

# National Water Program Performance, Trends, and Best Practices Report

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Fiscal Year 2016





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## Introduction

The National Water Program is charged with evaluating the progress it is making in developing and implementing effective programs to monitor, protect, and improve the waters of the United States. Activities of the National Water Program fall under Goal 2 of the EPA Strategic Plan, “Protecting America’s Waters,” which includes two objectives and 15 subobjectives (see Figure 1). The National Water Program tracks 110 performance measures under the 15 subobjectives. This report presents performance results and trends for the National Water Program using fiscal year 2016 (FY 2016) end-of-year data reported by states, tribes, and EPA regional and headquarters offices, as well as best practices in program implementation. The National Water Program’s performance webpage includes an overview of the measure universe and a detailed appendix with historical data on national and regional commitments and results for all performance measures.<sup>1</sup> Additionally, the National Water Program tracks progress toward Agency Priority Goals (APGs), a component of the Administration’s performance management framework that supports improvement in near-term outcomes related to EPA’s Strategic Plan.<sup>2</sup>

This report includes four main components:

- Progress toward Strategic Measures
- Overview of Progress toward the National Water Program’s Agency Priority Goal
- Summary of Results from Additional National, Regional, and Tribal Performance Measures
- Descriptions of Innovative Approaches and Best Practices in Program Implementation

### Progress toward Strategic Measures

Of the National Water Program’s 110 measures, 21 are identified as strategic measures, which have targets for 2018 established in the 2014-2018 EPA Strategic Plan. This report includes trend charts for these 21 measures showing results from 2014 to 2016 and indicating whether or not EPA anticipates meeting the strategic target set for 2018.

<sup>1</sup> <https://www.epa.gov/water-planning-evaluation>

<sup>2</sup> OW performance measures are referenced by codes, specifically Annual Commitment System (ACS) and/or Performance and Environmental Reporting System (PERS) codes. ACS and PERS are tracking systems that are used by EPA. The National Water Program tracks all of their regional data, and about half of their national data in ACS; however, national data for budget measures are tracked in PERS.

<sup>3</sup> <https://www.performance.gov/agency/environmental-protection-agency?view=public#apg>

### Overview of Progress toward the National Water Program’s Agency Priority Goal

One of EPA’s five two-year APGs is to “advance resilience in the nation’s water infrastructure, while protecting public health and the environment, particularly in high-risk and vulnerable communities.”<sup>3</sup> Through the green infrastructure program, EPA provides communities with tools to enhance their stormwater management systems and support their climate resiliency strategies. EPA has already met its two-year goal of providing technical assistance to 75 communities. Additionally, EPA provided tools and training for approximately 4,000 operators of small water utilities to improve resilience in drinking water, wastewater, and stormwater systems.

### Key Terms and Definitions

**Outcome measures** track the environmental or public health impacts a program achieves; e.g., a change in the number of streams restored or in the number of people drinking safe water.



**Output measures** show the type and quantity of activities completed; e.g., number of inspections or regulations promulgated.

**Commitment measures** include both outcome and output measures for which specific targets or commitments have been identified.

**Indicators** are output measures for which specific targets have not been set.

**Geographic programs** focus on specific areas such as the Gulf of Mexico or Chesapeake Bay.

**Core water programs** have a national focus that does not focus on specific geographic areas.

## Summary of Results from Additional National, Regional, and Tribal Performance Measures

The National Water Program tracks a total of 110 performance measures that address progress toward the 15 subobjectives under Goal 2, "Protecting America's Waters." This includes 79 commitment measures with specified annual targets and 31 measures designated as indicators, which are output measures that do not have annual performance commitments. This report includes detailed information on performance measures for FY 2016 and the past five years, including an assessment of regional and tribal measures. In FY 2016 the National Water Program met 62% of the performance targets set for commitment measures, a decrease in its five-year historic average (2011-2015) of 74%. Additionally, the National Water Program met 50% of its Tribal Commitments in FY 2016.

## Description of Innovative Approaches and Best Practices in Program Implementation

A best practice is defined as a process or methodology that consistently produces superior or innovative results. This report highlights eleven best practices that have resulted in successful programs addressing drinking water, surface water quality, wetlands, and coastal areas and oceans that were selected from proposals submitted by the water divisions in EPA's regional offices.



Figure 1. EPA Strategic Plan Goal 2: Protect America’s Waters



# Strategic Measures Progress

The National Water Program has identified 21 measures as strategic measures, which have targets for 2018 established in the 2014-2018 EPA Strategic Plan. Results from 2014 to 2016 are provided below along with an indication of whether or not EPA anticipates meeting the strategic target set for 2018.

Strategic Measure	2014 Result	2015 Result	2016 Result	2017 Target	2018 Strategic Target
<b>2.1 PROTECTING HUMAN HEALTH</b>					
<b>2.1.1 Water Safe to Drink</b>					
Percentage of community water systems providing drinking water that meets all applicable health-based standards (SDW-SP1.N11; apm)	90.8%	90.0%	90.4%	90.0%	92.0% Not on Track
Percentage of the population in Indian country served by community water systems providing drinking water that meets all applicable health-based standards (SDW-SP3.N11; E)	88.6%	88.4%	87.9%	87.0%	88.0% On Track
American Indian and Alaska Native homes provided with access to safe drinking water (SDW-18.N11)	113,656	No longer reported by Indian Health Service			148,100 No Longer Reported
<b>2.1.2 Fish and Shellfish Safe to Eat</b>					
Percentage of women of childbearing age with blood mercury levels above the level of concern (FS-SP6.N11; fs1)	2.1%	Biennial	3.3%	Biennial	2.1% On Track
<b>2.1.3 Water Safe for Swimming</b>					
Percentage of days of the beach season that coastal and Great Lakes monitored beaches are open and safe for swimming (SS-SP9.N11)	95.4%	94.5%	92.8%	95.0%	95.0% On Track

Strategic Measure	2014 Result	2015 Result	2016 Result	2017 Target	2018 Strategic Target
<b>2.2 PROTECT AND RESTORE WATERSHED AND AQUATIC ECOSYSTEMS</b>					
<b>2.2.1 Improve Water Quality on a Watershed Basis</b>					
Water body segments identified in 2002 as not attaining standards in which water quality standards have been attained (WQ-SP10.N11; L)	3,866	3,944	4,009	4,089	4,430 Not on Track
Impaired watersheds where water quality conditions are improved using the watershed approach (WQ-SP12.N11; wq3)	411	450	485	519	575 Not on Track
Ensure that the condition of the nation's waters does not degrade (WQ-SP13.N11)	Data Not Available	WQ In Lakes Maintained	WQ In Lakes Maintained	No WQ Degradation In Rivers/Streams	Maintain or Improve Conditions On Track
Baseline monitoring stations in tribal waters with improvements in one or more of seven key water quality parameters (WQ-SP14a.N11)	21	28	38	46	50 On Track
American Indian and Alaska Native homes with access to basic sanitation (WQ-24.N11)	75,140	81,080	Data Available 05/2017	90,600	91,900 On Track
<b>2.2.2 Improve Coastal and Ocean Waters</b>					
Rating of coastal waters on the National Coastal Condition Report's 5-point scale (CO-222.N11)	2.5	2.5	No longer reported due to change in reporting methodology. Survey is now included under National Aquatic Resource Surveys. 3.0 No Longer Reported		

# Strategic Measures Progress (Cont'd)

Strategic Measure	2014 Result	2015 Result	2016 Result	2017 Target	2018 Strategic Target
<b>2.2.2 Improve Coastal and Ocean Waters (Cont'd)</b>					
Percentage of dredged material ocean dumping sites with environmentally acceptable conditions (CO-SP20.N11; co5)	95%	95%	97%	95%	95% On Track
Acres of habitat protected or restored after 2012 within the study areas of the 28 estuaries in the National Estuary Program (CO-432.N11; 202)	221,151	332,735	403,197	503,197	600,000 On Track
<b>2.2.3 Increase Wetlands</b>					
Net increase in wetlands	<i>The U.S. Fish and Wildlife Service changed the frequency of reporting cycle from 5 years to 10 years.</i>				Net Increase in Wetlands Data Not Available
<b>2.2.4 Great Lakes</b>					
Great Lakes Areas of Concern with all management actions necessary for delisting implemented (GL-SP31; 626)	7	7	8	11	12 On Track
Percentage of Great Lakes coastal wetlands greater than 10 acres with necessary actions implemented and evaluated for protection, restoration or enhancement (EAGL 4.1.3)		4%	5%	No Target	20% On Track
<b>2.2.5 Chesapeake Bay</b>					
Percentage of Chesapeake Bay and tidal tributaries water quality standards attained for dissolved oxygen, water clarity/underwater grasses, and chlorophyll a (CB-05.N14)	28.9%	33.9%	37.2%	No Target	45% On Track

Strategic Measure	2014 Result	2015 Result	2016 Result	2017 Target	2018 Strategic Target
<b>2.2.6 Gulf of Mexico</b>					
Size of the hypoxic zone in the Gulf of Mexico (5-year running average)	13,080	10,419			No Longer Reported 5,000
<i>Data is no longer collected based on an OIG recommendation in Report 13-P-0271</i>					
<b>2.2.7 Long Island Sound</b>					
Percentage reduction in the maximum area of hypoxia in Long Island Sound (LI-SP42.N11)	34%	40%	33.7%	No Target	On Track 15%
<b>2.2.8 Puget Sound Basin</b>					
Acres of shellfish beds with harvest restrictions lifted in Puget Sound (PS-SP49.N11; ps1)	3,249	3,277	3,887	6,350	On Track 6,000
<b>2.2.9 U.S.–Mexico Border Environmental Health</b>					
(Part 1) Percentage of homes in the U.S.-Mexico Border area provided access to safe drinking water that lacked access in 2003 (MB-SP24.N11; xb2)	65.8%	66.7%	70.4%	71.9%	On Track 75%
(Part 2) Percentage of homes in the U.S.-Mexico Border area provided access to adequate wastewater sanitation that lacked access in 2003 (MB-SP25.N11; xb3)	84.3%	90.7%	97.2%	97.3%	On Track 90%

# Agency Priority Goal

## Green Infrastructure Communities

EPA has identified five two-year APGs for FY 2016-2017.<sup>4</sup> One APG with a water focus is to “advance resilience in the nation’s water infrastructure, while protecting public health and the environment, particularly in high-risk and vulnerable communities.” More specifically, the goal calls for EPA to work with communities to help them assess how green infrastructure can enhance their stormwater management programs and can be an important tool for climate resiliency. Green infrastructure uses vegetation, soils, and natural processes to manage stormwater (e.g., bioswales, rainwater harvesting, permeable pavement) and can help build resilience to droughts and localized flooding. The APG tracks the number of communities provided with technical assistance and tools to advance green infrastructure planning and implementation efforts.

The National Water Program has already met the two-year goal (originally planned to be met by September 2017) of providing technical assistance to 75 communities. The types of assistance and locations of the affected communities are presented here.

<sup>4</sup> <https://www.performance.gov/agency/environmental-protection-agency?view=public#apg>



### KEY



Regional Technical Assistance



Greening America’s Cities



Green Infrastructure Learning Lab Attendee



Stormwater Water Finance Forum Attendee



Green and Complete Streets Building Blocks



Smart Growth Implementation Assistance



Making a Visible Difference in Communities



Urban Waters Small Grants



## BY THE NUMBERS

**75**  
Communities benefited from Green Infrastructure events

**2**  
Greening America's cities events

**33%**  
Of participating communities attended green learning lab events

## Resilient Water Infrastructure

In addition to providing technical assistance for green infrastructure, EPA provided tools and training for approximately 4,000 operators of small water utilities to improve resilience in drinking water, wastewater, and stormwater systems. Participation occurred at extremely high rates throughout FY 2016.

**4,199**

utilities, states,  
and federal  
officials  
participated in  
events in 2016

### National Event

In September, EPA held a National Preparedness Day event entitled, "Navigating a Day without Water: A Virtual Discussion in Disaster Preparation" to highlight the importance of taking steps to prepare for a water emergency. The discussion included a disaster scenario that focused on disrupting the water services in a fictional community. Participants included water and wastewater utilities, public health agencies, hospitals, emergency managers, fire, state primacy agencies and associations.



### Tools and Resources Webinar

In May, EPA hosted a webinar to familiarize drinking water and wastewater utilities and the states with six specific products: Drought Response and Recovery Guide, Hazard Mitigation for Natural Disasters Guide, Water Quality Surveillance and Response System Exercise Development Toolbox, Analytical Preparedness Full-Scale Exercise Toolkit, Utility Preparedness Widget, and the What's Going On Newsletter.

### Conference Attendance

EPA presented and/or exhibited at numerous conferences including ones hosted by the American Water Works Association (AWWA), the National Rural Water Association, the Rocky Mountain AWWA, and several state Rural Water Associations (including North Carolina Georgia, and Wyoming).



### Outreach methods

- One-day trainings
- Functional exercises
- Workshops
- Webinars
- Events

## Summary of Results

The National Water Program tracks 110 performance measures, 79 of which are commitment measures with specified annual targets; the remaining 31 measures are designated as indicator measures, which are output measures that do not have annual performance commitments.<sup>5</sup> This section summarizes the FY 2016 performance results of these measures and trends over the last six years.

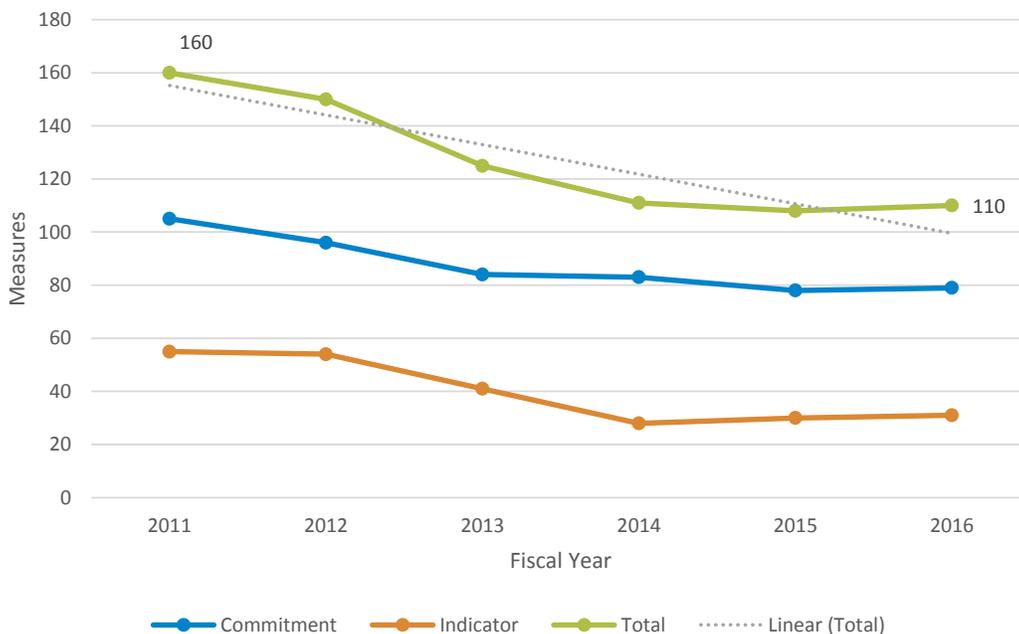
### Key Changes in FY 2016

This report includes several changes to the performance measures compared to the National Water Program Performance, Trends and Best Practices Report Fiscal Year 2015. Some of the key changes to performance measures for certain subobjectives are noted below:

- Water Quality: Seven performance measures were added in FY 2016, three were deleted, and one was modified.
- Gulf of Mexico: Three new measures were added in FY 2016, two were deleted, and one was modified.
- Puget Sound: One measure was modified in FY 2016.

Over the course of the last five years, the National Water Program has worked toward a smaller and more meaningful set of measures and has strived to align performance measures with what is important to EPA headquarters, EPA regions, states, and tribes. While the overall number of measures increased to 110 in FY 2016 (from 108 in FY 2015), this number is still substantially lower than the 160 measures analyzed in FY 2011. The number of performance measures over time is illustrated in Figure 2.

Figure 2. Number of Performance Measures over Time

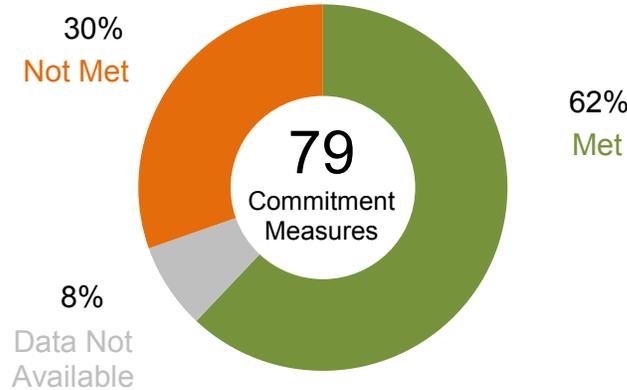


<sup>5</sup> The 21 strategic measures are included in the 110 total performance measures.

## FY 2016 National Performance for Commitment Measures

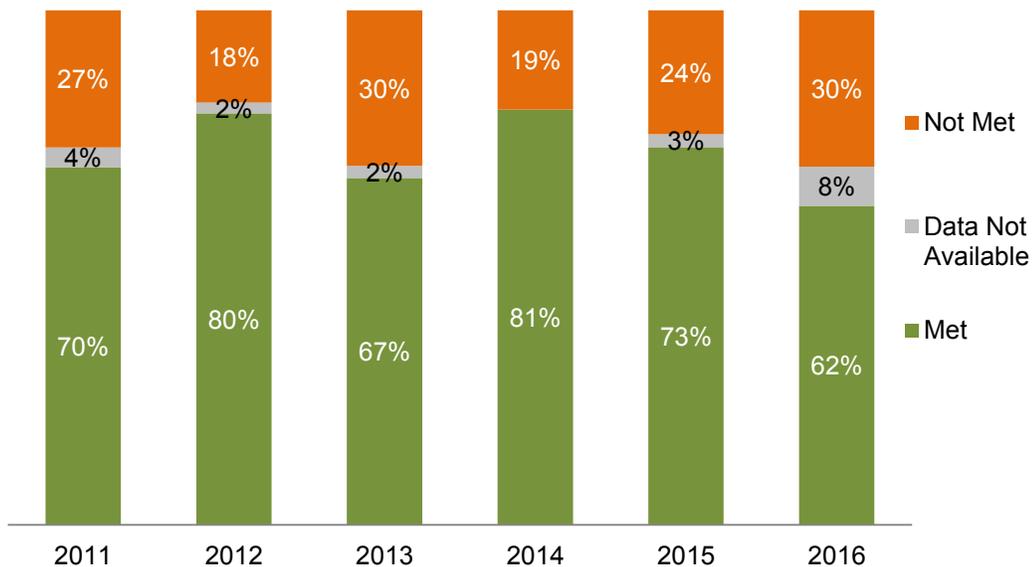
The FY 2016 results show a decrease in the number of commitment measures that met their targets compared to FY 2015. The National Water Program met 73% of their commitment measures in FY 2015, and 62% in FY 2016. Figure 3 illustrates the distribution of results between met, not met, and data not available for FY 2016.

Figure 3. National FY 2016 Performance for 79 Commitment Measures



Historical trend data show that between FY 2011 and FY 2016, the National Water Program has averaged about 74% measures met, 24% not met, and 2% with data not available or not reporting. Figure 4 shows the change in overall performance over the past six years.

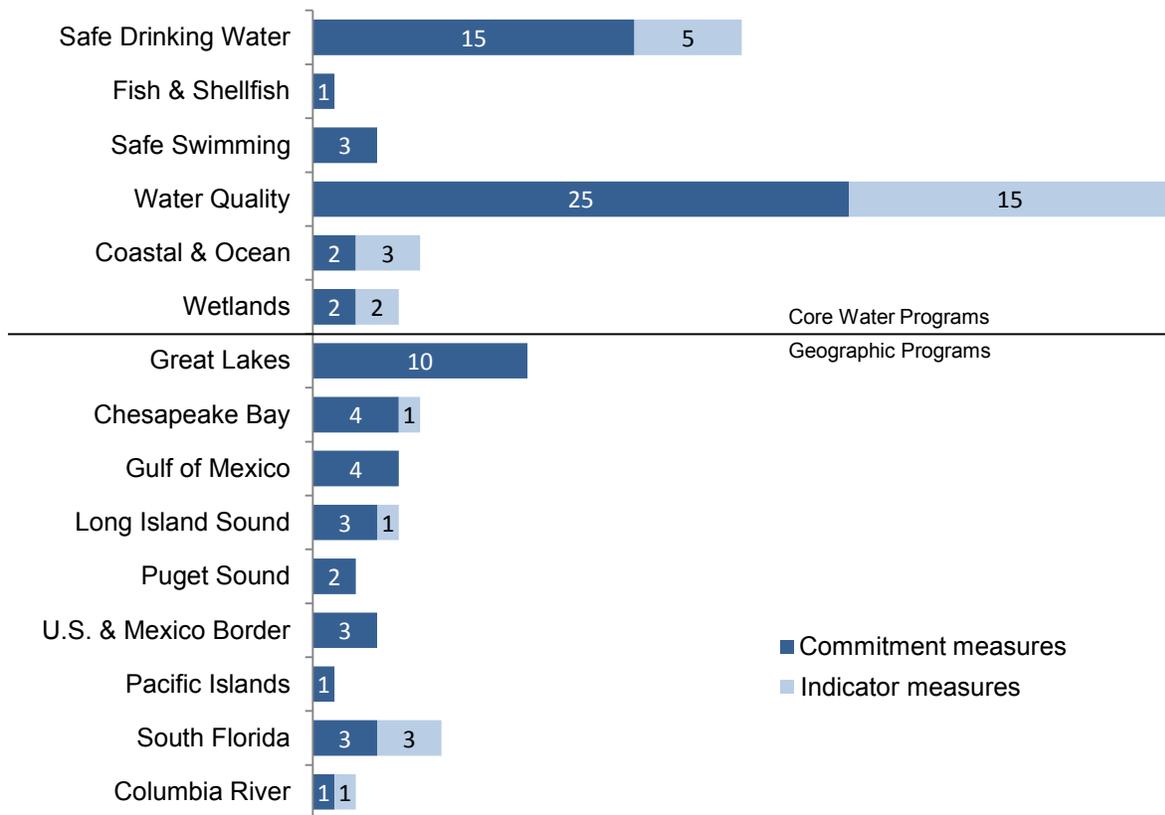
Figure 4. FY 2011-FY 2016 Commitment Measures Performance Trend (79 measures for FY 2016)



### National Performance by Subobjective

Figure 5 shows the number of measures analyzed for each of the 15 subobjectives. Water Quality has the largest share of performance measures at 36%; Safe Drinking Water is next with 18%; and the Great Lakes is third with 9%. The remaining 37% of the measures are spread among the other 12 subobjectives. For commitment measures, 61% (48 of 79) pertain to core water programs and 39% (31 of 79) track progress in geographic programs.

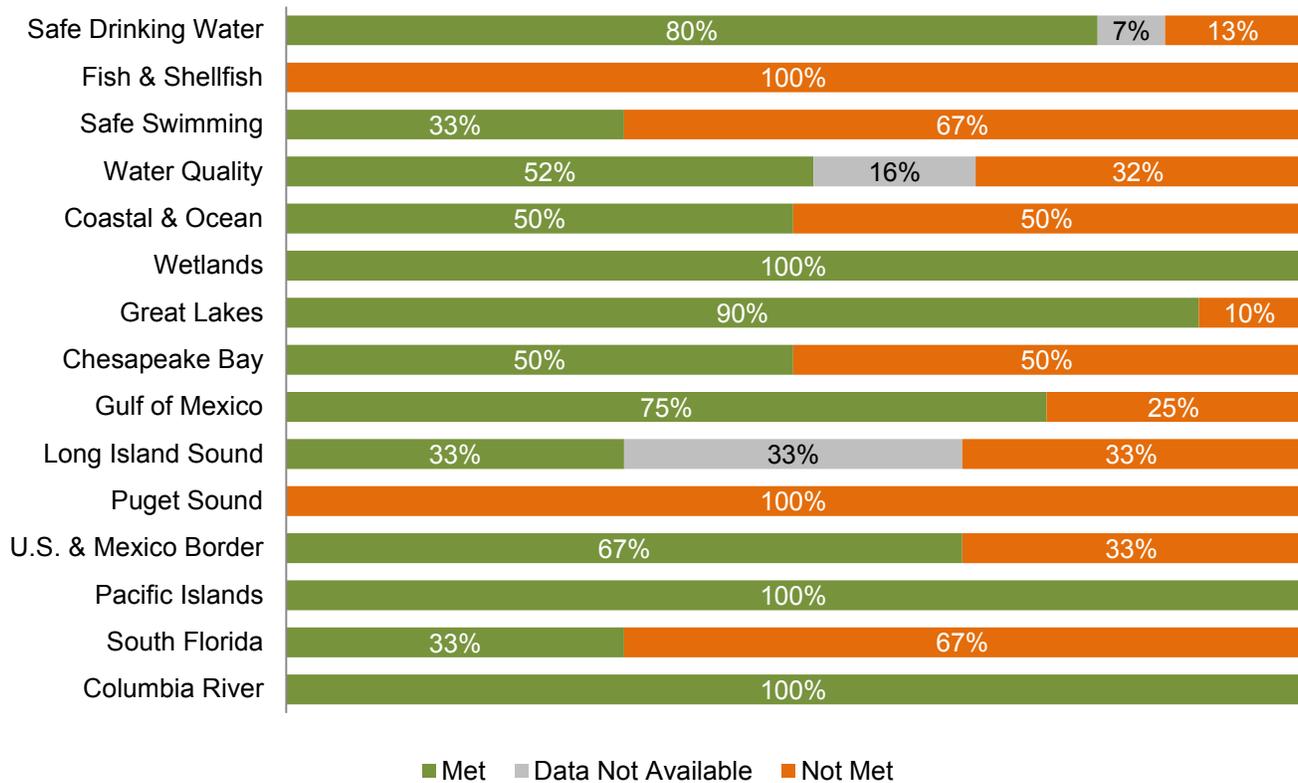
Figure 5. Number of Performance Measures Per Subobjective



## U.S. Environmental Protection Agency Office of Water

Of the national core water program measures, 60% met their targets in FY 2016. In addition, 65% of the geographic program measures were met. Figure 6 shows the FY 2016 results by subobjective. Commitments were fully met for three of the 15 subobjectives (Wetlands, Pacific Islands, and Columbia River).

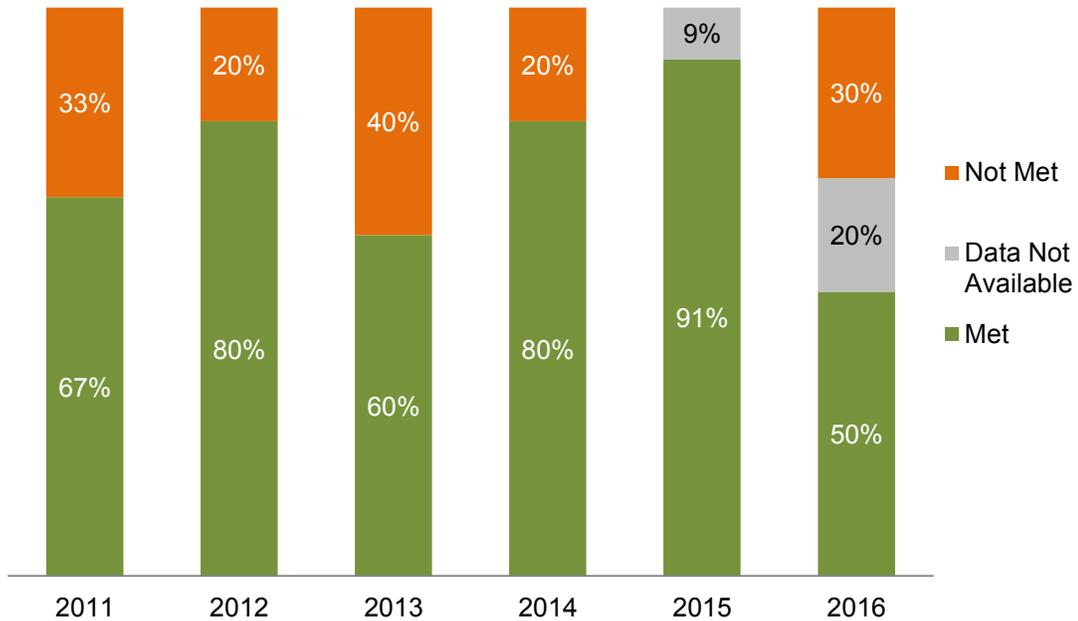
**Figure 6. Commitment Measures Met and Not Met by Subobjective**



### Tribal Measures

Ten performance measures focus on drinking water and water quality in American Indian lands. There was a significant decrease in the number of commitments met for tribes in FY 2016 (50%) compared to the results in FY 2015 (91%), as shown in Figure 7. However, it should be noted that for 20% of the 2016 measures, data are not available to track progress.

Figure 7. FY 2011-2016 Percent of Tribal Commitments Met or Not Met



Safe drinking water and water quality on tribal lands continue to be a concern for the National Water Program. Some key highlights and challenges include:

- 88% of the population in Indian country was served by CWSs with drinking water that met all applicable health-based drinking water standards. [SDW-SP3.N11]
- 92.8% of “person-months” during which tribal CWSs provided drinking water, met all applicable health-based drinking water standards. [SDW-20]
- There was a 36% increase in the number of tribal water quality monitoring stations with improved water quality. [WQ-SP14a.N11]

## Six-Year Trends of National Performance for All Measures

The next figures, referred to as heat maps, illustrate the performance history for the 15 subobjectives over a six-year period (FY 2011 to FY 2016). The heat maps indicate whether or not each measure was met or not met in a given year, using green and orange shading respectively, and report the actual result for each measure.<sup>6</sup> However, unlike the summary graphics shown in the previous section, the heat maps also include performance data for indicator measures; these results are shaded blue. Finally, gray shading indicates that data were not available for a given year and white is used for measures not in existence in a given year. Below each heat map is a discussion of key results for different subobjectives.

**Figure 8. Heat Map for Objective 2.1 – Protect Human Health**

ACS Code	PERS Code	Abbreviated Measure Description	Results and Commitment Status					
			2011	2012	2013	2014	2015	2016
<b>Subobjective 2.1.1 Water Safe to Drink</b>								
SDW-211*	aa	Percent population served by CWSs meeting safe standards	93.2%	94.7%	92%	93%	91%	91.2%
SDW-SP1.N11*	apm	Percent CWSs meeting safe standards	90.7%	91%	91%	91%	90%	90.4%
SDW-SP2*	dw2	Percent “person months” with CWSs meeting safe standards	97.4%	97.8%	96.9%	97%	96%	96%
SDW-SP3.N11*	E	Percent population served by CWSs meeting safe standards in Indian country	81.2%	84%	77%	89%	88%	88%
SDW-20	-	Percent “person months” with CWSs meeting safe standards in Indian country					95%	92.8%
SDW-SP4a	-	Percent CWSs with source water protection	40%	43%	48%	48%	49.9%	54.0%
SDW-SP4b	-	Percent population served by CWSs with source water protection	55%	56%	59%	58%	60.7%	61.0%
SDW-18.N11	-	Number Indian & Alaska Native homes provided safe drinking water	97,311	104,266	108,881	113,656		
SDW-01a*	aph	Percent CWSs with sanitary survey	92%	89%	93%	87%	90.8%	91.2%
SDW-01b	-	Number tribal CWSs with sanitary survey	74	84	84	633	663	653
SDW-04*	apc	DWSRF utilization rate	90%	90%	91%	92%	94%	95%
SDW-05	-	Number DWSRF projects initiated (cumulative)	6,076	6,721	7,474	8,101	9,317	9,119
SDW-07*	aps	Percent Class I, II, or III wells returned to mechanical integrity		85%	89%	89%	88%	86%
SDW-08*	apt	Number High Priority Class V wells closed/permitted (cumulative)		25,225	26,027	26,560	27,383	28,187
SDW-11	-	Percent DWSRF projects awarded to small PWS	71%	71%	71%	70%	70%	71.0%
SDW-15	-	Number small CWS with health-based violations	1,337	1,260	1,282	1,159	822	754
SDW-17	-	Number schools and childcare centers meeting safe standards	7,114	6,991	7,068	6,783	6,795	6,753
SDW-19a	-	Volume of CO <sub>2</sub> sequestered through injection		40,380	47,781	50,753		
SDW-19b	-	Number of permit decisions that result in CO <sub>2</sub> sequestered through injection		0	0	10	0	
SDW-21	-	Number of utilities and officials receiving training and technical assistance					2,929	4,965

<sup>6</sup> Of the 110 performance measures covered in the heat maps, 55 are part of EPA’s Congressional Justification. These “budget” measures are a subset that helps to show EPA’s progress toward the strategic objectives of protecting human health and improving water quality on a watershed basis. More information about the 55 measures can be found in EPA’s Annual Performance Reports (<https://www.epa.gov/planandbudget/>). Budget measures are identified with an asterisk.

Figure 8. Heat Map for Objective 2.1 – Protect Human Health (Cont'd)

ACS Code	PERS Code	Abbreviated Measure Description	Results and Commitment Status					
			2011	2012	2013	2014	2015	2016
<b>Subobjective 2.1.2 Fish and Shellfish Safe to Eat</b>								
FS-SP6.N11*	fs1	Percent women with high mercury blood levels		2.8%		2.1%		3.3%
FS-1a	-	Percent river miles with fish consumption advisory	36%		36%		36%	
FS-1b	-	Percent lake acres with fish consumption advisory	42%		42%		42%	
<b>Subobjective 2.1.3 Water Safe for Swimming</b>								
SS-SP9.N11	-	Percent beach days safe for swimming	96%	95%	96%	95%	95%	92.8%
SS-1	-	Number enforceable long-term CSO control plan with specific dates and milestones in place (cumulative)	734	748	758	775	785	794
SS-2	-	Percent Tier I (significant) public beaches monitored and managed	100%	100%	98%	98%	99%	99.3%

### Noteworthy Results for Objective 2.1

Objective 2.1 is to Protect Human Health, and covers three subobjectives: Safe Drinking Water, Fish and Shellfish Safe to Eat, and Safe Swimming.

EPA met 86% of its commitments under the Safe Drinking Water subobjective in FY 2016 for all commitment measures with reported results, as shown in Figure 8. Among the highlights for this subobjective are the following:

- 95% of the cumulative amount of Drinking Water State Revolving Funds (DWSRFs) available had loan agreements in place. [SDW-04]
- 90.4% of community water systems (CWSs) met all applicable health-based standards through approaches that include effective treatment and source water protection. [SDW-SP1.N11]
- 96% of “person-months” (i.e., all persons served by CWSs multiplied by 12 months) during which CWSs provided drinking water met all applicable health-based drinking water standards. [SDW-SP2]

Figure 9. Heat Map for Objective 2.2 – Protect and Restore Watersheds and Aquatic Ecosystems (Core Water Program Measures)

ACS Code	PERS Code	Abbreviated Measure Description	Results and Commitment Status					
			2011	2012	2013	2014	2015	2016
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 40%;"> <p><span style="color: green;">■</span> = Met</p> <p><span style="color: orange;">■</span> = Not Met</p> <p><span style="background-color: #cccccc;">■</span> = Data Not Available</p> </div> <div style="width: 50%;"> <p><span style="background-color: #cccccc;">■</span> = Indicator/Long-Term (No Commitment)</p> <p><span style="background-color: #cccccc;">■</span> = Measure Did Not Exist</p> </div> </div>								
<b>Subobjective 2.2.1 Improve Water Quality on a Watershed Basis</b>								
WQ-SP10.N11*	L	Number formerly impaired waterbodies now meeting standards (cumulative)	3,119	3,527	3,679	3,866	3,944	4,009
WQ-SP11*	wq2	Number causes of waterbody impairment removed (cumulative)	9,527	11,134	11,754	12,288	12,640	12,910
WQ-SP12.N11*	wq3	Number impaired watersheds improved water quality (cumulative)	271	332	376	411	450	485
WQ-SP13.N11	-	Maintain and improve nation's lake and stream conditions	Not Maintained				No WQ degradation in lakes	No WQ degradation in lakes
WQ-SP14a.N11	-	Number monitoring stations in tribal waters with improved water quality (cumulative)		15	20	21	28	38
WQ-SP14b.N11	-	Number monitoring stations in tribal waters no degradation in water quality (cumulative)		7	4	6	21	23
WQ-24.N11	-	Number Indian & Alaska Native homes with access to sanitation (cumulative)	56,875	63,087	69,783	75,140	81,080	
WQ-01a	-	Number of numeric nutrient water quality standards adopted (cumulative)	45	42	44	44	48	46
WQ-01d	-	Number of numeric nutrient water quality standards planned to be adopted (cumulative)						3
WQ-02	-	Number tribes with approved water quality standards (cumulative)	38	39	40	41	43	43
WQ-03a*	bpw	Percent states/territories with updated water quality criteria	69.6%	69.6%	58.9%	51.8%	64.3%	69.6%
WQ-03b	-	Number tribes with updated water quality criteria	13	14	9	10	7	10
WQ-04a	-	Percent states/territories water quality standards revisions approved	92%	89%	82%	90%	85%	76.1%
WQ-06a	-	Number tribes implementing monitoring strategies (cumulative)	196	214	224	228	248	244
WQ-09a*	bpg	Number pounds nitrogen reduced from nonpoint sources (millions)	12.8	9	10.4	11.3	9.6	
WQ-09b*	bpf	Number pounds phosphorus reduced from nonpoint sources (millions)	4.8	4.4	3.5	2.7	2.1	
WQ-09c*	bph	Number tons sediment reduced from nonpoint sources (millions)	2.0	1.1	1.2	1.7	0.9	
WQ-10	-	Number NPS-impaired waterbodies restored (cumulative)	358	433	504	560	604	674
WQ-11	-	Number NPDES follow-up actions completed (cumulative)	293	344	364	404	449	508
WQ-12a	-	Percent nontribal NPDES permits current	89.3%	90.4%	89.7%	90.0%	87.0%	88.0%
WQ-12b	-	Percent tribal NPDES permits current	86.5%	86.1%	83.4%	85.0%	84.9%	86.0%
WQ-13a	-	Number facilities covered by MS-4 permit	6,952	6,888	7,774	7,851	7,715	7,752
WQ-13b	-	Number facilities covered by industrial storm water permit	84,718	87,060	94,447	93,042	89,692	95,975
WQ-13c	-	Number sites covered by construction storm water permit	168,744	166,031	158,525	164,494	174,481	181,620
WQ-13d	-	Number facilities covered by CAFO permit	7,994	7,587	6,684	6,946	6,918	5,900
WQ-14a	-	Number POTWs SIUs control mechanisms in place	20,977	20,733	20,739	20,734	20,518	16,907
WQ-14b	-	Number POTWs CIUs control mechanisms in place	1,306	1,667	1,650	1,642	1,514	1,521

Figure 9. Heat Map for Objective 2.2 – Protect and Restore Watersheds and Aquatic Ecosystems (Core Water Program Measures, Cont'd)

ACS Code	PERS Code	Abbreviated Measure Description	Results and Commitment Status					
			2011	2012	2013	2014	2015	2016
			= Met      = Indicator/Long-Term (No Commitment) = Not Met      = Measure Did Not Exist = Data Not Available					
WQ-17*	bpb	CWSRF utilization rate	98%	98%	97%	98%	98%	98%
WQ-19a*	bpl	Number high priority state NPDES permits issued	135%	130%	55%	80%	82%	80%
WQ-19b*	bpv	Number high priority state & EPA NPDES permits issued	132%	128%	55%	77%	81%	78%
WQ-23*	Opb	Percent rural Alaska homes access to drinking water & wastewater disposal	92%	91%	91%	94.4%	94.6%	93.5%
WQ-25a*	uw1	Number urban water projects initiated addressing community water quality issues		46	9	65	28	48
WQ-25b*	uw2	Number of urban water projects completed addressing community water quality issues (cumulative)					60	110
WQ-27*	bpx	Percent priority areas restored to achieve water quality standards						9%
WQ-28	-	Percent state-wide activities leading to completed TMDLs, restoration of impaired waters, or protection of unimpaired waters						
WQ-29	-	Number of states protecting or improving water quality conditions						21
WQ-30	-	Number of WaterSense partners working to improve water use efficiency						1,833
WQ-31	-	Number of water and wastewater utilities that use the EnergyStar Portfolio Manager						
WQ-32	-	Number of water and wastewater utilities that have registered to use the CREAT						431
WQ-33	-	Number of CWSRFs/DWSRFs that used financial incentives to promote climate resilience						17; 15
<b>Subobjective 2.2.2 Improve Coastal and Ocean Waters</b>								
CO-SP20.N11*	co5	Percent ocean dumping sites acceptable conditions achieved	93%	97%	96%	95%	95%	97%
CO-02	-	Number square miles protected from vessel sewage (cumulative)	54,494	58,929	63,773	64,536	64,431	64,431
CO-04	-	Rate of return federal investment for NEP (million dollars)	662	323	822	577	490	464.9
CO-06	-	Number active dredged material sites monitored	33	35	40	41	33	31
CO-432.N11*	202	Number additional NEP acres habitat protected or restored	62,213	114,575	127,594	93,557	111,584	70,462
<b>Subobjective 2.2.3 Increase Wetlands</b>								
WT-SP22*	4E	No net loss of wetlands under CWA Section 404	No Net Loss	No Net Loss	No Net Loss	No Net Loss	No Net loss	No Net Loss
WT-01*	4G	Number wetland acres restored and enhanced (cumulative)	154,000	180,000	207,000	221,000	275,555	291,055
WT-02a	-	Number states/tribes increased wetland program capacity in one or more core elements	54	44	37	36	30	57
WT-03	-	Percent CWA Section 404 permits with greater environmental protection	88%	85%	78%	77%	85%	73.0%

### Noteworthy Results for Objective 2.2 (Core Water Program Measures)

Objective 2.2 is to Protect and Restore Watersheds and Aquatic Ecosystems; the heat map in Figure 9 covers the following subobjectives under this objective: Water Quality, Coastal and Ocean, and Wetlands.

EPA met 52% of its commitments under the Water Quality subobjective in FY 2016 and either did not meet or data were unavailable for 32% and 16% of the measures, respectively. The percentage of commitments met decreased in FY 2016 from the FY 2015 results (70%). Performance highlights include:

- For the ninth consecutive year, EPA and states achieved the national commitment of having current National Pollutant Discharge Elimination System (NPDES) permits in place for non-tribal facilities (88% for FY 2016). [WQ-12a]
- EPA and states made significant gains in documenting the full or partial restoration of waterbodies impaired primarily by nonpoint sources. Nationally, EPA exceeded its commitment, reaching a cumulative 674 waterbodies documented as partially or fully restored. [WQ-10]
- The Clean Water State Revolving Fund (CWSRF) utilization rate reached 98% in FY 2016. [WQ-17]
- EPA and states made progress addressing impaired watersheds by improving 35 watersheds in FY 2016. [WQ-SP12.N11]
- EPA, in partnership with the U.S. Army Corps of Engineers, states, and tribes, was able to report “no net loss” of wetlands under the Clean Water Act Section 404 regulatory program. More than 290,000 acres have been restored and enhanced since 2002. [WT-SP22/WT-01]



Figure 10. Heat Map for Objective 2.2 – Protect and Restore Watersheds and Aquatic Ecosystems (Geographic Program Measures)

ACS Code	PERS Code	Abbreviated Measure Description	Results and Commitment Status					
			2011	2012	2013	2014	2015	2016
Legend: <ul style="list-style-type: none"> <li><span style="color: green;">■</span> = Met</li> <li><span style="color: orange;">■</span> = Not Met</li> <li><span style="color: grey;">■</span> = Data Not Available</li> <li><span style="background-color: lightblue; border: 1px solid black;"> </span> = Indicator/Long-Term (No Commitment)</li> <li><span style="background-color: white; border: 1px solid black;"> </span> = Measure Did Not Exist</li> </ul>								
<b>Subobjective 2.2.4 Great Lakes</b>								
GL-SP31*	626	Number AOCs with all management actions implemented (cumulative)	2	2	3	7	7	8
GL-05*	625	Number BUIs removed within AOCs (cumulative)	26	33	41	52	60	65
GL-07*	629	Number response plans established, response exercises, and/or response actions (cumulative)	8	23	30	38	21	11
GL-09*	628	Number acres managed for populations of invasive species (cumulative)	13,045	31,474	35,924	84,500	101,392	115,889
GL-17*	638	Pounds projected phosphorus reductions from GLRI-funded projects (cumulative)					160,117	402,943
GL-18*	639	Projected gallons untreated urban runoff captured or treated by GLRI-funded projects (millions, cumulative)					37	116
GL-19*	640	Number tributary miles reopened by GLRI-funded projects (cumulative)					3,855	4,615
GL-20*	641	Number miles shoreline and riparian corridors protected, restored, and enhanced by GLRI-funded projects (cumulative)					313	662
GL-21*	642	Number acres of coastal wetlands protected, restored, and enhanced by GLRI-funded projects (cumulative)					7,033	17,540
GL-22*	643	Number acres of other habitats protected, restored, and enhanced by GLRI-funded projects (cumulative)					146,815	167,218
<b>Subobjective 2.2.5 Chesapeake Bay</b>								
CB-05.N14	-	Percent attainment of water quality standards in the Bay and tidal tributaries				28.9%	33.9%	37.2%
-	234*	Reduce per capita nitrogen loads to levels necessary to achieve TMDL allocations			14.92	14.7	14.8	14.35
CB-SP35*	cb6	Percent Bay nitrogen reduction practices implemented	8%	21%	25%	27%	21%	31%
CB-SP36*	cb7	Percent Bay phosphorus reduction practices implemented	1%	19%	27%	43%	71%	81%
CB-SP37*	cb8	Percent Bay sediment reduction practices implemented	11%	30%	32%	37%	25%	48%
<b>Subobjective 2.2.6 Gulf of Mexico</b>								
GM-SP39*	xg2	Number Gulf acres protected, enhanced, or restored (cumulative)	30,052	30,248	30,306	30,319	30,574	31,276
GM-01*	xg3	Improve and/or restore water and habitat quality to meet water quality standards						2
GM-02	-	Promote and support environmental education and outreach						18,662
GM-03	-	Support programs, projects and tools which strengthen community resilience						121

Figure 10. Heat Map for Objective 2.2 – Protect and Restore Watersheds and Aquatic Ecosystems (Geographic Program Measures, Cont'd)

ACS Code	PERS Code	Abbreviated Measure Description	Results and Commitment Status					
			2011	2012	2013	2014	2015	2016
<b>Subobjective 2.2.7 Long Island Sound</b>								
LI-SP41*	li5	Percent goal achieved reducing point source nitrogen discharges	69%	83%	88%	94%	99.8%	
LI-SP42.N11	-	Reduce Long Island Sound hypoxic zone (sq miles)	130	289	80	87	38	138
LI-SP43*	li8	Number acres coastal habitat restored, protected, or enhanced		537	336	410	1,678	532
LI-SP44*	li9	Number miles river and streams for fish passage reopened		72.3	56	21.6	0	50
<b>Subobjective 2.2.8 Puget Sound Basin</b>								
PS-SP49.N11*	ps1	Number acres of Puget Sound shellfish areas improved (cumulative)	1,525	2,489	3,203	3,249	3,277	3,887
PS-SP51*	ps3	Number acres of Puget Sound estuarine wetlands restored (cumulative)	14,629	23,818	30,128	41,006	43,002	45,360
<b>Subobjective 2.2.9 U.S.-Mexico Border Environmental Health</b>								
MB-SP23*	4pg	Number million pounds BOD loadings removed Mexico Border (cumulative)	108.5	119	128.3	131	142.9	151.8
MB-SP24.N11*	xb2	Number additional Mexico Border homes access to safe drinking water	54,734	5,185	3,400	1,468	878	3,700
MB-SP25.N11*	xb3	Number additional Mexico Border homes access to adequate sanitation	513,041	31,092	25,695	12,756	44,070	45,000
<b>Subobjective 2.2.10 Pacific Island Territories</b>								
PI-SP26*	pi1	Percent Pacific Islands population served by CWS	87%	80%	81%	98%	97.7%	82.1%
<b>Subobjective 2.2.11 South Florida Ecosystem</b>								
SFL-SP45	-	Achieve no net loss in South Florida stony coral	Not Achieved	No Net Loss	7%	No Net Loss	7%	6.2%
SFL-SP46	-	Maintain health of South Florida sea grass	Maintained	Not Maintained	Maintained	Maintained	Maintained	Maintained
SFL-SP47a*	sf3	Percent South Florida monitoring stations maintain coastal water quality for chlorophyll a & light clarity	85.4%	CHLA 70.9% Kd 72.5%	CHLA 84.5% Kd 80.4%	CHLA 86.0% Kd 87.2%	CHLA 82.0% Kd 77.3%	CHLA 70.9% Kd 78.5%
SFL-SP47b*	sf4	Percent South Florida monitoring stations maintain coastal water quality for nitrogen and phosphorous	73.6%	DIN 81% TP 89.5%	DIN 60.0% TP 82.3%	DIN 72.6% TP 87.6%	DIN 61.7% TP 78.3%	DIN 70.8% TP 89.1%
SFL-1	-	Increase percent sewage treatment systems receiving advanced wastewater treatment in Florida Keys		13%	5%	4%	7%	3.5%
SFL-2*	sf6	Number STAs with TP outflow less than or the same as the five-year annual average					4	4
<b>Subobjective 2.2.12 Columbia River Basin</b>								
CR-SP53	-	Number acres contaminated sediments cleaned up (cumulative)	63	79	79	82	89	91
CR-SP54	-	Percent reduction of contaminants in water & fish (cumulative)	92%		99%	90%		95.0%

## Noteworthy Results for Objective 2.2 (Geographic Program Measures)

The heat map in Figure 10 covers the geographic program subobjectives under Objective 2.2. EPA implements collaborative programs with other federal agencies, states, and local communities to improve the health of specific geographic areas. The following summaries are highlights and challenges for each geographic program.

### Great Lakes

- In FY 2016, EPA and its partners removed five Beneficial Use Impairments (benchmarks of environmental harm) from areas of concern within the Great Lakes. [GL-05]
- Since FY 2010, EPA and its partners also protected, restored, and enhanced over 180,000 acres of habitat across the Great Lakes Basin (over 30,000 acres in FY 2016). [GL-21/GL-22]

### Chesapeake Bay

The goal set in the 2010 Chesapeake Bay TMDL is designed to ensure all nitrogen, phosphorus, and sediment pollution control efforts needed to fully restore the Bay and its tidal rivers are in place by 2025, with controls, practices, and action in place by 2017 that would achieve 60 percent of the necessary pollution reductions.

- Practices are currently in place to achieve the following percentages of pollution reduction in the Chesapeake Bay watershed; EPA is working with jurisdictions to accelerate the pace of nitrogen reductions.
  - 81% for phosphorus reductions [CB-SP36]
  - 31% for nitrogen reductions [CB-SP35]
  - 48% for sediment reductions [CB-SP37]

### Gulf of Mexico

- In FY 2016, the Gulf of Mexico program restored or protected 702 acres of coastal and upland habitat. [GM-SP39]
- The Gulf of Mexico program has implemented several measure changes in FY 2016 to more accurately measure the impact its efforts moving forward.

### Long Island Sound

- The Long Island Sound program restored or protected 532 acres of coastal habitat, including tidal wetlands, dunes, riparian buffers, and freshwater wetlands in FY 2016. [LI-SP43]

### Puget Sound Basin

- Since FY 2006, 45,360 acres of tidally and seasonally influenced estuarine wetlands have been restored in the Puget Sound Basin, and water quality has been improved in these areas (2,358 acres were restored in FY 2016). [PS-SP51]

### U.S.–Mexico Border Environmental Health

- Infrastructure construction project completions through FY 2016 resulted in the removal of 151.8 million pounds of biochemical oxygen demand loadings cumulatively from the U.S.–Mexico border area. [MB-SP23]
- EPA provided access to safe drinking water for 3,700 additional homes along the U.S.–Mexico border. [MB-SP24.N11]

## Pacific Island Territories

- 82.1% of the population in the U.S. Pacific Island Territories was served by CWSs that meet all applicable health-based drinking water standards throughout the year. [PI-SP26]

## South Florida Ecosystem

- The health and functionality of the sea grass beds in the Florida Keys National Marine Sanctuary were maintained above 2006 baseline levels in FY 2016. [SFL-SP46]

## Columbia River Basin

- In FY 2016, The Columbia River program cleaned up a total of two acres of contaminated sediment in the Lower Columbia River. These cleanups provide a significant contribution to reducing toxins in the Columbia River. EPA measured a 95% reduction in contaminants of concern in the water and fish at several key sites on the Columbia River. [CR-SP53/CR-SP54]



## Regional Performance for Commitment Measures

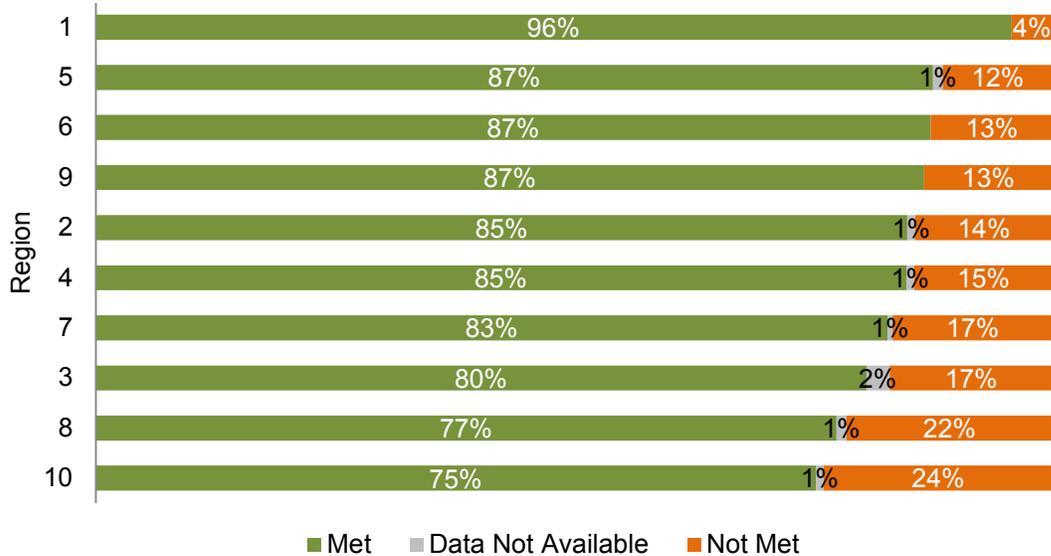
The 10 EPA regional offices, states, and tribes are primarily responsible for implementing the National Water Program. As such, the national results presented above are simple aggregations of regional results. In this section, regional results for commitment measures are briefly described.

On average, 84% of performance commitments set by the EPA regional offices for activities in their geographic areas were met in FY 2016, while an average of 15% of commitments were missed, and 1% of the data were unavailable. Regions 3, 4, 8, and 9 saw a decrease in commitments met in FY 2016, while Regions 2, 5, 6 and 10 saw an increase. Regions 1 and 7 saw no change from FY 2015 to FY 2016.

Regional performance has varied significantly over the last six years; 75% to 96% of performance commitments set by the EPA regional offices were met between FY 2011 and FY 2016, as shown in Figure 11. This variation results from a number of challenges facing each region in meeting its commitments or providing data on the measures. For example:

- Project plans may be delayed until after the National Water Program reporting period has ended; regions, therefore, do not meet their commitment until the following fiscal year, consequently, reporting results in an unintended fiscal year; and
- Progress for some measures is not linear; meaning, progress is dependent on external factors such as weather and seasons, and therefore it is difficult to forecast commitments.

Figure 11. FY 2011-FY 2016 Average Percent Commitments Met/Not Met by Region



## Regional Ambitiousness

For many years, the National Water Program has published the percentage of commitments met and not met by regions in its end-of-year reports. Although this information can be useful in determining to what extent regions are setting and meeting realistic goals, it is limited in that it does not account for the level of ambitiousness or number of stretch goals a specific region attempts to undertake in a given year. In an effort to provide some context to the measure results, the National Water Program developed a method that attempts to assess the ambitiousness of regional commitments, regardless of whether those commitments were met or not met.

EPA used the calculations described below to evaluate the relative ambitiousness of regional commitments for a set of 24 performance measures. These 24 measures were chosen due to the high level of regional participation associated with them.<sup>7</sup> The calculation(s) used for each measure depended on whether the commitment is expressed as a percentage or as a numeric value.

For each commitment expressed as a percentage, EPA computed both:

- The difference between FY 2016 regional commitments and FY 2016 national commitments, and
- The difference between FY 2016 regional commitments and FY 2015 regional end-of-year results.

For each commitment expressed in numeric units, EPA computed:

- FY 2016 regional commitments as a percentage of the regional universe.

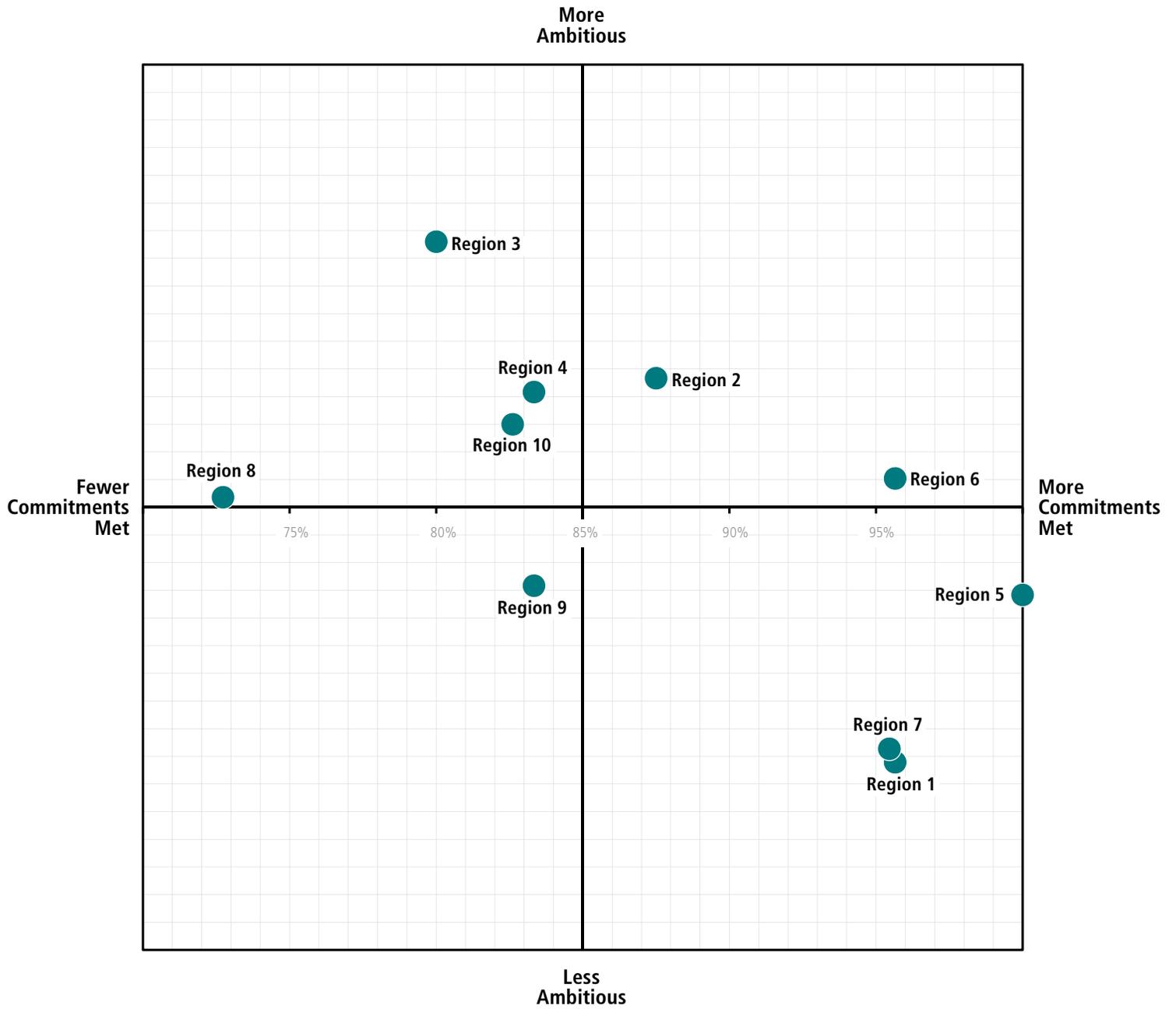
For each measure, within each of the analyses above, each region was assigned a rank based on its result relative to other regions (1 = most ambitious, 10 = least ambitious). For instance, for a particular numeric measure, the region committing to the greatest share of its universe would be ranked most ambitious for that measure. These measure-level rankings were combined to generate an average weighted rank per region (i.e., a region's ambitiousness score).

EPA explored the relationship between each region's level of ambitiousness and the degree to which commitments are met. To do so, EPA plotted each region's ambitiousness score against its percentage of commitments met. As Figure 12 illustrates, there tends to be a tradeoff between regional ambitiousness and the percentage of commitments met.

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<sup>7</sup> The focus is on those measures with eight or more regions setting commitments and reporting results, so that each region is analyzed for a similar number of measures. This choice excluded measures for geographic programs, which are often reported by only one or two regions.

Figure 12. FY 2016 Regional Commitments Met vs. Ambitiousness



# National Water Program FY 2016 Best Practices

## Introduction

Achieving continuous improvement in programmatic activities and environmental outcomes requires a process of planning, implementation, measurement, and analysis. This section highlights a number of best practices that have resulted in successful drinking water, surface water quality, wetlands, coastal and oceans, and large aquatic ecosystem programs. A best practice is defined as a process or methodology that consistently produces superior or innovative results. To propagate their impact widely and encourage their adoption, it is important to identify and analyze these approaches.

The eleven best practices highlighted in this report were selected from proposals submitted by the water divisions in EPA's regional offices. The proposals were evaluated based on the following criteria:

- **Success Within the Program:** How has the activity resulted in improvements? Are the activity results clear? Does the activity have a direct or catalytic impact on program success?
- **Innovation:** How does the activity differ from existing approaches?
- **Replicability:** Can the activity be adopted by other regions/offices/states? Does it have the potential for expansion?
- **Direct Relation to the Agency's Priorities**

The selected best practices do not represent a comprehensive list of the innovative activities that are being implemented. Rather, the selection is intended to provide examples of different types of activities taking place in different regions addressing different subobjectives. In selecting these best practices, special emphasis was placed on identifying activities or approaches that have resulted in measurable successful outcomes. These best practices are in addition to a number of activities identified in the FY 2016 Performance, Trends, and Best Practices Report.

The vision for this report is to promote the widespread use of these successful activities and scale up the benefits of their implementation by sharing information on them among the program and regional offices.

Further activities will be identified and analyzed on a biannual basis. Furthermore, activities that have been selected will continue to be monitored to study their long-term effectiveness. This is part of a continuous learning process that is expected to yield even more innovation and successful outcomes.



# Executive Summary

## Urban Problems Become the Solutions

**Providing Food and Soaking Up Stormwater through Urban Gardens** A Regional Partnership turned a 3-acre urban site into a facility to promote urban agriculture, improve food access and nutrition, and support storm water management. *Pg 30*

**Assessing Vacant Lots as Candidates for Green Infrastructure** Development of a protocol to use in systematically assessing the potential for implementing stormwater runoff retention actions in vacant lots. *Pg 32*

## Getting Good Data Into the Right Hands

**Monitoring Bacteria Levels and Identifying Pollution Sources to Restore a Historic Creek** A Coastal Mississippi Partnership conducted monitoring to determine locations and possible sources of E. coli contamination to Turkey Creek. Collected data supported development of BMPs and infrastructure improvement recommendations. *Pg 34*

**Collecting Data Quickly and Accurately to Respond to the Flint Drinking Water Crisis** Region 5 used iPads to collect and manage Flint drinking water sampling data for use by EPA and for reporting to Flint residents and the public. *Pg 36*

**Conducting Workshops to Increase Tribal Water Quality Monitoring Capabilities** EPA developed and led a multi-day workshop providing targeted technical training to support tribal water quality monitoring personnel. *Pg 38*

**Learning from Each Other Leverages Good Ideas to Restore Urban Waters** EPA has partnered with Groundwork USA and River Network since 2010 to operate the Urban Waters Learning Network, which has developed web-based sources to share information among urban waters practitioners. *Pg 40*

**Mapping Bacteria Pollution in Denver Leads to Better Communication and Decisions** The South Platte River Urban Waters Partnership water quality workgroup developed an analytical tool to map and chart E. coli levels for the Denver metro area. *Pg 42*

## Compliance through Collaboration

**Working Collaboratively to Improve Tribal Drinking Water Compliance** The Region 6 Tribal Drinking Water Workgroup provides training and technical assistance to improve compliance with drinking water rules. *Pg 43*

**Identifying Challenges and Barriers to Effective Funds Utilization** Region 9 conducted an assessment to understand the challenges California and Hawaii were facing to spend their Drinking Water Revolving Loan Funds effectively and to recommend solutions for better funds utilization. *Pg 44*

## Preparing for Disasters

**Promoting Preparedness to Protect a Town's Drinking Water** Development of a story map compiling experiences, videos, and data showing the impacts of extreme weather and flooding and helping to develop response actions to maintain water service. *Pg 46*

**Protecting Drinking Water from Earthquakes** Region 5 established conditions in two permits to protect underground sources of drinking water from contamination that can occur if a well loses mechanical integrity after an earthquake. *Pg 48*



# Providing Food and Soaking Up Stormwater through Urban Gardens

## Brief Description:

The Partnership turned a 3-acre site in an underserved area into an urban farming and aquaponics facility to promote urban agriculture, improve food access and nutrition through community-centered farmers markets, provide storm water education and implement storm water best management practices, provide green job skills and entrepreneurship training, and provide a nature playscape for neighborhood youth to play outdoors. Additionally, the project provides opportunities for arts and educational programming for local schools, neighborhood residents, and University of DC (UDC) students.

The farm set-up can serve as a template for the temporary use of vacant lots and to implement a portable aquaponics component into the design of the farm. All of the materials used in construction of the farm, with the exception of the soil, can be relocated in a different location, if need be. Additionally, the Partnership has developed a manual to facilitate the adoption of this this unique approach replicated in other locations.

## Current Status:

The farm and aquaponics facility are in full operation and enjoying a very fruitful first season.

The launch of the Farmers Market took place in June and it will operate each Saturday at the farm through the growing season. The local community has been highly supportive of the Market.

## Outcomes:

The project’s vision goes beyond the East Capitol Urban Farm, as UDC has mapped vacant lots in the District that might be potential urban garden sites. With the temporary nature of the initial site in mind, partners plan to use

## HIGHLIGHTS

**WHAT** | A transferrable urban garden and aquaponics project – the East Capitol Urban Farm (ECUF).

**WHO** | EPA, Region 3, Office of State and Watershed Partnerships, in partnership with the Anacostia Urban Waters Federal Partnership (AUWFP), District of Columbia Building Industry Association (DCBIA), UDC, American Forests, Bradley Site Design, D.C. Commission on the Arts and Humanities, Metropolitan National Church, Anacostia Groundworks, and others.

**WHY** | In 2012, a study of subsistence angling along the Anacostia River indicated that most people who were fishing in the Anacostia were unaware of fish consumption advisories and as many as 17,000 people were eating fish from the river—many due to hunger. AUWFP partners felt a sense of urgency about the fish consumption issue and began exploring creative solutions to address this problem. This effort helps provide a way for residents to have access to clean fish to eat, and presents an opportunity to install green infrastructure (GI) to control storm water runoff, and educate the community about the benefits of GI.

innovative technologies to build raised beds and portable aquaponics/fish tank facilities. The AUWFP anticipates a continued collaboration with this urban farm effort, both locally and nationally. Four pilots of the Urban Waters Federal Partnership have expressed strong interest in—or are in the early stages of—transforming vacant or underused urban land parcels and establishing urban farms and/or native plant nurseries. These cities are Washington, DC, Kansas City, Los Angeles, and Albuquerque. Urban Waters ambassadors at these sites are working with a headquarters national team and a private sector company to develop a “sister-cities” proposal under the Urban Waters Federal Partnership.

### East Capital Urban Farm



**Lessons Learned/Recommendations:**

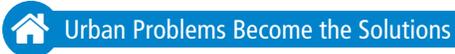
A lessons learned document is being developed.

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**Additional Information:**

<https://www.epa.gov/urbanwaters>



# Assessing Vacant Lots as Candidates for Green Infrastructure

## Brief Description:

The protocol provides guidance on how to assess the potential for stormwater retention on a vacant property. The protocol builds upon an earlier EPA report that highlights environmental issues associated with residential demolitions and provides examples of bid specification language.<sup>7</sup> The protocol is divided into the five assessment areas:

- General site information;
- Elevation, transects, and station points;
- Vegetation;
- Waste and debris; and
- Pervious/impervious surfaces.

The project team developed a standard operating procedure (SOP) for each assessment area. The SOPs provide a step-by-step process to collect data in the field and record that information. In addition to the protocol, a Buffalo-specific database and mobile tablet-based web application were developed to provide data entry and storage of site information.

## Current Status:

The assessment protocol has been finalized and the mobile application is currently being used by BSA. While the mobile application is Buffalo specific, the protocol's SOPs can be used by any municipality and can serve as a basis for an individualized application to be developed.

<sup>7</sup> On the Road to Reuse: Residential Demolition Bid Specification Development Tool (EPA 2013a) <https://www.epa.gov/sites/production/files/2013-09/documents/road-to-reuse-residential-demolition-bid-specification-201309.pdf>

## HIGHLIGHTS

**WHAT** | This project involved the development of an urban vacant land protocol for the Buffalo Sewer Authority's (BSA's) Green Infrastructure Program to use in systematically assessing the potential for stormwater runoff retention in vacant lots.

**WHO** | EPA's Office of Wastewater Management's 2014 Green Infrastructure Technical Assistance Program provided contractor support to the BSA.

**WHY** | In 2014, the BSA submitted a Green Infrastructure Master Plan to EPA and the New York State Department of Environmental Conservation. In the Green Infrastructure Master Plan, BSA proposed to partner with the City of Buffalo to utilize abandoned properties to reduce impervious surfaces within the BSA's sewer system.

## Outcomes:

The results of vacant lot assessments can be used to assess large numbers of parcels for stormwater infiltration potential and to target resources to the sites that provide the largest benefit in terms of stormwater retention. The vacant lot assessments should take approximately one to two hours per lot, depending on the number of field staff involved. The short time spent on-site results in a large amount of data that can be used to assess and analyze impacts of these vacant lots.

This protocol and technical application could serve as a model for similar communities needing to assess the stormwater and green infrastructure performance of post-demolition vacant lots.

### Lessons Learned/Recommendations:

After conducting several dozen urban vacant land assessments, several lessons learned were identified:

- When conducting a vacant land assessment, it is important to consider the age of the demolition. At older sites, it is possible that demolition debris is buried on-site. Many cities have changed their demolition specifications in recent years, disallowing this practice. Unconsolidated demolition debris would affect a property's ability to retain stormwater. Additionally, the former location of the foundation and driveway could impact soil infiltration capacity. Penetration tests could be used in these areas to confirm assumptions about soil compaction and indicate whether construction debris is still present at the site.
- Where there is significant soil variability, assessors need to take the time to assure soil texture tests are properly conducted.
- Some of the testing could be noisy and disturbing to residents and should be conducted at times when they are the least disruptive.
- Due to the large number of sites, a system of data checking and oversight of the assessment process needs to be in place to ensure quality results.

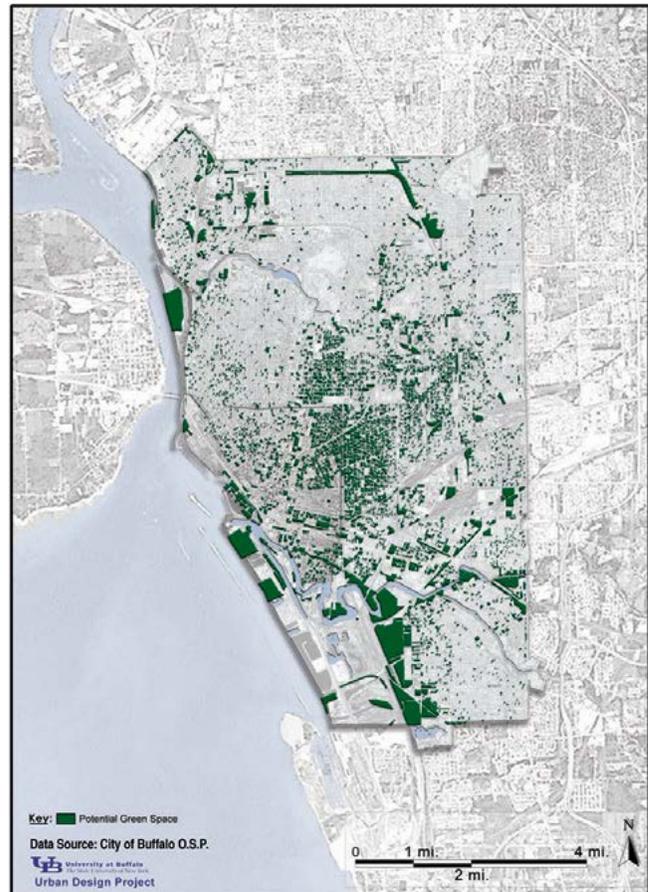
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City of Buffalo/Buffalo Sewer Authority

### Additional Information:

Urban Vacant Land Assessment Protocol, [https://www.epa.gov/sites/production/files/2016-08/documents/buffalo\\_ny\\_urban\\_vacant\\_land\\_assessment\\_protocol.pdf](https://www.epa.gov/sites/production/files/2016-08/documents/buffalo_ny_urban_vacant_land_assessment_protocol.pdf)

### Potential Green Infrastructure



Source: City of Buffalo Comprehensive Plan (Figure 37)

Getting Good Data Into The Right Hands

# Monitoring Bacteria Levels and Identifying Pollution Sources to Restore a Historic Creek

## Brief Description:

The historical communities of Turkey Creek originated in 1866, when a group of emancipated African-Americans purchased land in Harrison County, MS, along the Turkey Creek watershed, which is part of the Mississippi Coastal Basin and Streams waterways system. Turkey Creek is an EPA Making a Visible Difference (MVD) community. Possible sources of bacterial contamination in the creek include urbanized areas, wildlife, livestock, failing or aged septic systems, or other runoffs. There are three sewer system NPDES permitted discharges in the creek.

In August of 2011, the Community's Plan for the Turkey Creek and North Gulfport Neighborhoods included the need to "identify and mitigate all pollution sources for both Turkey Creek and Bayou Bernard, and establish regular monitoring to ensure water quality." A strong partnership has been developed with the Gulf of Mexico Program (GMP), Turkey Creek Steering Committee, MDEQ and key partners which developed a weekly monitoring program that includes students from Mississippi Gulf Coast Community College and the North Gulfport 8th grade. This monitoring data has been reported directly to the Turkey Creek Steering Committee to help the community make informed decisions about implementing best management practices and infrastructure improvements in the watershed. Students worked directly with EPA staff weekly to collect and process samples, especially at the Community College laboratory via a current EPA MOU with the college. EPA staff and students use the EPA approved IDEXX Colilert fluorescent detection method for E. coli most probable number of colonies determination. The data collection is covered under a Quality Assurance Project Plan and is being reported under two EPA Regional Applied Research Effort (RARE) projects that include Turkey Creek.

High E. coli levels have been found in the creek in both low flow and high flow conditions during FY 2016 along with

## HIGHLIGHTS

**WHAT** | A Coastal Mississippi Partnership in the Turkey Creek watershed determined locations and possible sources of E. coli contamination to the stream. Partners conducted weekly water quality parameter and E. coli monitoring and discussed this data with the Turkey Creek Steering Committee for development of BMPs and infrastructure improvement recommendations.

**WHO** | EPA Gulf of Mexico Program; Mississippi Department of Environmental Quality (MDEQ); Turkey Creek Steering Committee; Land Trust for the Mississippi Coastal Plain; Mississippi Gulf Coast Community College Jefferson Davis Campus; North Gulfport 8th Grade School; EPA Region 4 and the EPA Office of Water.

**WHY** | This project was developed and implemented with Turkey Creek partners to identify pollution sources in the creek and builds on and augments the monitoring work MDEQ has conducted to establish a Total Maximum Daily Load (TMDL) for fecal coliform in the creek.

some low levels of E. coli found during low to no-runoff sampling days. FY 2016 had many significant rainfall events and the stream stayed on most sampling days above low flow conditions.

## Current Status:

The current Turkey Creek MVD community monitoring project has received initial support from the Office of Water with funding for some equipment, supplies and consumables that was leveraged with other funds. A RARE project on which GMP and GED implemented periphyton and nutrient analysis was added in Turkey Creek starting the end of March 2016. Recently a new RARE proposal was awarded to the Turkey Creek Watershed partnership for direct bacterial and viral



source tracking. This new RARE funding will strongly leverage the current successful community monitoring program in Turkey Creek and better inform the Steering Committee's decisions on seeking solutions to the contamination in the creek.

### Outcomes:

- Water quality results are discussed regularly at Turkey Creek Steering Committee meetings, which include local residents and decision makers as well as state, federal and NGO partners. Decision makers are using the data to seek solutions to high bacterial levels in the creek. Since E. coli levels are elevated, bacterial source tracking is currently being conducted with partners and that information will be brought back to the Steering Committee for decision making as well.
- Over 100 8th grade students directly participated in hands-on weekly water quality monitoring in Turkey Creek and approximately 500 8th grade students participated in water quality and environmental outreach events at North Gulfport 8th Grade School.
- Mississippi Gulf Coast Community College Phi Theta Kappa students won regional and international awards for their partnership work in water quality monitoring in Turkey Creek with partners.
- Effective leveraging of both EPA and partner resources and time has led to a strong Turkey Creek monitoring partnership that seeks solutions based directly on the community's needs.

- As a result of the partners work, Turkey Creek has also been chosen by Region 4 as the location for Phylochip analysis to determine bacterial community make-up with the Lawrence Berkeley National Lab. Student and community partners will be collecting the Phylochip samples and RARE project samples with EPA staff. All data will continue to be reported via EPA RARE and directly to the Turkey Creek Steering Committee and the city.

### Lessons Learned/Recommendations:

- Forming partnerships (Federal, State, Universities, and Civic groups) and pooling funds produced significant results that are not otherwise obtainable.
- Outreach events with local schools and universities helped to gain buy-in of environmental data by local groups.

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Getting Good Data Into The Right Hands

# Collecting Data Quickly and Accurately to Respond to the Flint Drinking Water Crisis

## Brief Description:

Region 5 developed an innovative e-Process to collect and manage Flint drinking water sampling data for use by Incident Command, sampling teams, drinking water technical staff, and EPA management, and for reporting to Flint residents and the public. Data are collected by field samplers using iPads, verified by the sampling teams, and then uploaded to an MS Access database. From there, drinking water technical staff review final laboratory results, prepare reports, prepare letters to individual residents, and provide public website content (which protects Personally Identifiable Information (PII)). The master database is in MS Access, and Scribe software is used to manage data queries and correct misaligned data links. The e-Process is sufficiently flexible to manage different drinking water sampling types such as sequential samples, filtered samples, grab water samples from multiple locations within the home, chlorine field measurements, and more. The database already contains tens of thousands of data points, and e-Process is actively managing this information and able to prepare reports and maps for analysis and public dissemination.

## Current Status:

This e-Process was implemented following the January 2016 emergency declaration in Flint, MI, and continues to be used as part of EPA's response activities. Data managed using the e-Process continues to be used to assess the status of the Flint drinking water system, inform decision-making, and prepare reports and maps for public dissemination of information. The e-Process fulfills the niche of collecting, managing, storing, and organizing field information, and linking the information to corresponding analytical results from numerous sampling locations and sampling objectives. It is foreseeable Region 5 will continue to use this e-Process, including corresponding iPads, well into the future.

## HIGHLIGHTS

**WHAT** | The data management "e-Process" using iPads in field is an excellent IT system to efficiently collect, share, analyze, and interpret large numbers of environmental sample results.

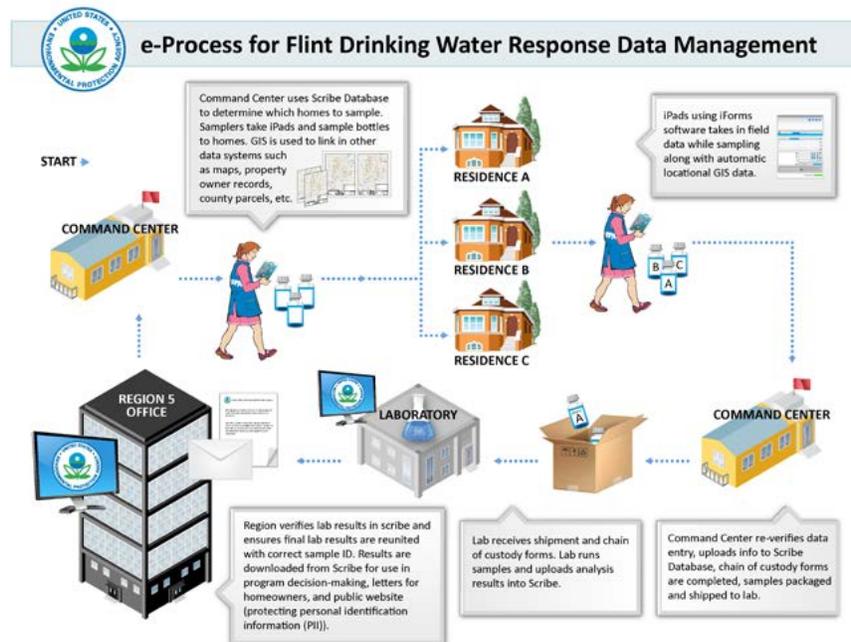
**WHO** | The e-Process is a combined undertaking between Region 5 Water and Superfund Divisions involving field staff, IT and GIS specialists, QA staff, scientists, engineers, and the regional laboratory.

**WHY** | From the very beginning of the Flint drinking water crisis, Region 5 realized it needed a better process to facilitate time critical exchange of information between sampling teams, laboratories, drinking water technical staff, Incident Command, and US EPA management, as well as reporting to Flint residents and the public.

## Outcomes:

The e-Process is so effective in the Flint Drinking Water Response that a similar e-Process is being implemented at a second emergency response in Region 5, addressing lead in dust and soil in East Chicago, IN. Among the benefits as demonstrated by the Flint Drinking Water Response, the e-Process:

- Ensures a consistent, reliable data collection information flow that links field sample collection information to laboratory analytical results;
- Ensures appropriate actions and functions of samplers, laboratories, and data reviewers;
- Prevents unnecessary duplication of work;
- Provides verification and quality assurance of field sample collection data, chain of custody, and laboratory analytical results;



- Facilitates analysis, mapping, and reporting of information for informed decision-making, communication between the different activities and EPA offices, and information sharing for the public; and
- Ensures protection of PII.

The most important outcomes are effective data entry, verification and validation which produce a reliable and comprehensive data set, and effective data exports which produce meaningful reporting for decision making and for public dissemination.

### Lessons Learned/Recommendations:

When it comes to emergency responses impacting communities, this project combined sound IT tools and technical reviews, managed large volumes of field data, linked in laboratory analytical results, met PII concerns, and presented information in a meaningful fashion. It was based on Region 5's Superfund experience and knowledge of iForms and Scribe databases.

- The e-Process is easily tailored for any field operation, independent of environmental media. It is effective at

data management and export, and a similar e-Process is now being implemented at a second emergency response in Region 5 in East Chicago, IN.

- To implement elsewhere, IT staff familiar with MS Excel, MS Access, Scribe, database design, and programming skills can tailor data fields to the specific situation, with input from scientists and engineers familiar with the sampling objectives. The iForm templates used for data input can be created and Scribe software is already in use by Regional and commercial labs.
- Current EPA computer, IT systems, and software platforms are compatible with the e-Process. Procuring iPads for field staff would be a new hardware requirement for implementation. As part of the e-Process, technical staff familiar with the sampling objectives should be involved in field data verification, analytical data review, and preparation of reports such as maps.

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Getting Good Data Into The Right Hands

# Conducting Workshops to Increase Tribal Water Quality Monitoring Capabilities

## Brief Description:

Face-to-face interaction between tribal monitoring personnel and EPA technical staff is critical to workshop success and the free exchange of ideas and solutions. The workshop represents a new and innovative approach to training tribal water quality monitoring personnel. Currently, outside of this workshop, training opportunities for tribal monitoring personnel are often limited in availability and scope. The tailored course content is designed specifically by EPA technical staff to meet the immediate training needs of tribal monitoring personnel. Direct contact between EPA technical staff and tribal monitoring personnel facilitates the establishment of relationships while at the same time providing directly applicable programmatic-specific training.

## Current Status:

Following two successful workshops, a third annual workshop is tentatively planned for late 2017 dependent upon travel budget, current workload of staff, and tribal demand.

## Outcomes:

Forty six members of tribal monitoring programs have attended the two workshops and have provided very positive feedback regarding both workshop content and approach. Additionally, increased contact between EPA technical staff and tribal monitoring personnel has been leading to the collection of better quality data and more thorough data assessment. Lastly, an unexpected workshop success was the formation of tribe-tribe collaborations to tackle equipment and/or monitoring issues.

The outcomes and results of the workshop have included the following:

- EPA staff increased their understanding of the challenges and training needs facing tribal water quality monitoring staff.

## HIGHLIGHTS

**WHAT** | An EPA-led hands-on multi-day workshop providing targeted technical training for tribal water quality monitoring personnel. Collaboration with tribes was necessary to identify a tribe or pueblo with the willingness and resources (i.e. classroom and easily-accessible stream sampling sites) to host the training workshop.

**WHO** | Water Division, Region 6 developed content and provided instruction for the workshops. To date, two successful workshops have been held – one each in Oklahoma and New Mexico.

**WHY** | To counter the detrimental effects of rapid staff turnover observed in several tribal monitoring programs which have limited the availability of personnel with monitoring experience. To fill a void in available training opportunities and provide necessary, tailored, practical hands-on water quality monitoring experience that promotes collection of high quality data and increases capacity of tribal monitoring programs. To foster better communication between tribal water quality monitoring personnel and EPA staff.

- Tribal monitoring personnel increased their comprehension and capacity regarding EPA-required monitoring documents such as Quality Assurance Project Plans (QAPPs) and Tribal Annual Reports.
- Tribal monitoring personnel gained hands-on experience using technically advanced water quality monitoring equipment.
- Tribal monitoring personnel increased the rigor of their quality assurance practices (leading to increased data quality).
- EPA technical staff and tribal monitoring personnel increased their direct communication.



- Tribal monitoring personnel from multiple programs increased communication and collaboration.

### **Lessons Learned/Recommendations:**

The workshop can be easily modified for implementation in different regions, as EPA staff can determine course content. This workshop is best for beginning-to intermediate-level tribal program staff and ideally suited for those with less experience or new to water quality monitoring and reporting.

It has been valuable for members of advanced programs to be present at the workshop, but they should expect to serve as mentors, which will foster tribe-tribe communication. If possible, have an experienced tribal monitoring staff member teach one or more of the hands-on trainings.

Ask the tribes to bring their water quality monitoring equipment to the training and have every program conduct a pre-and post-calibration of their multiprobe sondes, since this one piece of equipment causes the most confusion and it is used for the majority of tribal-produced data.

Lastly, strive to create an atmosphere that is free, open and conducive to sharing and learning and let participants know that EPA staff are not there to perform evaluations of monitoring programs.

Region 6 has replicated the workshop with equal success by 1) Not charging a workshop fee; 2) Holding the workshop in a central location that can serve multiple tribes/pueblos and is conducive to day-travel; 3) Having field sites available for hands-on training; and 4) Collaborating with "host" tribes/pueblos to secure classroom space at no charge. Additionally, the workshop could be scaled up to allow more time in the field to demonstrate additional sampling methods, or scaled down by cutting out unneeded topics or limiting field time.

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 Getting Good Data Into The Right Hands

# Learning from Each Other Leverages Good Ideas to Restore Urban Waters

## Brief Description:

EPA has partnered with Groundwork USA and River Network since 2010 to operate the Urban Waters Learning Network. The Urban Waters Learning Network is an innovative sharing network because it contributes so much more than web-based resources for urban waters practitioners. The Learning Network sustains active conversation among members, solves challenges and answers questions in real-time, and brings disparate organizations and actors from across the country into a unified movement to revitalize the nation's waterways and surrounding communities. The Urban Waters Learning Network and its members have become thought leaders and conversation shapers in the wider environmental movement.

Members also share their expertise by hosting webinars and peer calls on topics of interest such as green infrastructure job training programs, community grants best practices, and how to design volunteer water quality monitoring programs. The Learning Network amplifies member successes, posts the most useful practitioner resources and guides to an online Resource Toolbox, and announces major funding and event opportunities to those outside the Learning Network on its public website. Doing so allows replicable models, best practices, and experts' contact information to percolate to anyone outside the Learning Network's Basecamp community including organizations, local governments, and individuals.

The Urban Waters Learning Network hosts the Urban Waters Learning Forum. The Forum provides a face-to-face opportunity for members of the Learning Network to strengthen relationships, discuss emerging topics and issues, and provide input on the past and future activities provided by the Learning Network. The Urban Waters Learning Forum is held as a side-event before River Rally, River Network's annual conference.

EPA's partners in this initiative are River Network and Groundwork USA (Learning Network Coordinators), who

## HIGHLIGHTS

**WHAT** | The Urban Waters Learning Network provides a model for how to cultivate and support a national community of environmental organizations and practitioners to learn from one another and achieve a common set of goals.

**WHO** | EPA's Urban Waters Program with River Network and Groundwork USA operate this network of over 375 members comprised of current and past grantees and key partners.

**WHY** | This was developed as a way to capture and share knowledge among urban waters practitioners and give grantees and partners a support system even when grant terms end and federal resources are not available.

coordinate and operate the Urban Waters Learning Network with funding from EPA. River Network brings expertise in non-profit organizational development and capacity-building, policy, science, and leadership along with a network of over 6,000 organizations, agencies, individuals, and corporations. Groundwork USA brings expertise in on-the-ground project organizing and implementation of urban waters projects, environmental justice insights, and a network of over twenty local Groundwork Trusts. The Learning Network is funded through a grant managed by a cooperative agreement between Groundwork USA and the National Park Service within the Department of the Interior.

## Current Status:

The Urban Waters Learning Network has experienced significant growth. In 2010, the Learning Network had just twenty members. By 2013, it had 120, and by 2015, it had grown to over 350. The Learning Network grows with each new cycle of grant recipients from the Urban Waters Small Grants

Program and the Urban Waters funded Five Star and Urban Waters Restoration Grants Program. The Learning Network also includes Urban Waters Federal Partnership locations and their local partnership members.

Currently, the Learning Network is continuing its agenda of providing support and opportunities for members to share successes, challenges, and technical resources. The Learning Network is creating a new means to recognize member excellence and share successes through the first Urban Waters Learning Network Contest.

#### **Outcomes:**

The Learning Network's role in peer networking and idea incubation has led to real impacts and gains on the ground, including the following:

- A member organization from Michigan launched a youth stewardship program (Green Team) after learning about Green Teams from Network members. Green Teams are paid positions that focus youth on urban environmental challenges.
- A member from Alabama installed a trash boom after being inspired by a presentation from another member at the Learning Forum.

The Learning Network is creating more space in the environmental movement to discuss environmental justice and issues central to work on urban waters in particular. This impact can be seen in the increased number of sessions at River Rally, the premier conference for water conservation organizations, featuring environmental justice insights and organizers and the institutionalization of Urban Waters as its own conference track. Lastly, Learning Network Coordinators are continuing to build out the Resource Tool box and create a pipeline for EPA offices and programs to easily share documents with this community.

#### **Lessons Learned/Recommendations:**

- Because one of the key elements of the Urban Waters Learning Network is to share information and best practices, anyone can find useful and replicable information from this network online. The Learning Network model could be replicated for other types of environmental communities of practice.
- Partnering with well-established national organizations with complimentary skills to coordinate the Urban Waters Learning Network has been essential to building trust and connection within the network.
- Meeting face-to-face with members on a yearly basis breathes new energy into and sustains participation in the Learning Network. Doing so also helps to onboard new members.
- Providing a member-only networking tool such as Basecamp and a publicly available website for accessing tools, training, case studies and resource announcements benefits the largest audience and provides a venue for distribution of EPA key guidance and tools.

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<http://www.urbanwaterslearningnetwork.org>

Getting Good Data Into The Right Hands

# Mapping Bacteria Pollution in Denver Leads to Better Communication and Decisions

## Brief Description:

The SPRUWP is conducting a water quality assessment that will present a cross-jurisdictional view of water quality in the Denver metro area. EPA assisted in compiling data to map pollutants and emerging contaminants in relation to development patterns. The Agency then collected and analyzed some of the data and worked with Groundwork Denver to compile all of the data into spreadsheets. Data also came from USGS and the Colorado Data Sharing Network. The developed tool currently has the capability to map and/or chart water quality data for the urban South Platte River basin for E. coli. EPA is currently creating a mobile platform and expanding the contaminants from E. coli to also include total dissolved solids, nutrients, and select pesticides, pharmaceuticals, and personal care products. The water quality workgroup is developing the storylines for the added contaminants.

## Current Status:

The interactive tool went live in January 2016, making existing E. coli water quality data available to professionals and the public. The dataset represents over 5,000 sampling events between 2009 and 2014.

## Outcomes:

This tool can be useful to decision makers, educators and the general public to explore water quality issues that impact everyone. Work is underway to restart the education sub-committee of SPRUWP and incorporate the tool into various efforts. Many nonprofits in the Denver metro area have efforts around water quality and education that the tool can be incorporated into. The tool is replicable by other urban waters partnership areas, communities, or nonprofits.

## Lessons Learned/Recommendations:

Collaboration was key to the success of this program as multiple groups collected and housed data and the workload was distributed across multiple key players. Hosting the tool on a non-government server provided the Partnership with more flexibility.

## HIGHLIGHTS

**WHAT** | The Denver Metro Water Quality Assessment Tool combines E. coli data from 2009 through 2014 with maps, graphs, and narrative to provide a picture of water quality in the South Platte River basin.

**WHO** | The South Platte River Urban Waters Partnership (SPRUWP) water quality workgroup, which has participation from EPA Region 8, USGS, ATSDR, USFS, Denver Water, Denver Environmental Health, Colorado Department of Public Health and Environment (CDPHE), Littleton/Englewood Wastewater Treatment Plant, Metro Wastewater, CO Watershed Assembly, The Water Connection/Greenway Foundation, Aurora Water, Tri-County Health Department, and led by Groundwork.

**WHY** | This tool provides a central location for the public, decision makers, and educators to obtain water quality information and background information about what the information means, why it is important, and what the public can do to reduce E. coli contamination in the watershed.

There is an enormous amount of quality assurance that goes into compiling this amount of data. Creating the interface required a creative and knowledgeable person, and the tool was created with open source code, so it is available to anyone.

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## Additional Information:

[http://thewaterconnection.org/wq\\_tool/](http://thewaterconnection.org/wq_tool/)



## Compliance Through Collaboration

# Working Collaboratively to Improve Tribal Drinking Water Compliance

**Brief Description:**

Region 6 continued its Tribal Collaborative Workgroup efforts which include providing training and technical assistance to assist tribes with compliance, as well as conducting regular meetings with tribal representatives to resolve the most difficult compliance issues on tribal lands.

The Workgroup's weekly/monthly focus includes discussions on the quarterly violation list; enforcement strategy to address the violations list; training and technical assistance efforts planned; status of administrative orders; coordination between the enforcement compliance inspections and regulatory sanitary surveys; and consultation with tribal leadership and utility staff.

**Current Status:**

The Workgroup continues to meet and collaborate regularly to address/prevent compliance issues before they become drinking water violations.

**Outcomes:**

Due to the Workgroup efforts, the tribal compliance rate in Region 6 went from 83% to 86% in populations served by tribal community water systems that met health-based standards. Among those served by these systems are children, the elderly, and the immuno-suppressed.

In addition, the Workgroup's efforts reduced down to zero the number of tribal water systems on the EPA Enforcement Targeting (ETT) list with 11+ points or higher, which would place them on the radar for formal enforcement actions. This marks the first time since the inception of the ETT list (2009) that Region 6 has zero tribal water systems on the ETT list with 11+ points.

## HIGHLIGHTS

**WHAT** | Work of the Region 6 Tribal Drinking Water Workgroup has led to improved drinking water oversight and compliance on tribal lands.

**WHO** | The Workgroup consists of the Region 6 Water Division, Enforcement Division, Regional Counsel, and the Office of Environmental Justice and Tribal Affairs.

**WHY** | The Workgroup was developed for the Divisions to collaborate on a regular basis (weekly, biweekly, monthly) to determine the most effective and consistent way to address tribal drinking water system issues and violations. The goal was to decrease violations and improve compliance and EPA's oversight role as the primacy agency for tribal water systems.

**Lessons Learned/Recommendations:**

This Workgroup practice can easily be implemented/replicated in other Regions/States. This collaborative, cross-program approach has proven to be effective in improving tribal drinking water compliance, as well as collaborative partnerships among the Divisions and with our tribal and federal partners outside of EPA.

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# Identifying Challenges and Barriers to Effective Funds Utilization

## Brief Description:

The California and Hawaii DWSRF programs were found in non-compliance with the Safe Drinking Water Act (SDWA) for inadequate financial management and unspent federal dollars or “unliquidated obligations,” also known as “ULO’s.” The NNC to California cited \$455 million in ULO’s, the highest dollar amount in the nation and one of the highest national percentages. Hawaii had a ULO of \$33 million and one of the highest national percentages of ULO when issued its NNC.

The management study was developed as a comprehensive assessment to identify institutional and organizational challenges hindering the DWSRF funding process. The scope of the assessment was very broad and included marketing, management, internal processes, political forces, planning, federal and state legal constraints, partnering agencies and more. Onsite meetings were held with staff to discuss the challenges facing the DWSRF program, targeted interviews were held with program level staff and management, and a Process Optimization Drill was conducted to empirically quantify the workload associated with managing the DWSRF program. The final assessment report summarized the challenges facing the program and recommended options for change and program improvement. For each item, a staff lead was recommended (state, contractor, Region 9), a timeline was laid out, and an assessment of impact and the level of effort was described.

Similar assessments have been conducted for SRF programs in the past, however the unique aspect of this project is that it included a broader scope and was required as an enforcement action in California and Hawaii, and appropriate recommendations from the studies were incorporated into the CAPs, which ensured that critical changes to the program would be mandatory (note: not all items were incorporated into the CAPs).

## HIGHLIGHTS

**WHAT** | Utilizing management studies in conjunction with an enforcement action (i.e., notices of non-compliance (NNCs)) to create holistic Drinking Water State Revolving Loan Fund (DWSRF) program improvements for California and Hawaii.

**WHO** | Developed by Region 9 with contractor support; conducted by state DWSRF grantees, Region9 and contractor.

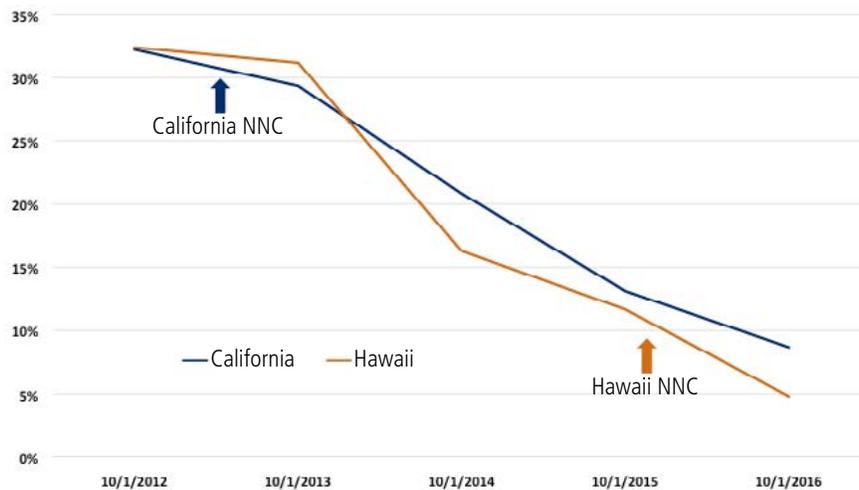
**WHY** | Allowed Region9 to fully understand the organizational, legal and political impediments contributing to California’s and Hawaii’s unliquidated obligations (ULOs). Through the enforcement action and subsequent corrective action plans (CAPs) impediments were addressed to ensure a return to compliance in a lasting and meaningful way.

The overwhelming success of this approach could not have been achieved without strong support and engagement of the state agencies who played an integral role in conducting the management studies, agreeing with the final report, and implementing recommendations from the report. All parties were invested and had responsibilities in completing actions incorporated into the CAPs.

## Outcomes:

- California completed the CAP early and returned to compliance with the SDWA. It reduced ULOs from the \$455 million cited in the NNC to \$154 million as of 11/1/16 (note: California received a capitalization grant of \$78 million on 10/1/16). It is positioned to meet the DWSRF ULO policy.
- Hawaii is in the process of completing its CAP. The State reduced ULOs from the \$33 million cited in the NNC to

Unliquidated Obligations as a Percentage of Awarded Federal Dollars



\$8.7 million as of 11/1/16 (note: Hawaii received a capitalization grant of \$7.9 million 10/1/16). It is positioned to meet the DWSRF ULO policy.

**Lessons Learned/Recommendations:**

- Broader Context:** The purpose of conducting and incorporating a management study with a grant enforcement action is to ensure long-lasting program improvements. The goals are to assess the program holistically and make improvements, across the program, that are impactful and sustainable, and to prevent a return to non-compliance. This approach is implementable nation-wide. One of the most fundamental aspects of this approach is that it can be 100% tailored to the program under review. In Region 9 it was applied to the largest SRF program in the nation (California receives an allotment of 9.4%) and one of the smallest (Hawaii receives an allotment of 1%). This approach is predicated upon being able to undertake a management study and issue a NNC. The latter is an enforcement action with repercussions for failure to perform, such as potential grant withholding. The stakes are very high. As such, a realistic assessment of the appetite for risk should be conducted. What is the level of pressure to correct the underlying issues causing non-compliance and

under-performance at the state agency?

- Buy In:** If the Regional Administrator (RA) finds a state program in non-compliance, his/her support will likely be needed throughout the project. This approach can involve outreach to governor’s offices, legislative representatives, agency heads, and the media.
- Level of Effort:** This is not a small lift. As mentioned, the RA needs to be involved to a fair degree. Regional Council will need to be involved as well as the Public Affairs Office. Program staff up through the Division Director will likely all see an increase in engagement on this.
- Relationship with State Grantee:** The state is an integral partner in the process. On one hand they will be found in non-compliance and will likely not be happy about this. On the other hand they will need to buy-in to the process, as it will go much smoother if they are cooperative during the study, realistic with implementing changes, and committed to being responsible for their actions.

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 Preparing for Disasters

# Promoting Preparedness to Protect a Town's Drinking Water

## Brief Description:

EPA Region 1 worked with ORD to develop an understanding of the vulnerability of the drinking water and wastewater pumping station to storm surges, and identified adaptation options to create resiliency. The extent of storm surge was predicted using the SLOSH model, with a matrix of hurricane parameters from global climate model CMIP5 and resultant projected sea level rise. The results from the inundation models were combined with hydrogeological modeling to identify potential for salt water intrusion and to facilitate identification of potential options for adaptive measures.

While working on the resilience of the drinking water and wastewater system EPA conducted a community assessment to identify ways residents could connect to climate change in their community. EPA held a series of meetings with town employees and community members including the library director and the environmental science teacher at the high school, a scout leader, director of the council on aging, and officers from the land trust.

At the first community meeting in January 2016, EPA Region 1 shared all the ideas it had collected about emergency preparedness, past storms, and possible actions to take. The community cable station volunteered to capture the stories from survivors of past hurricanes and storms. The library created a display about preparedness. Over time meetings continued about every six weeks and the group selected the name Weather Ready Mattapoisett.

By the end of the summer, the local cable station created videos about preparedness using the town manager, fire and police chiefs, and the drinking water and highway superintendents, focusing on the importance of preparedness and evacuation orders. The cable station recorded many stories from citizens who remembered the hurricane of '38 and Hurricane Bob, incorporating pictures and video footage that was received from the librarian's spring press release. An Eagle Scout posted signs on utility poles around the town

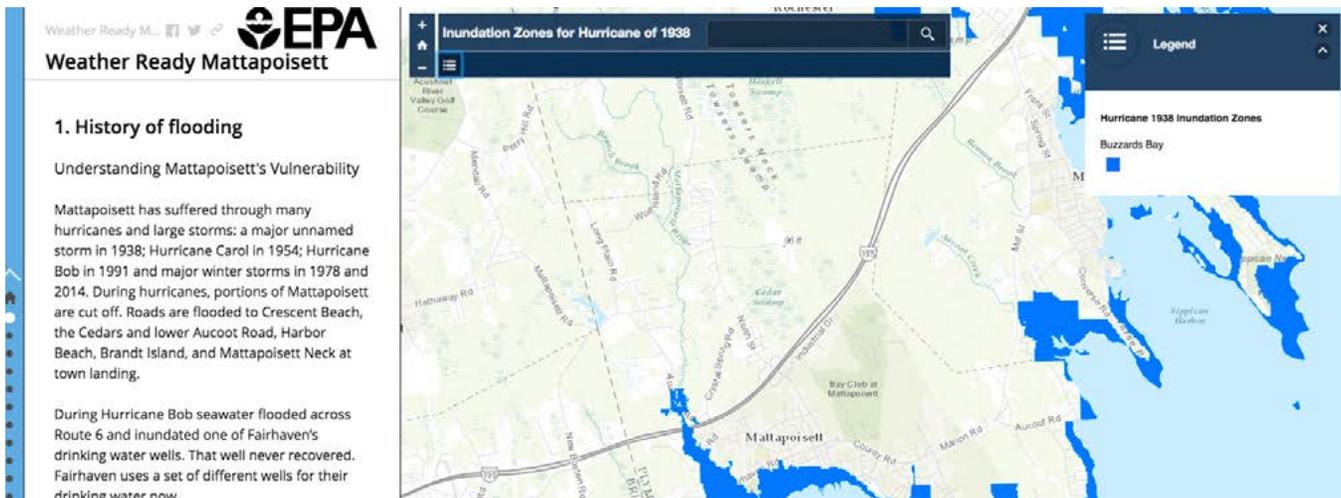
## HIGHLIGHTS

**WHAT** | In conjunction with a project to understand the vulnerability of drinking water in Mattapoisett, Massachusetts to impacts from climate change, EPA worked with local residents to collect stories of the impacts of extreme weather events in their community. The final product incorporated visual reminders of past hurricanes as well as highlighting the need to develop an adaptation plan for their drinking water and wastewater pumping station. In addition, there were videos of survival stories from the unnamed hurricane of 1938 and Hurricane Bob; a flood-level marking project; a long term environmental monitoring project; before and after photos; and the development of a story map which compiled accomplishments of all the projects.

**WHO** | EPA Region 1 and the Office of Research and Development (ORD), along with various community members for the town of Mattapoisett.

**WHY** | EPA wanted to engage the Mattapoisett community in addressing issues related to climate change, focusing on the threat to the town's drinking water system from a storm surge inundating its drinking water wells and saltwater intrusion into source water. The hope was that citizen involvement would increase local interest in the results of the vulnerability assessment of their drinking water systems, and support for potential adaptation measures for their infrastructure and their community.

using EPA's modeling results and local knowledge to estimate the water height from past floods. The team created a collection of before and after photos, using the pictures from residents and images from Google Maps to compare them to present day locations. To sustain this effort, the science teacher identified two locations for a picture post, which will allow students and residents to use their own smartphones to collect information about their changing environment.



**Current Status:**

The community plans to use information from completed projects during their hazard mitigation planning.

**Outcomes:**

In October 2016, Weather Ready Mattapoisett held a public meeting presenting all the information to the community. The community created a web page with the information about the projects. EPA Region 1 coordinated with FEMA's PrepareAthon using their preparedness templates and incorporating local information.

At that meeting, EPA shared the story map about Mattapoisett "How one community is preparing for extreme weather and a changing climate." This format allowed EPA to link all the pieces of this project into a coherent story about preparedness and potential impacts, as well as provide a way to hear the hurricane survivor stories. On the science end, the story map provided graphics from the EPA ORD/Region 1 research project which compared inundation between different storm categories and the impact of sea level rise on the town's critical drinking water wells wastewater pumping station.

At the end of the meeting, a neighboring town expressed interest in seeing how EPA could support them in doing a similar project. EPA Region 1 has also heard from another coastal community that is interested in using a story map and marking flood heights to tell their story for their town. Bina Venkataraman, the director of Global Policy Initiatives at the

Broad Institute of MIT and Harvard and lecturer at MIT is planning to include this effort as a chapter in a book she is working on about how society can forge tools to think about the future amid the rapid changes we are all facing, including climate change. This project clearly demonstrates how Mattapoisett is preparing for its future by looking back at its past. From EPA's perspective, it was uplifting to hear from the town manager and other local officials about the critical role played by EPA employees "to make it all happen."

**Lessons Learned/Recommendations:**

- Conduct an initial assessment to identify local priorities and champions;
- Town leaders' support can bring in the right people and make projects happen;
- Piggyback on resources: the cable television station, Eagle Scouts, and FEMA's PrepareAthon materials;
- EPA can provide the organizational and logistical support to convene members across the community, develop the story map and preparedness materials, and compile the final project results; and
- Link citizen science and involvement to EPA research, to personalize the results and its local impacts.

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# Protecting Drinking Water from Earthquakes

## Brief Description:

In FY 2016, Region 5 established conditions in two permits to protect underground sources of drinking water from contamination that can occur if a well loses mechanical integrity after an earthquake. The Region took action at wells located less than 100 kilometers from two earthquakes that occurred in 2015 near Kalamazoo, Michigan.<sup>8</sup> The permits are the first two issued by the Region for Class II wells that include these seismicity conditions (the universe of Class II wells issued by Region 5 is 1,432). The permit conditions for these wells require the well owner to: 1) sign up for an earthquake notification system administered by the U.S. Geological Survey, 2) cease injection and perform an internal mechanical integrity test if a quake equal to or greater than 3.5 but less than 5.0 moment magnitude occurs within 100 km of the well, 3) cease injection and perform internal and external mechanical integrity tests if a quake equal to or greater than 5.0 moment magnitude occurs within 100 km of the well, and 4) report results of the test(s) to EPA within five days of completion. The owner cannot resume injection without EPA authorization.

These permits, as well as others issued by the Region, recognize that seismicity, whether natural or human-induced, can enable injected fluids to endanger drinking water sources. They follow two Class VI permits issued by the Region with seismicity actions in an emergency response plan as well as a Class II permit that imposes a limit on pressure in a geologic formation because the well is close to a known fault. The latter permit has proven successful: pressure in the formation increased toward the limit, contrary to the well owner's earlier contention, prompting the owner to voluntarily cease injection until the pressure declines.

<sup>8</sup> In the stable mid-continent region, USGS reports that even minor earthquakes can be felt within 100 km.

## HIGHLIGHTS

**WHAT** | Conditions in permits require an injection well owner to take action in response to earthquakes.

**WHO** | Region 5

**WHY** | The practice protects underground sources of drinking water from fluid injection.

## Current Status:

No party commented on or appealed the two permits issued in FY 2016.

## Outcomes:

The Region intends to include the same conditions in other permits drafted for any other well to be located within 100 km of a recorded earthquake. The Region may consider modifying existing permits to include such conditions, where appropriate, at the conclusion of the five-year review permit mandated by federal regulations.

## Lessons Learned/Recommendations:

Region 5 believes it is possible for other Regions to impose such conditions in their fluid injection permits. The required response actions and reporting requirements should be replicable across all other Regions. Regions that serve the mid-continent should be able to use Region 5's distance and trigger mechanisms. Other Regions may want to tailor those characteristics to meet their needs.

## Contact Information:

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## FIND OUT MORE

For additional information on  
EPA's National Water Program  
Performance please visit  
[https://www.epa.gov/  
water-planning-evaluation](https://www.epa.gov/water-planning-evaluation).



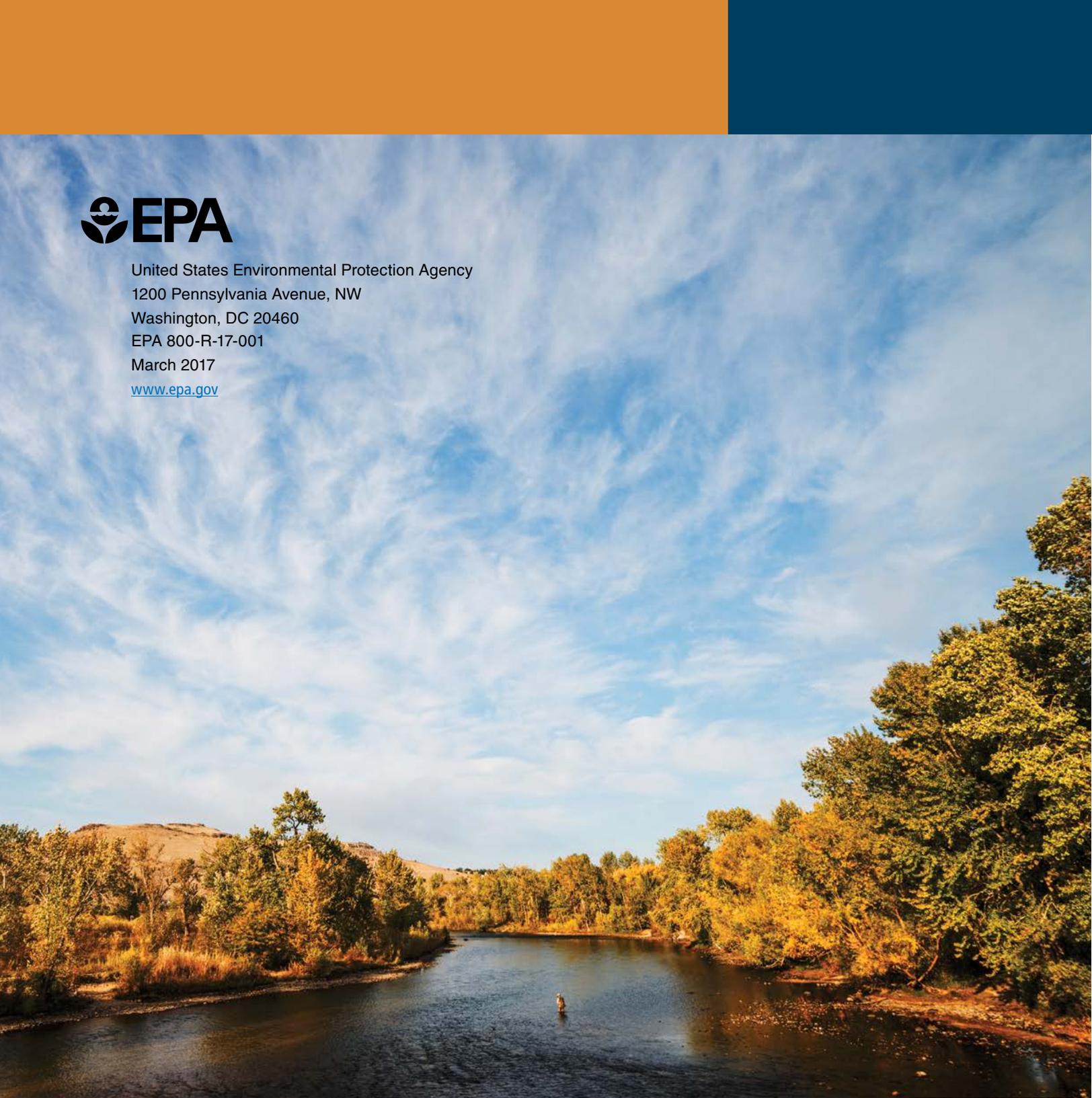
## Appendix A: Acronyms

AOC	Area of Concern
APG	Agency Priority Goal
BOD	Biochemical Oxygen Demand
BUI	Beneficial Use Impairment
CAFO	Concentrated Animal Feeding Operation
CIU	Categorical Industrial User
CO <sub>2</sub>	Carbon Dioxide
CREAT	Climate Resilience Evaluation and Awareness Tool
CSO	Combined Sewer Overflow
CWA	Clean Water Act
CWS	Community Water System
CWSRF	Clean Water State Revolving Fund
DWSRF	Drinking Water State Revolving Fund
FY	Fiscal Year
GLRI	Great Lakes Restoration Initiative
NEP	National Estuary Program
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
POTW	Publicly Owned Treatment Works
PWS	Public Water System
SIU	Significant Industrial User
STA	Stormwater Treatment Area
TMDL	Total Maximum Daily Load
TP	Total Phosphorus





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