may have.

Sincerely,

The GWU Research Team

Kami Ehrich, Jessica Blackband, Lilia Ledezma, Melissa Diaz, Cheryl Barnes

Appendix E: Additional Tables & Figures

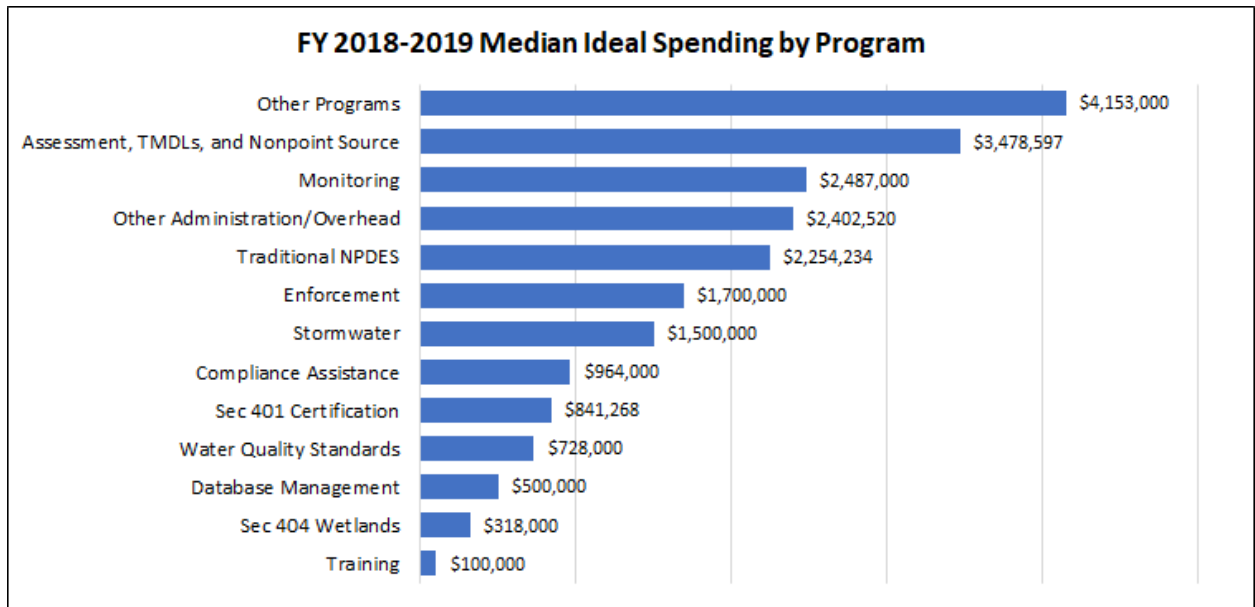
Table 14: Actual Program Spending

CWA Program	FY 2017 - 2018				
	Mean	Standard Deviation	Minimum	Maximum	Count
Monitoring	\$2,396,914	\$2,593,054	\$248,358	\$9,344,529	15
Water Quality Standards	543,406	571,726	92,459	1,573,568	11
Assessment, TMDLs, and Nonpoint Source	2,603,513	2,131,720	620,000	7,489,307	15
Traditional NPDES	3,454,713	2,995,256	721,323	11,000,000	15
Stormwater	1,750,519	2,356,066	120,000	8,309,726	11
Compliance Assistance	1,003,786	797,388	109,000	2,002,872	8
Enforcement	1,744,781	2,111,569	539,531	6,876,515	8
Sec 401 Certification	762,934	910,190	111,236	\$2,825,727	10
Sec 404 Wetlands	-	-	-	-	0
Training	86,758	40,439	50,000	140,061	5
Database Management	456,545	314,174	75,000	991,680	10
Other Administration/Overhead	2,269,484	2,480,724	82,105	9,197,857	11
Other Programs	24,200,000	50,800,000	556,202	173,000,000	11
Total Actual Spending	25,900,000	38,900,000	4,334,710	173,000,000	18

CWA Program	FY 2018 - 2019				
	Mean	Standard Deviation	Minimum	Maximum	Count
Monitoring	\$2,113,476	\$1,743,324	\$301,079	\$5,178,000	13
Water Quality Standards	591,350	672,903	71,503	1,977,200	10
Assessment, TMDLs, and Nonpoint Source	228,949	1,872,979	218,000	6,754,682	13
Traditional NPDES	3,702,042	3,127,325	668,524	11,000,000	13
Stormwater	1,757,062	1,617,256	120,000	5,578,893	10
Compliance Assistance	1,056,747	826,559	150,000	2,149,527	7
Enforcement	1,353,730	1,033,054	676,809	3,269,202	6
Sec 401 Certification	865,063	954,663	49,698	2,825,727	9
Sec 404 Wetlands	168,000	-	168,000	168,000	1

Training	69,734	21,534	50,000	92,703	3
Database Management	502,668	346,843	75,000	991,680	9
Other Administration/Overhead	2,617,056	2,750,672	80,381	9,019,209	10
Other Programs	18,000,000	32,800,000	508,212	111,000,000	11
Total Actual Spending	21,500,000	24,900,000	4,146,670	111,000,000	18

Figure 5



Names and Contact Information of Client Liaisons

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