EPA

Office of Water

National Water Program

Performance, Trends, and Best Practices Report

Fiscal Year 2017






February 2018

Table of Contents

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. In the Fiscal Year (FY) 2014-2018 EPA Strategic Plan, the activities of the National Water Program fall under Goal 2, "Protecting America's Waters," which includes two objectives. These objectives are further broken out in this report into 15 subobjectives (see Figure 1). In FY 2017, the National Water Program tracked 108 performance measures under the 15 subobjectives. This report presents performance results and trends for the National Water Program using FY 2017 end-of-year data reported by states, tribes, and EPA regional and headquarters offices, as well as best practices in program implementation.[1] The National Water Program's performance webpage includes a detailed appendix with historical data on national and regional commitments and results for all performance measures.[2]

This report includes three main components:

- Progress toward Strategic Measures
- 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 108 measures, 21 are identified as strategic measures, which have targets for FY 2018 established in the FY 2014-2018 EPA Strategic Plan. This report includes trend charts for these 21 measures showing results from 2014 to 2017. Note that this report will be the final year of reporting for these 21 strategic measures. New strategic measures will be published for the FY 2018-2022 EPA Strategic Plan.

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

The 108 performance measures include 77 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 2017 and the past five years. In FY 2017 the National Water Program met 64% of the performance targets set for commitment measures, a decrease in its five-year historic average (2012-2016) of 73% commitments met. Additionally, the National Water Program met 78% of its Tribal Commitments in FY 2017.

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 11 best practices that have resulted in successful programs for assisting water systems, improving processes and relationships, and modernizing water quality monitoring. The best practices were selected from proposals submitted by the water divisions in EPA's regional offices.

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 utilities and officials receiving training and technical assistance.

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

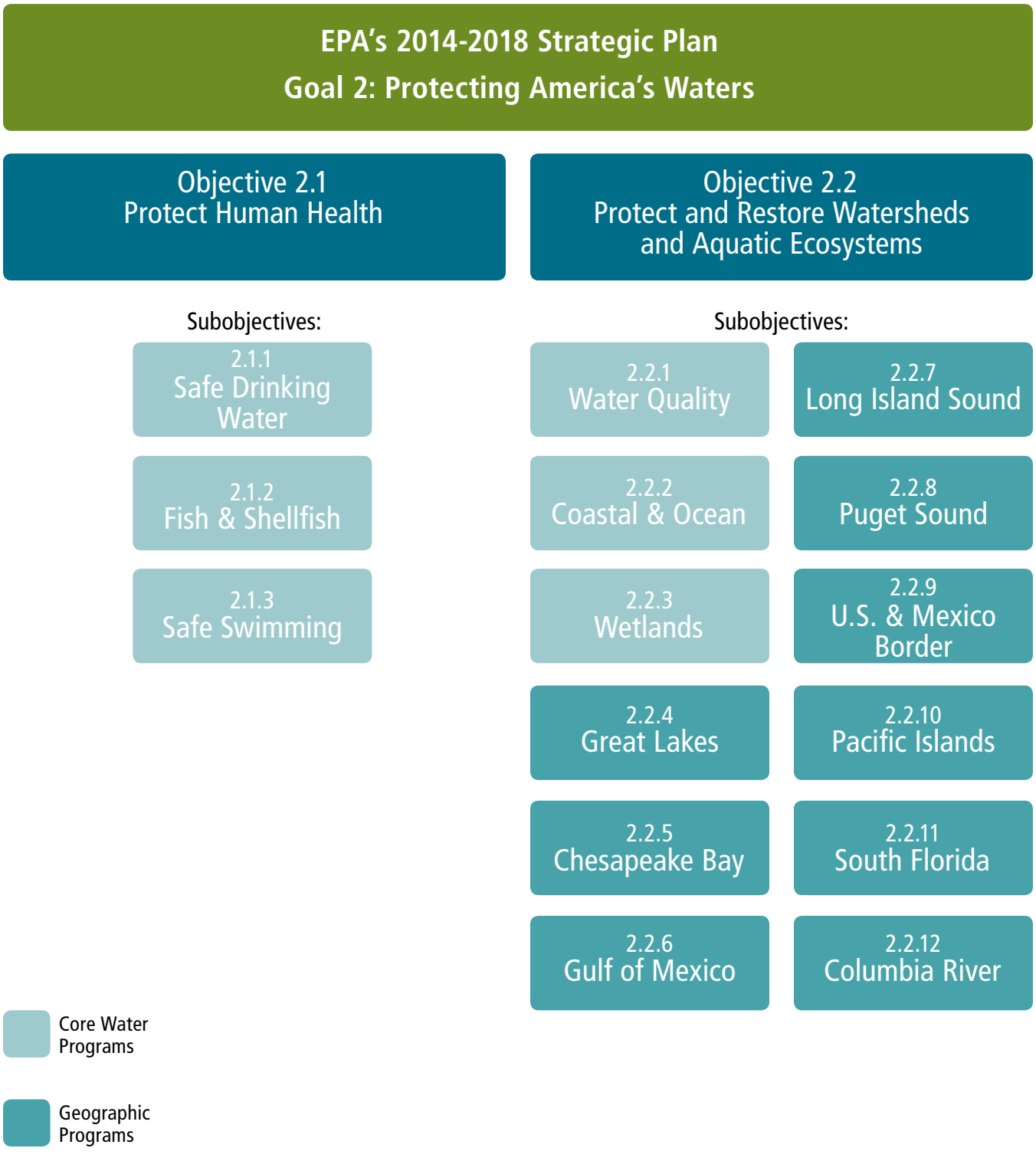
Indicators are output measures for which specific targets have not been set.

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.

[1] Across all reported years, the information presented in this report is the most up-to-date information available and should be utilized over previous FY reports.
[2] https://www.epa.gov/water-planning-evaluation

Figure 1. EPA Strategic Plan Goal 2: Protecting America's Waters



Strategic Measures Progress

The National Water Program has 21 strategic measures, which have targets for 2018 established in the FY 2014-2018 EPA Strategic Plan. Results from 2014 to 2017 are provided below.

Strategic Measure	2014 Result	2015 Result	2016 Result	2017 Result	2018 Strategic Target
2.1 PROTECTING HUMAN HEALTH					
2.1.1 Water Safe to Drink					
Percentage of community water systems providing drinking water that meets all applicable health-based standards (SDW-SP1; apm)	90.8%	90.0%	90.4%	93.0%	92.0%
Percentage of the population in Indian country served by community water systems providing drinking water that meets all applicable health-based standards (SDW-SP3; E)	88.6%	88.4%	87.9%	90.5%	88.0%
American Indian and Alaska Native homes provided with access to safe drinking water (SDW-18)	113,656	*No longer reported by Indian Health Service*			148,100
2.1.2 Fish and Shellfish Safe to Eat					
Percentage of women of childbearing age with blood mercury levels above the level of concern (FS-SP6; fs1)	Biennial	1.8%	Biennial	Data Not Available	2.1%
2.1.3 Water Safe for Swimming					
Percentage of days of the beach season that coastal and Great Lakes monitored beaches are open and safe for swimming (SS-SP9)	95.4%	94.5%	92.8%	94.0%	95.0%

Strategic Measure	2014 Result	2015 Result	2016 Result	2017 Result	2018 Strategic Target
2.2 PROTECT AND RESTORE WATERSHED AND AQUATIC ECOSYSTEMS					
2.2.1 Improve Water Quality on a Watershed Basis					
Water body segments identified in 2002 as not attaining standards in which water quality standards have been attained (WQ-SP10; L)	3,866	3,944	4,009	4,162	4,430
Impaired watersheds where water quality conditions are improved using the watershed approach (WQ-SP12; wq3)	411	450	485	509	575
Ensure that the condition of the nation's waters does not degrade (WQ-SP13)	Data Not Available	WQ In Lakes Maintained	WQ In Lakes Maintained	No WQ Degradation In Rivers/Streams	Maintain or Improve Conditions
Baseline monitoring stations in tribal waters with improvements in one or more of seven key water quality parameters (WQ-SP14a)	21	28	38	47	50
American Indian and Alaska Native homes with access to basic sanitation (WQ-24)	75,140	81,080	*Data Not Available*	101,064	91,900
2.2.2 Improve Coastal and Ocean Waters					
Rating of coastal waters on the National Coastal Condition Report's 5-point scale (CO-222)	2.5	2.5	*No longer reported due to change in reporting methodology. Survey is now included under National Aquatic Resource Surveys.*		3.0

Strategic Measures Progress (Cont'd)

Strategic Measure	2014 Result	2015 Result	2016 Result	2017 Result	2018 Strategic Target
2.2.2 Improve Coastal and Ocean Waters (Cont'd)					
Percentage of dredged material ocean dumping sites with environmentally acceptable conditions (CO-SP20; co5)	95.0%	95.0%	97.0%	97.2%	95%
Acres of habitat protected or restored after 2012 within the study areas of the 28 estuaries in the National Estuary Program (CO-432; 202)	221,151	332,735	403,197	455,454	600,000
2.2.3 Increase Wetlands					
Net increase in wetlands	*Data Not Available: The U.S. Fish and Wildlife Service changed the frequency of reporting cycle from 5 years to 10 years.*				Net Increase in Wetlands
2.2.4 Great Lakes					
Great Lakes Areas of Concern with all management actions necessary for delisting implemented (GL-SP31; 626)	7	7	8	11	12
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%		21%	20%
2.2.5 Chesapeake Bay					
Percentage of Chesapeake Bay and tidal tributaries water quality standards attained for dissolved oxygen, water clarity/underwater grasses, and chlorophyll a (CB-05)	28.9%	33.9%	37.2%	39.2%	45%

Strategic Measure	2014 Result	2015 Result	2016 Result	2017 Result	2018 Strategic Target
2.2.6 Gulf of Mexico					
Size of the hypoxic zone in the Gulf of Mexico (5-year running average)	13,080	10,419	*Data is no longer collected based on an OIG recommendation in Report 13-P-0271*		5,000
2.2.7 Long Island Sound					
Percentage reduction in the maximum area of hypoxia in Long Island Sound (LI-SP42)	34%	40%	33.7%	54%	15%
2.2.8 Puget Sound Basin					
Acres of shellfish beds with harvest restrictions lifted in Puget Sound (PS-SP49; ps1)	3,249	3,277	3,887	5,083	6,000
2.2.9 U.S.–Mexico Border Environmental Health					
(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; xb2)	65.8%	66.7%	70.4%	72.0%	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; xb3)	84.3%	90.7%	97.2%	97.3%	90%

Summary of Results

The National Water Program tracks 108 performance measures, 77 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.[3] This section summarizes the FY 2017 performance results of these measures and trends over the last six years.

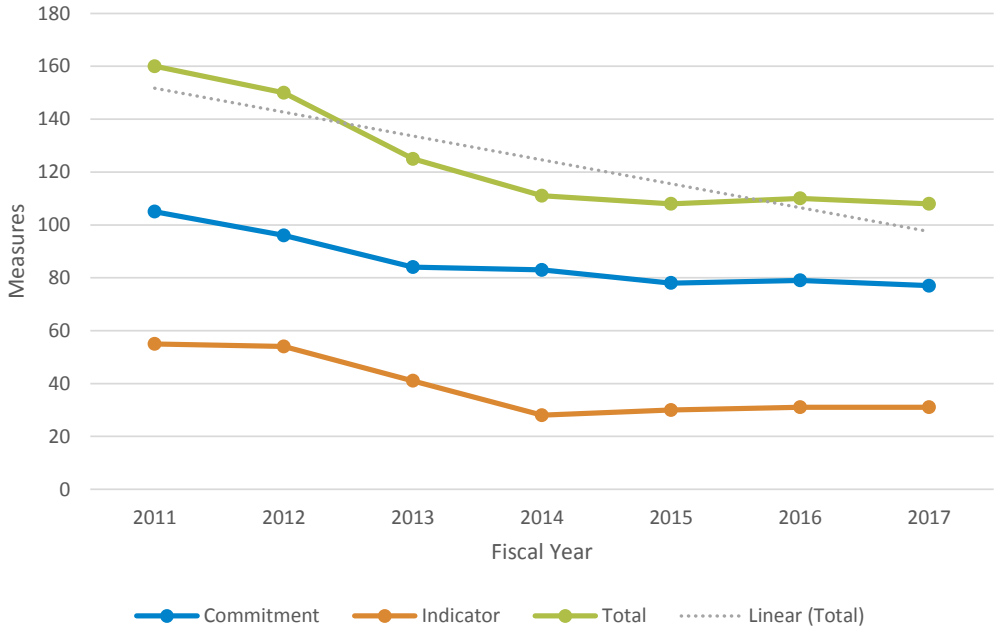
Key Changes in FY 2017

This report includes several changes to the performance measures compared to the National Water Program Performance, Trends and Best Practices Report Fiscal Year 2016. Some of the key changes to performance measures for certain subobjectives are noted below:

- Water Quality: Two performance measures were added and two were modified in FY 2017.
- Fish and Shellfish Safe to Eat: Two performance measures were deleted in FY 2017.[4]
- Water Safe to Drink: Three measures were deleted in FY 2017.
- Chesapeake Bay: One measure was deleted in FY 2017.

Over the course of the last six 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. The overall number of measures decreased to 108 in FY 2017 (from 110 in FY 2016); this number is also 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



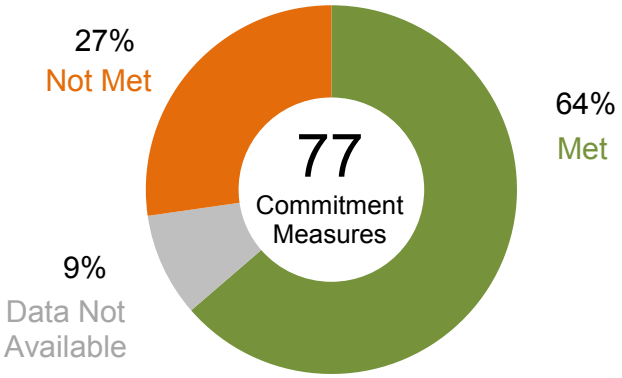
[3] The 21 strategic measures are included in the 108 total performance measures.

[4] The two *Subobjective 2.1.2 Fish and Shellfish Safe to Eat* measures deleted in FY 2017, FS-1a and FS-1b, were not included in the total number of measures for FY 2016.

FY 2017 National Performance for Commitment Measures

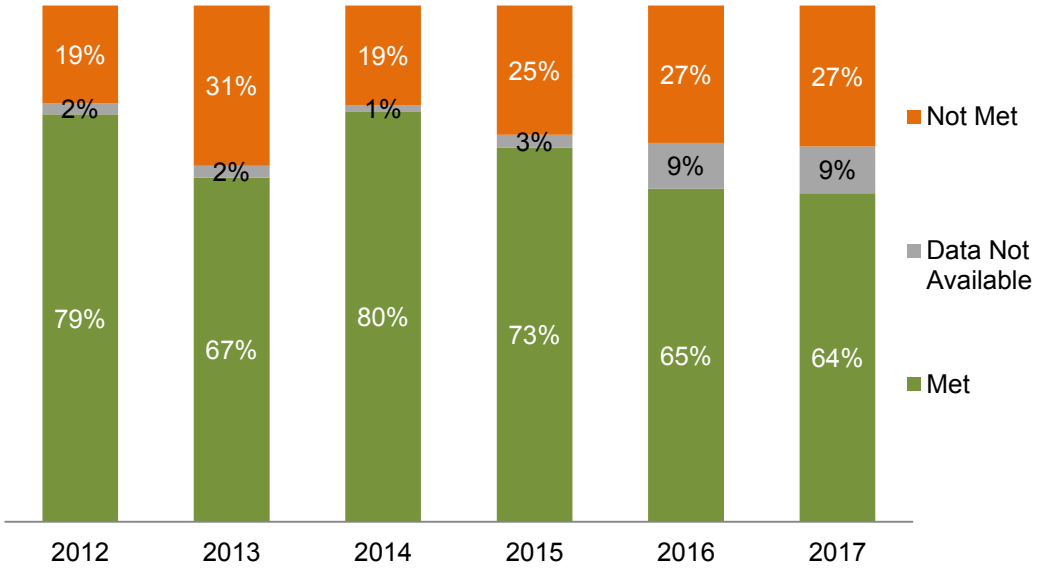
The FY 2017 results show a slight decrease in the number of commitment measures that met their targets compared to FY 2016. The National Water Program met 65% of its commitment measures in FY 2016, and 64% in FY 2017. Figure 3 illustrates the distribution of results between met, not met, and data not available for FY 2017.

Figure 3. National FY 2017 Performance for 77 Commitment Measures



Historical trend data show that between FY 2012 and FY 2017, the National Water Program has averaged about 71% committment measures met, 25% not met, and 4% with data not available or not reporting. Figure 4 shows the change in overall performance over the past six years.

Figure 4. FY 2012-FY 2017 Commitment Measures Performance Trend (77 measures for FY 2017)[5]

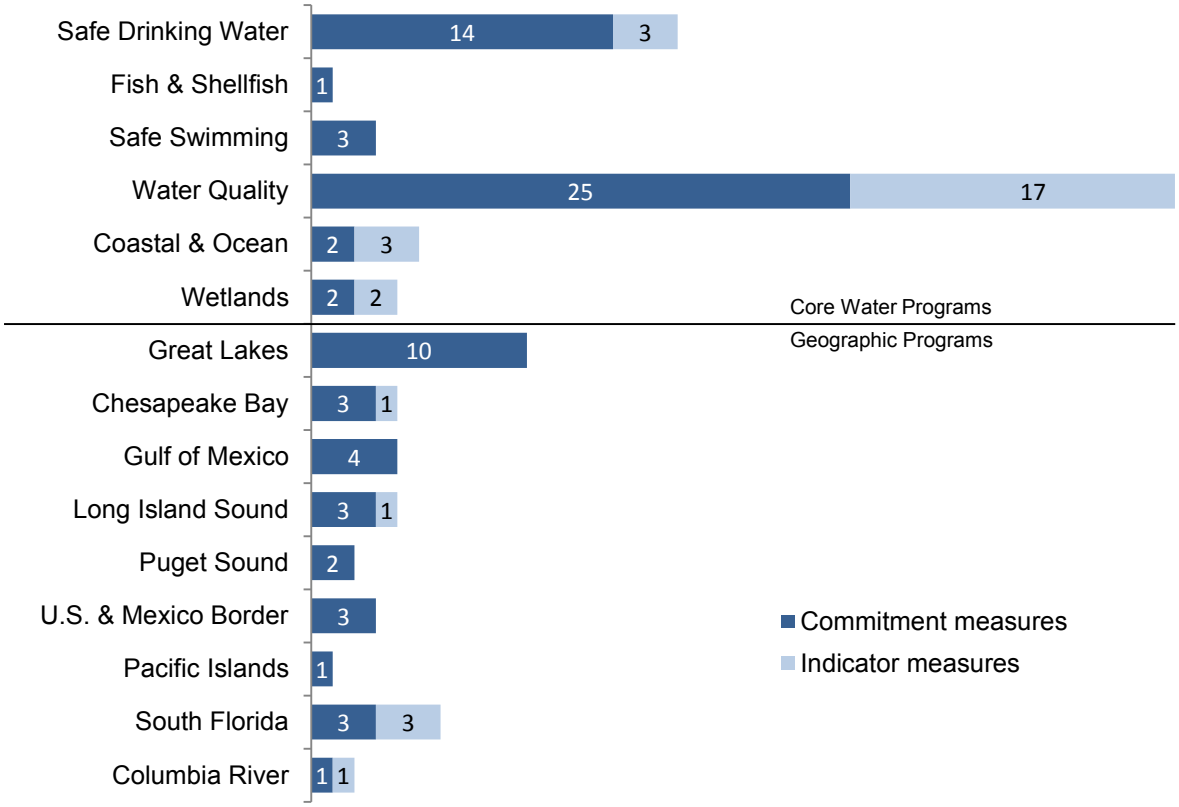


[5] Due to rounding, the sum of each commitment measure status may not add to 100%.

National Performance by Subobjective

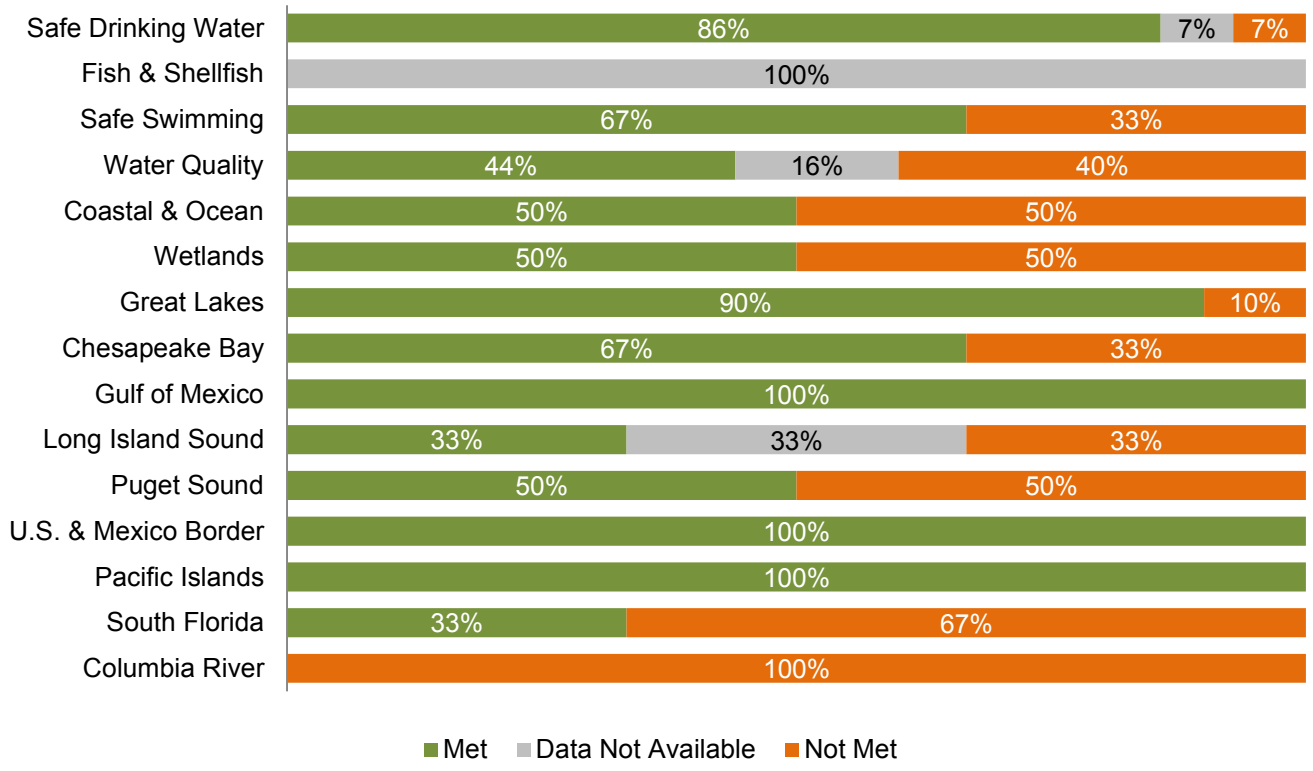
Figure 5 shows the number of measures analyzed for each of the 15 subobjectives. Water Quality has the largest share of performance measures at 39%; Safe Drinking Water is next with 16%; and the Great Lakes is third with 9%. The remaining 36% of the measures are spread among the other 12 subobjectives. For commitment measures, 61% (47 of 77) pertain to core water programs and 39% (30 of 77) track progress in geographic programs.

Figure 5. Number of Performance Measures Per Subobjective



Of the national core water program measures, 70% (33 of 47) met their targets in FY 2017. In addition, 77% (23 of 30) of the geographic program measures were met. Figure 6 shows the FY 2017 results by subobjective. Commitments were fully met for three of the 15 subobjectives (Gulf of Mexico, U.S. & Mexico Border, and Pacific Islands).

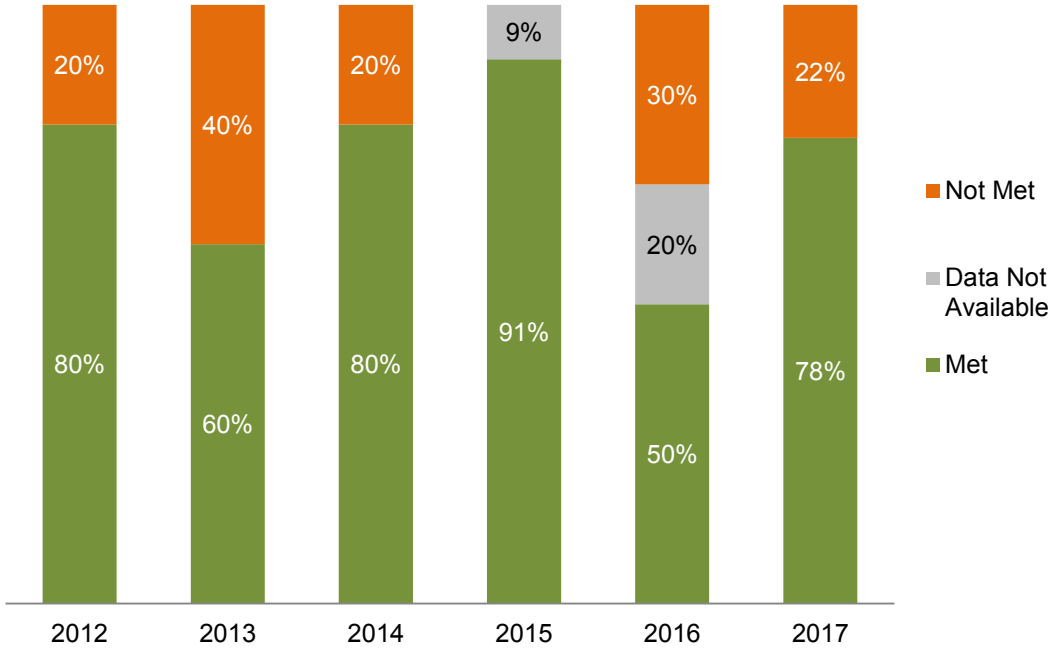
Figure 6. Commitment Measures Met and Not Met by Subobjective



Tribal Measures

In FY 2017, ten performance measures (9 commitment and 1 indicator) focused on drinking water and water quality in American Indian lands. There was a substantial increase in the number of commitments met for tribes in FY 2017 (78%) compared to the results in FY 2016 (50%), as shown in Figure 7. However, it should be noted that for 20% of the 2016 measures, data were not available to track progress.

Figure 7. FY 2012-2017 Percent of Tribal Commitments Met or Not Met



Safe drinking water and high quality surface water on tribal lands continues to be a goal for the National Water Program. Some key highlights and challenges include:

- 90.5% of the population in Indian country was served by Community Water Systems (CWS) with drinking water that met all applicable health-based drinking water standards. [SDW-SP3]
- 93.8% of "person-months" (i.e., all persons served by CWSs multiplied by 12 months) during which tribal CWSs provided drinking water, met all applicable health-based drinking water standards. [SDW-20]
- Nine additional tribal water quality monitoring stations reported improved water quality. [WQ-SP14a]

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 2012 to FY 2017). 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.[6] 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: = Met; = Indicator/Long-Term (No Commitment); = Not Met; = Measure Did Not Exist; = Data Not Available					
			2012	2013	2014	2015	2016	2017
Subobjective 2.1.1 Water Safe to Drink								
SDW-211*	aa	Percent population served by CWSs meeting safe standards	94.7%	92.0%	93.0%	91.0%	91.2%	92.8%
SDW-SP1*	apm	Percent CWSs meeting safe standards	91.0%	91.0%	90.8%	90.0%	90.4%	93.0%
SDW-SP2*	dw2	Percent "person months" with CWSs meeting safe standards	97.8%	96.9%	97.0%	96.0%	96.3%	96.1%
SDW-SP3*T	**E**	**Percent population served by CWSs meeting safe standards in Indian country**	84.0%	77.0%	88.6%	88.4%	87.9%	90.5%
SDW-20 T	**-**	**Percent "person months" with CWSs meeting safe standards in Indian country**				94.7%	92.8%	93.8%
SDW-SP4a	-	Percent CWSs with source water protection	43.3%	48.3%	48.0%	49.9%	54.0%	55.0%
SDW-SP4b	-	Percent population served by CWSs with source water protection	55.9%	59.1%	57.7%	60.7%	61.0%	64.0%
SDW-01a*	aph	Percent CWSs with sanitary survey	89.0%	93.0%	87.0%	90.8%	91.2%	90.8%
SDW-01b T	**-**	**Number tribal CWSs with sanitary survey**	84	84	633	663	653	666
SDW-04*	apc	DWSRF utilization rate	90%	91%	92%	94%	95%	96%
SDW-05	-	Number DWSRF projects initiated (cumulative)	6,721	7,474	8,101	9,317	9,119	9,836
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	28,134
SDW-11	-	Percent DWSRF projects awarded to small PWS	71%	71%	70%	70%	71%	70%
SDW-15	-	Number small CWS with health-based violations	1,260	1,282	1,159	822	754	326
SDW-17	-	Number schools and childcare centers meeting safe standards	6,991	7,068	6,783	6,795	6,753	6,839
SDW-21	-	Number of utilities and officials receiving training and technical assistance				2,929	4,965	6,703

*Asterisks indicate a measure is a budget measure. **Bolded text and "T" indicates a tribal measure.**

[6] Of the 108 performance measures covered in the heat maps, 57 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 57 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 = Met; = Indicator/Long-Term (No Commitment); = Not Met; = Measure Did Not Exist; = Data Not Available					
			2012	2013	2014	2015	2016	2017
Subobjective 2.1.2 Fish and Shellfish Safe to Eat								
FS-SP6*	fs1	Percent women with high mercury blood levels	2.3%	2.3%		1.8%		
Subobjective 2.1.3 Water Safe for Swimming								
SS-SP9	-	Percent beach days safe for swimming	95%	96%	95%	95%	93%	94%
SS-1	-	Number enforceable long-term CSO control plan with specific dates and milestones in place (cumulative)	748	758	775	785	794	850
SS-2	-	Percent Tier I (significant) public beaches monitored and managed	100.0%	98.0%	98.0%	99.0%	99.3%	99.7%

*Asterisks indicate a measure is a budget measure. **Bolded text and "T" indicates a tribal measure.**

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 78% (14 of 18) of its commitments under the Protect Human Health objective in FY 2017 for all commitment measures, as shown in Figure 8. Among the highlights for this objective are the following:

- 96% of the cumulative amount of Drinking Water State Revolving Funds (DWSRFs) available had loan agreements in place. [SDW-04]
- 93% of CWSs met all applicable health-based standards through approaches that include effective treatment and source water protection. [SDW-SP1]
- 96.1% of "person-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 = Met; = Indicator/Long-Term (No Commitment); = Not Met; = Measure Did Not Exist; = Data Not Available					
			2012	2013	2014	2015	2016	2017
Subobjective 2.2.1 Improve Water Quality on a Watershed Basis								
WQ-SP10*	L	Number formerly impaired waterbodies now meeting standards (cumulative)	3,527	3,679	3,866	3,944	4,009	4,162
WQ-SP11*	wq2	Number causes of waterbody impairment removed (cumulative)	11,134	11,754	12,288	12,640	12,910	13,140
WQ-SP12*	wq3	Number impaired watersheds improved water quality (cumulative)	332	376	411	450	485	509
WQ-SP13	-	Maintain and improve nation's lake and stream conditions				No WQ degradation	No WQ degradation	No WQ degradation
WQ-SP14a T	**-**	**Number monitoring stations in tribal waters with improved water quality (cumulative)**	15	20	21	28	38	47
WQ-SP14b T	**-**	**Number monitoring stations in tribal waters no degradation in water quality (cumulative)**	7	4	6	22	24	25
WQ-24 T	**-**	**Number Indian & Alaska Native homes with access to sanitation (cumulative)**	63,087	69,783	75,140	81,080		101,064
WQ-01a	-	Number of numeric nutrient water quality standards adopted (cumulative)	42	44	44	48	46	46
WQ-01d	-	Number of numeric nutrient water quality standards planned to be adopted (cumulative)					3	1
WQ-02 T	**-**	**Number tribes with approved water quality standards (cumulative)**	39	40	41	43	43	44
WQ-03a*	bpw	Percent states/territories with updated water quality criteria	69.6%	58.9%	51.8%	64.3%	64.3%	67.9%
WQ-03b T	**-**	**Number tribes with updated water quality criteria**	14	9	9	7	10	13
WQ-04a	-	Percent states/territories water quality standards revisions approved	88.9%	82.4%	89.6%	84.8%	76.1%	82.5%
WQ-06a T	**-**	**Number tribes implementing monitoring strategies (cumulative)**	214	224	228	248	244	253
WQ-09a*	bpg	Number pounds nitrogen reduced from nonpoint sources (millions)	10.5	10.4	11.4	9.7		
WQ-09b*	bpf	Number pounds phosphorus reduced from nonpoint sources (millions)	4.4	3.5	2.7	2.1		
WQ-09c*	bph	Number tons sediment reduced from nonpoint sources (millions)	1.1	1.2	1.7	0.9		
WQ-10a	-	Number NPS-impaired waterbodies restored (cumulative)	433	509	560	604	674	731
WQ-11	-	Number NPDES follow-up actions completed (cumulative)	344	364	404	449	508	583
WQ-12a	-	Percent nontribal NPDES permits current	90.4%	89.7%	90.0%	87.0%	88.0%	89.4%
WQ-12b T	**-**	**Percent tribal NPDES permits current**	86.1%	83.4%	85.0%	84.9%	86.0%	83.3%
WQ-13a	-	Number facilities covered by MS-4 permit	6,888	7,774	7,851	7,715	7,752	8,289
WQ-13b	-	Number facilities covered by industrial storm water permit	87,060	94,447	93,042	89,692	95,975	93,252
WQ-13c	-	Number sites covered by construction storm water permit	166,031	158,525	164,494	174,481	181,620	190,109
WQ-13d	-	Number facilities covered by CAFO permit	7,587	6,684	6,946	6,918	5,900	6,752
WQ-14a	-	Number POTWs SIUs control mechanisms in place	20,733	20,739	20,734	20,518	16,907	20,347

*Asterisks indicate a measure is a budget measure. **Bolded text and "T" indicates a tribal measure.**

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 = Met; = Indicator/Long-Term (No Commitment); = Not Met; = Measure Did Not Exist; = Data Not Available					
			2012	2013	2014	2015	2016	2017
WQ-14b	-	Number POTWs CIUs control mechanisms in place	1,667	1,650	1,642	1,514	1,521	2,000
WQ-17*	bpb	CWSRF utilization rate	98%	97%	98%	98%	98%	98%
WQ-19a*	bpl	Number high priority state NPDES permits issued	850	404	516	506	462	467
WQ-19b*	bpv	Number high priority state & EPA NPDES permits issued	720	652	532	526	501	508
WQ-20a	-	Percent of major wastewater treatment plants with nutrient limits in NPDES permit						36%
WQ-20b	-	Percent of major wastewater treatment plants with nutrient monitoring in NPDES permit						74%
WQ-23*	Opb	Percent rural Alaska homes access to drinking water & wastewater disposal	91%	91%	94%	95%	94%	
WQ-25a*	uw1	Number urban water projects initiated addressing community water quality issues	46	9	65	28	48	24
WQ-25b*	uw2	Number of urban water projects completed addressing community water quality issues (cumulative)				60	110	158
WQ-27*	bpx	Percent priority areas restored to achieve water quality standards					9%	14%
WQ-28	-	Percent state-wide activities leading to completed TMDLs, restoration of impaired waters, or protection of unimpaired waters					8%	40%
WQ-29	-	Number of states protecting or improving water quality conditions					21	24
WQ-30	-	Number of WaterSense partners working to improve water use efficiency					1,833	1,956
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	41
Subobjective 2.2.2 Improve Coastal and Ocean Waters								
CO-SP20*	co5	Percent ocean dumping sites acceptable conditions achieved	97%	96%	95%	95%	97%	97%
CO-02	-	Number square miles protected from vessel sewage (cumulative)	58,929	63,773	64,536	64,431	64,431	64,431
CO-04	-	Rate of return federal investment for NEP (million dollars)	323	822	577	490	465	150
CO-06	-	Number active dredged material sites monitored	35	40	41	33	31	17
CO-432*	202	Number additional NEP acres habitat protected or restored	114,579	127,594	93,557	111,585	70,463	52,257
Subobjective 2.2.3 Increase Wetlands								
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)	180,000	207,000	221,000	275,555	291,055	301,463
WT-02a	-	Number states/tribes increased wetland program capacity in one or more core elements	44	37	36	30	57	29
WT-03	-	Percent CWA Section 404 permits with greater environmental protection	85%	78%	77%	85%	73%	64%

*Asterisks indicate a measure is a budget measure. **Bolded text and "T" indicates a tribal measure.**

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 45% (13 of 29) of its commitments under the Protect and Restore Watersheds and Aquatic Ecosystems objective in FY 2017. Performance highlights include:

- For the tenth 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 (89.4% for FY 2017). [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 731 waterbodies documented as partially or fully restored. [WQ-10a]
- The Clean Water State Revolving Fund (CWSRF) maintained a 98% utilization rate in FY 2017. [WQ-17]
- 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. [WT-SP22/WT-01]

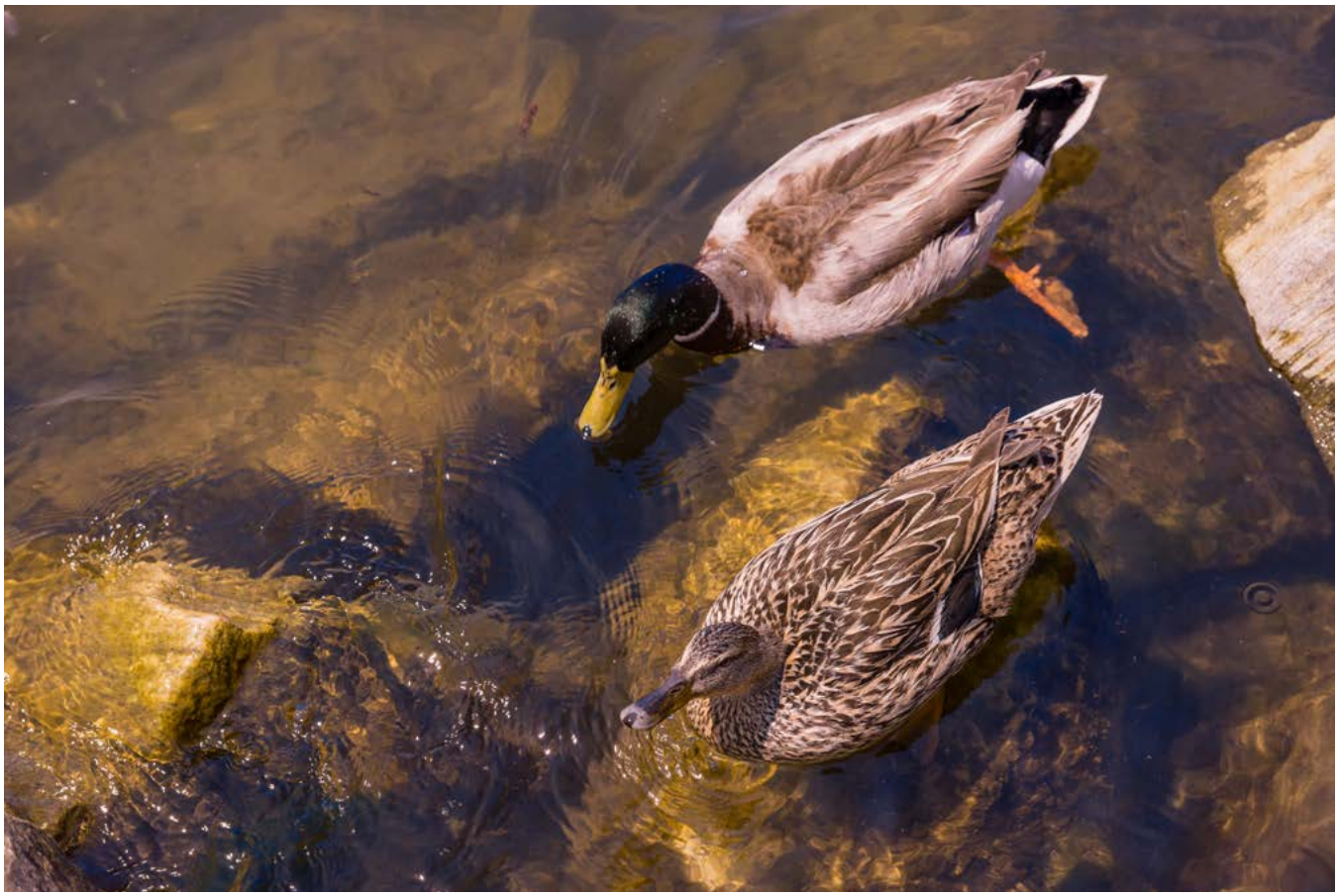


Figure 10. Heat Map for Objective 2.2 – Protect and Restore Watersheds and Aquatic Ecosystems (Geographic Program Measures)

ACS Code	PERS Code	Abbreviated Measure Description	Results and Commitment Status = Met; = Indicator/Long-Term (No Commitment); = Not Met; = Measure Did Not Exist; = Data Not Available					
			2012	2013	2014	2015	2016	2017
Subobjective 2.2.4 Great Lakes								
GL-SP31*	626	Number AOCs with all management actions implemented (cumulative)	2	3	7	7	8	11
GL-05*	625	Number BUIs removed within AOCs (cumulative)	33	41	52	60	65	73
GL-07*	629	Number response plans established, response exercises, and/or response actions	23	30	38	21	11	25
GL-09*	628	Number acres managed for populations of invasive species (cumulative)	31,474	35,924	84,500	101,392	115,889	134,856
GL-17*	638	Pounds projected phosphorus reductions from GLRI-funded projects (cumulative)				160,117	402,943	767,864
GL-18*	639	Projected gallons untreated urban runoff captured or treated by GLRI-funded projects (millions, cumulative)				37	116	239
GL-19*	640	Number tributary miles reopened by GLRI-funded projects (cumulative)				3,855	4,615	4,967
GL-20*	641	Number miles shoreline and riparian corridors protected, restored, and enhanced by GLRI-funded projects (cumulative)				313	662	947
GL-21*	642	Number acres of coastal wetlands protected, restored, and enhanced by GLRI-funded projects (cumulative)				7,033	17,540	24,306
GL-22*	643	Number acres of other habitats protected, restored, and enhanced by GLRI-funded projects (cumulative)				146,815	167,218	201,075
Subobjective 2.2.5 Chesapeake Bay								
CB-05	-	Percent attainment of water quality standards in the Bay and tidal tributaries			29%	33.9%	37.2%	39.2%
CB-SP35*	cb6	Percent Bay nitrogen reduction practices implemented	21%	25%	27%	21%	31%	33%
CB-SP36*	cb7	Percent Bay phosphorus reduction practices implemented	19%	27%	43%	71%	81%	81%
CB-SP37*	cb8	Percent Bay sediment reduction practices implemented	30%	32%	37%	25%	48%	57%
Subobjective 2.2.6 Gulf of Mexico								
GM-SP39*	xg2	Number Gulf acres protected, enhanced, or restored (cumulative)	30,248	30,306	30,319	30,574	31,276	31,554
GM-01*	xg3	Improve and/or restore water and habitat quality to meet water quality standards					2	2
GM-02	-	Promote and support environmental education and outreach					18,662	11,170
GM-03	-	Support programs, projects and tools which strengthen community resilience					121	90

*Asterisks indicate a measure is a budget measure. **Bolded text and "T" indicates a tribal measure.**

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 = Met; = Indicator/Long-Term (No Commitment); = Not Met; = Measure Did Not Exist; = Data Not Available					
			2012	2013	2014	2015	2016	2017
Subobjective 2.2.7 Long Island Sound								
LI-SP41*	li5	Percent goal achieved reducing point source nitrogen discharges	83%	88%	94%	100%		
LI-SP42	-	Reduce Long Island Sound hypoxic zone (sq miles)	289	80	87	38	138	70
LI-SP43*	li8	Number acres coastal habitat restored, protected, or enhanced	537	336	410	1,678	532	669
LI-SP44*	li9	Number miles river and streams for fish passage reopened	72.3	56.0	21.6	0.0	50.0	22.0
Subobjective 2.2.8 Puget Sound Basin								
PS-SP49*	ps1	Number acres of Puget Sound shellfish areas improved (cumulative)	2,489	3,203	3,249	3,277	3,887	5,083
PS-SP51*	ps3	Number acres of Puget Sound estuarine wetlands restored (cumulative)	23,818	30,128	41,006	43,002	45,360	49,752
Subobjective 2.2.9 U.S.-Mexico Border Environmental Health								
MB-SP23*	4pg	Number million pounds BOD loadings removed Mexico Border (cumulative)	119	128	131	143	152	152
MB-SP24*	xb2	Number additional Mexico Border homes access to safe drinking water	5,185	3,400	1,468	878	3,700	1,599
MB-SP25*	xb3	Number additional Mexico Border homes access to adequate sanitation	31,092	25,695	12,756	44,070	45,000	495
Subobjective 2.2.10 Pacific Island Territories								
PI-SP26*	pi1	Percent Pacific Islands population served by CWS	80.0%	81.0%	98.0%	97.7%	82.1%	82.0%
Subobjective 2.2.11 South Florida Ecosystem								
SFL-SP45	-	Achieve no net loss in South Florida stony coral	Maintained	7%	Maintained	7%	Not Maintained	Maintained
SFL-SP46	-	Maintain health of South Florida sea grass	Not Maintained	Maintained	Maintained	Maintained	Maintained	Maintained
SFL-SP47a*	sf3	Percent South Florida monitoring stations maintain coastal water quality for chlorophyll a & light clarity	70.9%; 72.5%	84.5%; 80.4%	86.0%; 87.2%	82.0%; 77.3%	70.9%; 78.5%	76.2%; 75.9%
SFL-SP47b*	sf4	Percent South Florida monitoring stations maintain coastal water quality for nitrogen and phosphorous	81%; 89.5%	60.0%; 82.3%	72.6%; 87.6%	61.7%; 78.3%	70.8%; 89.1%	62.2%; 89.1%
SFL-1	-	Increase percent sewage treatment systems receiving advanced wastewater treatment in Florida Keys	13%	5%	4%	7%	4%	4%
SFL-2*	sf6	Number STAs with TP outflow less than or the same as the five-year annual average				4	4	1
Subobjective 2.2.12 Columbia River Basin								
CR-SP53	-	Number acres contaminated sediments cleaned up (cumulative)	79	79	82	89	91	94
CR-SP54	-	Percent reduction of contaminants in water & fish (cumulative)		99%	90%		95%	80%

*Asterisks indicate a measure is a budget measure. **Bolded text and "T" indicates a tribal measure.**

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 2017, EPA and its partners removed eight 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 225,381 acres of habitat across the Great Lakes Basin (over 40,000 acres in FY 2017). [GL-21/GL-22]

Chesapeake Bay

The goal set in the 2010 Chesapeake Bay Total Maximum Daily Load (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]
- 33% for nitrogen reductions [CB-SP35]
- 57% for sediment reductions [CB-SP37]

Gulf of Mexico

- In FY 2017, the Gulf of Mexico program restored or protected 278 acres of coastal and upland habitat. [GM-SP39]

Long Island Sound

- The Long Island Sound program restored or protected 669 acres of coastal habitat, including tidal wetlands, dunes, riparian buffers, and freshwater wetlands in FY 2017. [LI-SP43]

Puget Sound Basin

- Since FY 2006, 49,752 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 (4,392 acres were restored in FY 2017). [PS-SP51]

U.S.–Mexico Border Environmental Health

- In 2017, EPA provided access to safe drinking water for 1,599 additional homes along the U.S.–Mexico border. [MB-SP24]
- In 2017, EPA provided access to sewer services for 495 additional homes along the U.S.–Mexico border. [MB-SP25]

Pacific Island Territories

- 82% 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 and stony coral in the Florida Keys National Marine Sanctuary were maintained above baseline levels in FY 2017. [SFL-SP45/SFL-SP46]

Columbia River Basin

- In FY 2017, The Columbia River program cleaned up a total of three acres of contaminated sediment in the Lower Columbia River. These cleanups provide a significant contribution to reducing toxins in the Columbia River. EPA measured an 80% cumulative reduction in contaminants of concern in the water and fish at several key sites on the Columbia River. [CR-SP53/CR-SP54]

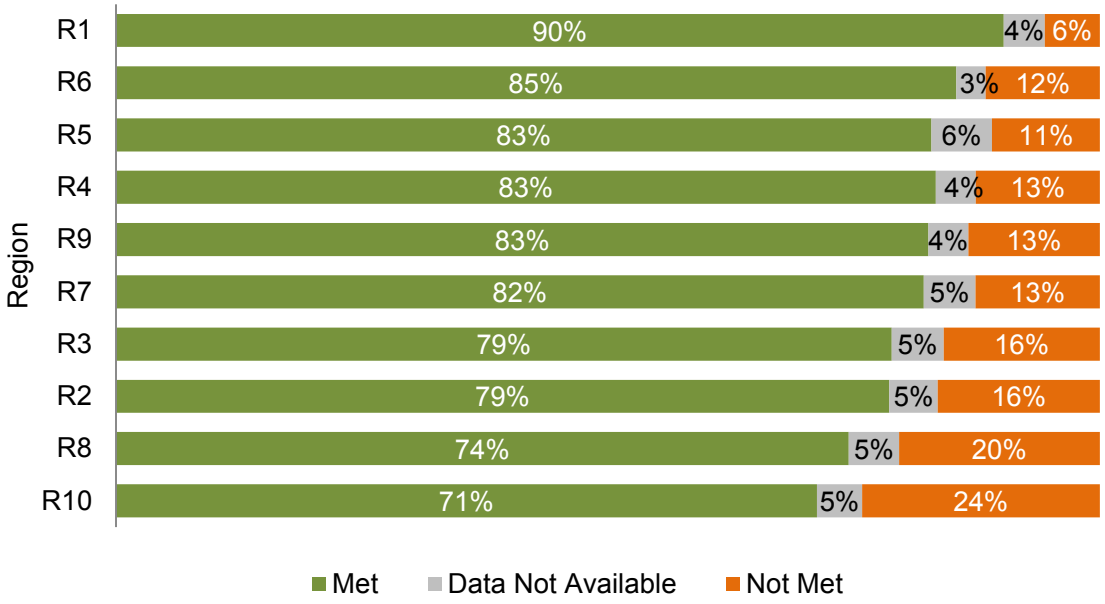
Regional Performance for Commitment Measures

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.

Regional performance has varied significantly over the last six years; an average of 71% to 90% of performance commitments set by the EPA regional offices were met between FY 2012 and FY 2017, 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 2012-FY 2017 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 25 performance measures. These 25 measures were chosen due to the high level of regional participation associated with them.[7] 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 2017 regional commitments and FY 2017 national commitments, and
- The difference between FY 2017 regional commitments and FY 2016 regional end-of-year results.

For each commitment expressed in numeric units, EPA computed:

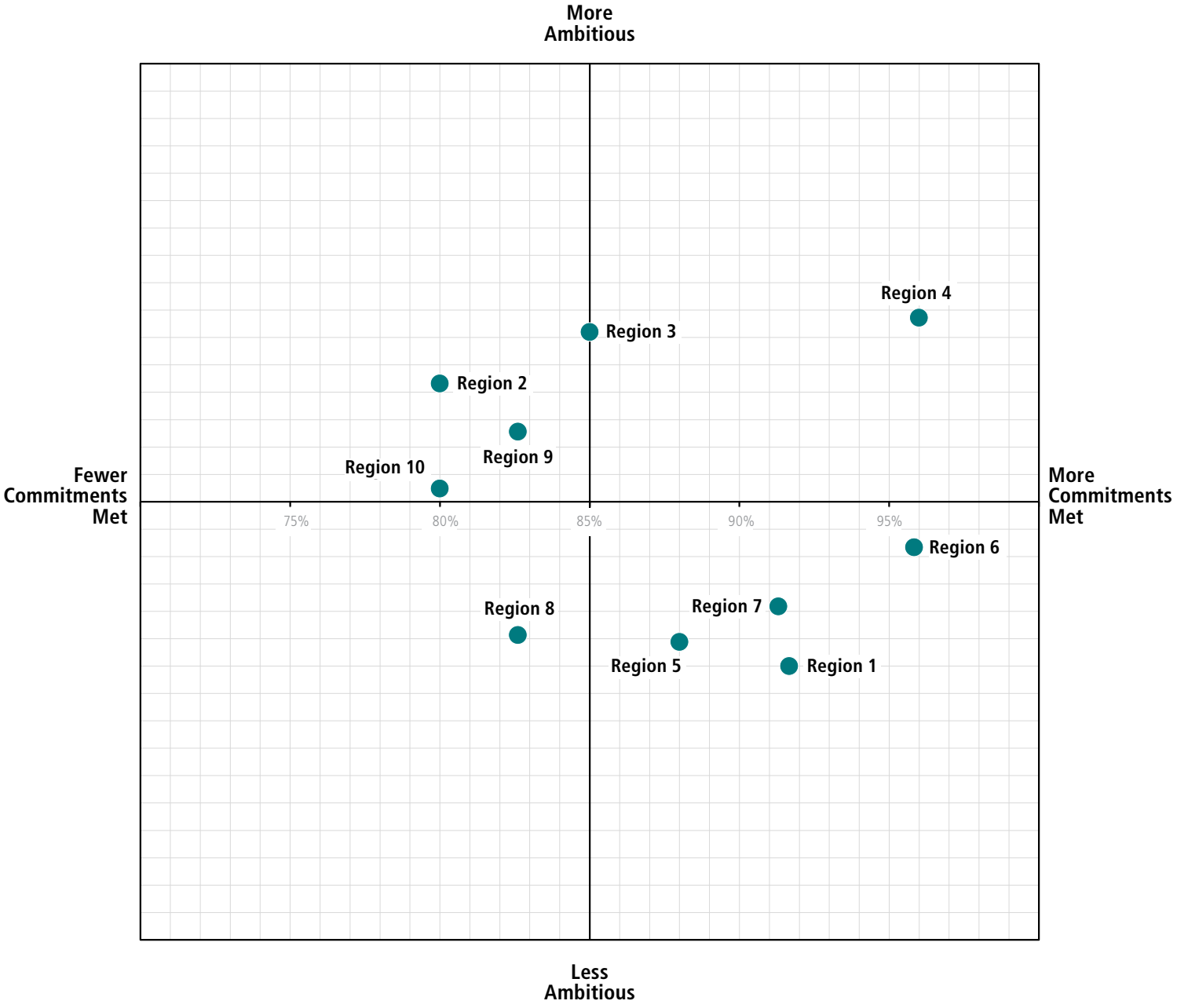
- FY 2017 regional commitments as a percentage of the regional universe.

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.

[7] 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 2017 Regional Commitments Met vs. Ambitiousness



National Water Program FY 2017 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 11 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. In selecting these best practices, special emphasis was placed on identifying activities or approaches that have resulted in measurable successful outcomes.

The vision is to promote the widespread use of these best practices and scale up the benefits of their implementation by sharing them among the program and regional offices.

The Office of Water will host monthly webinars on the Best Practices in the 12 months following the publication of this report. To be notified about these webinars, please subscribe online by entering your email or phone number at the EPA OW subscription site[8] and select from our list of subscription topics.

[8] https://public.govdelivery.com/accounts/USAEPAOW/subscriber/new

Executive Summary

Assisting Water Systems

Funding Engineering Services through the Drinking Water State Revolving Funds (DWSRF) Set-aside to Help Small Drinking Water Systems Comply with Health-Based Standards A Small Project Engineering Services program, developed through the DWSRF Program, designed to fund engineering services at waterworks that otherwise could not afford these services. *Pg 27*

Training Operators in Region 8 to Develop Sampling Plans Can Reduce Exposure to Lead A field training program on the Lead and Copper Rule to support systems that lack records to justify where they collect compliance samples. *Pg 28*

Implementing Low-Cost Process Changes Improves Efficiency at Wastewater Treatment Facilities in Two Regions Efforts in Regions 4 and 8 to build capacity of municipal wastewater operators, state regulatory offices, and key stakeholders to use low-cost process modifications to achieve improved treatment and lower operational costs. *Pg 29*

Improving Process and Relationships

Enhanced Collaboration Leads to DWSRF Targeting Small Drinking Water Systems in Need A DWSRF and Drinking Water Program Team meets quarterly to review and discuss ways to address drinking water systems that are in noncompliance. *Pg 32*

Focusing on Past Gains and Future Goals Forges Stronger Relationships that Lead to Water Quality Improvement A project that utilized the Appreciative Inquiry process to transform relationships between people, enhance communication, build effective collaboration, and lead to water quality improvements in the Proctor Creek Watershed. *Pg 33*

Implementing Standard Operating Procedures (SOPs) Improves Permitting Decisions Two efforts, in Region 5 and Region 9, to develop SOPs for National Pollution System Discharge Elimination System and Underground Injection Control permit decisions. *Pg 35*

Pretreatment Program Assistance Can Reduce Pollution and Improve Compliance A program to target Pretreatment Program compliance assistance and enforcement to cities without approved Pretreatment Programs. *Pg 37*

Modernizing Water Quality Monitoring

Tracking Down Sources of Bacteria Pollution Helps Restore A New Jersey River A pilot project utilizing conventional pathogen indicators coupled with microbial source tracking to identify several significant sources of human pathogen pollution to the Second River in New Jersey. *Pg 39*

Assisting Citizen Groups to Conduct High Quality Monitoring A program to provide water quality monitoring equipment to citizen scientists (throughout New York, New Jersey, Puerto Rico, the U.S. Virgin Islands and Tribal Nations). *Pg 41*

Using a Customizable Tool to Measure Changes in Stream Function A spreadsheet and field-based method developed to quantify changes in stream functional attributes, pre-and post-project. *Pg 43*

Identifying Nonpoint Sources of Pollution in Puget Sound to Improve Shellfish Beds A program to provide local partners with innovative tools to protect and restore shellfish beds and protect people from water-borne pathogens. *Pg 45*

Assisting Water Systems

Funding Engineering Services through the DWSRF Set-aside Can Help Small Drinking Water Systems Comply with Health-Based Standards

Brief Description:

Of the 1,118 community systems in the Commonwealth of Virginia, 1,048 are small community water systems (serving less than 10,000 people). Small systems in Virginia represent about 94% of the community systems. The Virginia Department of Health's (VDH) Small Project Engineering Services (SPES) program complements the state's capacity development program and augments state technical assistance services. The program achieves the dual objectives of generating compliant water systems capable of long-term sustainability and increasing the number of systems benefiting from the Drinking Water State Revolving Funds (DWSRF). VDH contracts directly with engineering firms for each region of the Commonwealth. Field Office staff coordinate with the SPES program to direct the consultant engineering firms in the initiation of needed projects through task order development. Eligible waterworks include community and non-profit non-transient systems serving a population of 10,000 or less. SPES provides up to $10,000 for project design services.

HIGHLIGHTS

WHAT | A Small Project Engineering Services (SPES) program developed through the DWSRF Program Set-aside.

WHO | The Virginia Department of Health, Office of Drinking Water

WHY | The SPES program is designed to fund engineering services at waterworks that otherwise could not afford these services.

Current Status:

Through the first three years of this program's implementation, eleven waterworks were assisted utilizing funds totaling approximately $150,000. A "value engineering" service has been added by the SPES program.

Outcomes:

Results have exceeded expectations. Services were provided to schools that exceeded the action level for lead and/or copper. The engineer's recommendations resulted in infrastructure improvements that produced sampling results below contaminate levels. A very small municipal system used SPES to fund an asset management study in a small town. Now this town knows the location, condition, and useful life of all its critical infrastructure. The town developed an effective maintenance and replacement schedule and for the first time, a capital improvement plan (CIP) to replace infrastructure when appropriate. The CIP will result in potential projects for the DWSRF. In short, these examples demonstrate the value of SPES funding in protecting public health and drinking water supplies where the needs are critical.

Lessons Learned/Recommendations:

By providing access to engineering services, small systems can more easily design and plan needed capital projects resulting in improved drinking water quality and system management.

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Assisting Water Systems

Training Operators in Region 8 to Develop Sampling Plans Can Reduce Exposure to Lead

Brief Description:

This workshop assists water system operators who, due to a lack of historical materials records, do not have a complete pipe materials inventory across their distribution system and therefore have difficulty identifying Tier 1 sampling sites. Operators want to verify that they sample in proper locations but do not know where to begin that confirmation.

Eight-hour Lead and Copper Rule (LCR) trainings were held throughout the geographic area of the Region providing operators, public health officials, and technical assistance providers with an opportunity to have one-on-one assistance with their tap sample plans. Attendees learned the basics of the LCR and their responsibilities for complying with the LCR, and now have more tools to select appropriate sampling sites for the LCR, and assist those systems that exceed the action level for lead and/or copper.

Current Status:

Training has been provided at ten locations for 259 water operators and technical assistance providers. Training materials are all available for other Regions/States to use, and workshops can be scaled up or scaled down to meet specific local needs.

Outcomes:

The workshops have improved the implementation of the LCR and have greatly helped operators understand their role and responsibility in complying with the LCR. The workshops have offered a venue for operators to share ideas and ways to gather information about their distribution system so they can select appropriately tiered sites to monitor for LCR. This best practice has resulted in ongoing improvements in the field as operators continually record information they gather in the field and verify Tier 1 sites.

HIGHLIGHTS

WHAT | The Drinking Water Program conducted eight-hour field trainings on the Lead and Copper Rule (LCR) to support systems that lack records to justify where they collect compliance samples. Operators were trained on developing or updating their lead and copper sampling plans.

WHO | The EPA Region 8 Drinking Water Program, Office of Water Protection in partnership with the Midwest Assistance Program.

WHY | This training helped operators and other public health professionals understand and comply with the LCR.

Lessons Learned/Recommendations:

This workshop benefits those operators and anyone engaged in protecting the public from exposure to lead and copper in drinking water. The workshop layout can be modified to adapt to different audiences, for example schools embarking on school sampling programs. Participants should bring their sampling plans to the workshops for review before they begin their lead sampling programs. Completed training materials can be used directly or modified to accommodate different projects.

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Assisting Water Systems

Implementing Low-Cost Process Changes Improves Efficiency at Wastewater Treatment Facilities in Two Regions

Brief Descriptions:

Since 2011, the Region 4 Wastewater Process Optimization Program (WPOP) team and its partners have worked with over 70 drinking water and wastewater plants, identifying operational changes with the potential to reduce treatment costs by $2.8M/year, while also reducing the amount of effluent total nitrogen (TN) by over 1,500 tons/year. Regional funds promote optimization at wastewater treatment plants through a three-pronged approach:

- Develop capacity of state and tribal water regulatory programs, municipalities, and stakeholders to recognize and act on opportunities to improve treatment and reduce costs at wastewater treatment plants;
- Support development of process models to identify optimization strategies, and data tools to target candidate facilities and measure results over an extended period; and
- Target a manageable number of facilities each year to identify and implement optimization strategies, gather data, measure results, and develop case studies. These case studies and successful operators become resources for other wastewater treatment plants interested in pursuing optimization.

In Region 8, the Montana Department of Environmental Quality partnered with a wastewater operations consultant to provide free classroom training to 70 Publicly Owned Treatment Works (POTW) operators and on-site consultation to 38 plants beginning in 2012. During 2014 and 2015, the Montana pilot showed that operator-implemented optimization at 11 POTWs achieved an average 59% reduction in TN and 33% in total phosphorus (TP), all for a modest investment in training and on-site assistance. With these impressive results, Region 8 worked with other states to roll out the approach more broadly. On-site assistance was provided to

HIGHLIGHTS

Improving Processes at Publicly Owned Treatment Works (POTWs) in Region 4

WHAT | Staff in the Region 4 Grants and Drinking Water Protection Branch are leading efforts to build capacity of municipal wastewater operators, state regulatory offices, and key stakeholders to use low-cost process modifications to achieve improved treatment and lower operational costs. Most modifications can be implemented at no cost, resulting in cash flow that municipalities can use to finance needed infrastructure improvements.

WHO | The Region 4 Wastewater Process Optimization Program team, its partners and over 70 drinking water and wastewater plants

WHY | The program advances the Administrator's priorities to 1) build robust relationships with state and local governments, and 2) leverage resources to stimulate infrastructure investment.

Collaboration on POTW Optimization Reduces Nutrient Pollution in Region 8

WHAT | EPA and Region 8 states collaborate to train and assist small community POTWs to optimize their operations to achieve low-cost reductions in nutrient concentrations

WHO | Montana, Region 8 and other Region 8 States assisted by a consultant.

WHY | Many small communities in Region 8 lack the resources and capacity to upgrade POTWs to reduce nutrients in effluent. Training and individual assistance to POTW operators is resulting in affordable and immediate progress on nutrient pollution.

the Laramie, Wyoming POTW and optimization efforts there have resulted in a 65% reduction in TN. A regional classroom optimization training was offered in Denver in September 2017, with operators and state agency representatives from Colorado, Utah, and North Dakota participating. As part of the training, Region 8 state water directors met with the operators to hear the benefits and share perspectives about regulatory barriers to optimization and how to address those barriers. The success of these efforts demonstrates a practical, cost-effective approach to achieving significant near-term nutrient reductions, and empowers POTW operators to more effectively utilize their existing infrastructure.

Current Status:

Region 4 actively supports Tennessee, Alabama, and Kentucky in optimization activities. The Region also collaborates with United South and Eastern Tribes, Inc. (USET), providing assistance to Tribal governments to meet the needs of Indian people. Region 4 has partnered with USET to assess two tribal facilities, and continues to serve as a resource when needed. In July 2017, Region 4 hosted two trainings to build capacity of state environmental field officers and other technical assistance providers to recognize opportunities for optimization at wastewater treatment plants and develop actionable strategies. Region 4 is developing strategies to continue collaboration and sharing of resources to scale up the program.

In Region 8, the results are helping demonstrate the viability of optimization to Region 8 state NPDES permitting programs. Having succeeded with efforts to help mechanical plants in Montana reduce nutrients, the Montana Department of Environmental Quality (MDEQ) is beginning to explore methods for reducing ammonia and nitrogen for lagoon systems. Region 8 hopes to secure funds to offer optimization training in additional states, and is exploring next steps such as conducting outreach to POTW operator forums as well as to encourage peer-to-peer outreach. Region 8 obtained funding to support the Wyoming and Denver trainings after learning from Montana's experiences, which the state supported with State Revolving Funds. This innovative effort supports state efforts to effectively reduce nutrient pollution, and achieves cost-effective environmental results on a high-priority issue for EPA's national water program.

Outcomes:

Region 4 staff have measured and verified results at ten facilities, accounting for reductions of $600,000/year in operational costs and 256,000 pounds/year of effluent total nitrogen. Other facilities are known to have implemented recommendations and results verification is in process.

Although training and assistance to operators in other Region 8 states is in the early stages, the MDEQ effort that has been underway longer has demonstrated these impressive reductions in nutrients in the effluent from 11 POTWs (see table on the next page).[9]

Lessons Learned/Recommendations:

- Existing off-the-shelf operator training is generally not designed to help POTW operators modify the biological processes that result in effective nutrient removal. The process was assisted in Region 8 by using a certified wastewater operator who understands the perspectives of the POTW operators.
- Dialogue between operators contemplating optimization efforts and regulators setting permit limits can be helpful in recognizing and addressing potential barriers.

Continued >

[9] From "Low Cost Nutrient Removal in Montana," 2016, The Water Planet Company

Nutrient Reductions at Publicly Owned Treatment Works in Montana

Montana POTW	TN (mg/L) post-optimization	% reduction in TN	TP (mg/L) post-optimization	% reduction in TP
Columbia Falls	7	32%	0.3	87%
East Helena	10	48%	NR	NA
Helena	5	31%	2	32%
Manhattan	8	21%	0.4	73%
Big Sky	14	46%	1.4	-8%
Chinook	3	85%	0.3	89%
Conrad	5	85%	0.13	94%
Hamilton	3	54%	4	28%
Hardin	4	78%	2.4	-14%
Libby	21	34%	3	35%
Lolo	21	25%	4.4	5%

- This cost-effective approach can be replicated in other states or regions with a significant number of small communities that may not be able to afford costly capital improvements available to larger municipalities with a larger ratepayer base.
- The opportunity to improve treatment at lower cost exists for many wastewater systems, often through operational changes that can be achieved with little to no cost to the facility.
- The success of optimization efforts depends upon leveraging resources outside EPA, and establishing robust relationships with wastewater treatment plant operators and state regulatory agencies.
- Regulatory agencies can encourage adoption of established and innovative practices by working with operators toward a common purpose, using enforcement discretion and unbiased analysis.

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Additional Information:

https://www.epa.gov/sites/production/files/2015-08/documents/case_studies_on_implementing_low-cost_modification_to_improve_potw_nutrient_reduction-combined_508_-_august.pdf

http://www.cleanwaterops.com/wp-content/uploads/2016/02/Montana-Report-Final-Proof.compressed.pdf

Improving Process and Relationships

Enhanced Collaboration Leads to DWSRF Being Targeted to Small Drinking Water Systems in Need

Brief Description:

Nationally, small drinking water systems represent about 97% of the community systems. Over 15,700 public water systems in Region 3 serve a population of less than 10,000. Although small systems serve a relatively small population (14% nationally), small systems have the greatest number of violations and repeat violations. In addition they often have limited funds for infrastructure investments and for establishing and maintaining technical and managerial capacity.

To more directly connect Drinking Water State Revolving Fund (DWSRF) funding with drinking water systems experiencing health-based violations, Region 3 formed an inter-divisional team. The drinking water programs conduct quarterly team meetings to discuss the Enforcement Tracking Tool (ETT) list with their state partners. At these meetings, systems are evaluated considering the nature of noncompliance, possible solutions (i.e., technical, managerial, or financial support), and planned or intended state response actions.

Current Status:

The inter-divisional team meets quarterly to review the ETT list. In follow-up to the quarterly team meetings, the Region 3 DWSRF representative discusses the ETT list with the State DWSRF program; DWSRF Project officers summarize any actions taken to assist noncompliant systems and prepare success stories reflected in the State Program Evaluation Reports and elsewhere.

Outcomes:

The team has achieved two significant successes thus far. A drinking water system with no operator or responsible owner drew drinking water from three small surface ponds that were subject to runoff pollution. The community was at the top of the ETT list for the state. Through a coordinated effort, $2.2 million in project funding from the DWSRF Program connected the community with a filtered, dependable, high-quality source of water, full fire protection, and regular maintenance. In addition, a mobile home park ranking high on the State's ETT list for several years with numerous violations including nitrate exceedances worked with DWSRF's Technical Assistance Provider to return to complete compliance using the 15% Set-Aside.

The actions taken by the team and its state partners demonstrate creativity and vision in achieving the Agency's priority of increasing compliance with health-based drinking water standards. The team worked to codify its action through the development of a Standard Operating Procedure.

HIGHLIGHTS

WHAT | Region 3 formed a Drinking Water State Revolving Fund (DWSRF) and Drinking Water Program Team that meets quarterly to review and discuss drinking water systems that are in noncompliance. Two noncompliant systems at the top of the Enforcement Tracking Tool list received DWSRF funding and were returned to compliance because of enhanced internal and external communication and collaboration.

WHO | Representatives from the DWSRF program, the Capacity Development program, Source Water Protection, and the Drinking Water Enforcement program.

WHY | Need to enhance coordination and collaboration among team partners to increase compliance with drinking water standards.

Lessons Learned/Recommendations:

Collaborative efforts generate superior outcomes. Communicating effectively internally and with state partners, DWSRF funds are serving to increase compliance with health-based drinking water standards.

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Improving Process and Relationships

Focusing on Past Gains and Future Goals Forges Stronger Relationships that Lead to Water Quality Improvement

Brief Description:

The Appreciative Inquiry (AI) process consists of 4 key phases or "the 4 Ds": Discover, Dream, Design, and Deploy. In Proctor Creek, the AI process challenged team members to look at the root causes of their recent successes as opposed to the reasons for previous failures. In the initial Discover stage, discussions focus on each agency's accomplishments and what initiatives, what feelings, and what partners contributed to their success. During the Dream phase, team members imagine, without boundaries or restrictions, ways their agency can resolve problems within the watershed. In the Design phase, team members create defined projects that fit into the overall goals for the watershed and each individual organization. In the Deploy phase, team members prioritize and agree upon the specific details of each project and design a plan for coordination and communication. This final phase leads to successful implementation of the projects.

The AI process in Proctor Creek involved six meetings over a ten-month period. Participants included representatives from the partnership agencies, the city, the state, NGOs, and the community. To stimulate the free exchange of ideas and get people comfortable with each other, eight major community challenges had been identified prior to the initial meeting. During the morning session of the meeting, each challenge was written on a flip chart and participants were asked to break into eight small groups to openly discuss and capture the issues involved with a particular challenge. The afternoon session included presentations on what had been discussed for each challenge. After the initial meeting, the partnership team used consensus building to narrow down the number of challenges from eight to four. A second meeting, with the same format as the first, was held to further discuss the selected four. By the end of these first two meetings, participants felt more comfortable working together and had a comprehensive understanding of the complexities of each challenge.

HIGHLIGHTS

WHAT | Appreciative Inquiry (AI) is a process for developing trust and implementing change within teams by focusing on the root causes of success as opposed to the root causes of failure.

WHO | The Region 4 Proctor Creek Urban Waters Federal Partnership (UWFP), with the help of a Region 7 Conflict Prevention and Resolution Center Facilitator.

WHY | The Proctor Creek watershed, designated in 2013 as one of 19 UWFPs nationwide, consists of nine federal agencies, the City of Atlanta, the State of Georgia, and three supporting non-government organizations. The partnership team provides resources and assistance to improve water quality throughout the watershed and revitalize the communities within it. The Proctor Creek UWFP team used the AI process to transform relationships among people, thus enhancing communication and building effective collaboration.

Building upon the work of the initial meetings, the team decided to use the Integrated Water Resources Management Plan, a document created by the U.S. Army Corp of Engineers, as the umbrella under which other agencies' projects could be coordinated across the watershed. In the following three meetings, participants talked about how they felt about being involved in the process and shared, in detail, the current projects being conducted by each organization. Subsequent discussions were then held to identify opportunities to partner on various projects and include them in the Integrated Water Plan. By the end of the process, all partners had a clearly defined role and knew how they contributed to the larger goals of the watershed, identifying projects to include in an UWFP plan. This plan, a subset of the larger Proctor Creek Integrated Plan, includes 40 projects specific to the UWFP team.

Current Status:

The AI process will continue to be used by the Proctor Creek UWFP Ambassador as a tool for facilitating future meetings with the partnership and other organizations. The Region 7 facilitator spent a portion of his time training and mentoring the Proctor Creek Ambassador to ensure the success of the process and that projects become fully implemented. Communication between partners, both in the UWFP and throughout the community, has greatly increased and the level of enthusiasm remains high. Participation rates have increased and people actually look forward to meetings.

Outcomes:

The Proctor Creek UWFP is part of an award-winning National Urban Waters Team. Member participation in partnership activities has increased from 50% a year ago to 80% since the introduction of AI process, and communication and collaborations between federal agencies, the City of Atlanta, and the Proctor Creek community have been strengthened. The identification of shared priorities led to the development of the Proctor Creek UWFP workplan, a compendium of projects agreed to by the partnership and the community. As a result of the AI process, the Army Corp of Engineers' Ecological Feasibility Study for Proctor Creek was completed with the support and participation of the UWFP. The study was designated by the partnership as our top priority project.

Lessons Learned/Recommendations:

AI is a widely used practice for building trust and collaboration. With a trained facilitator, this method can be utilized anywhere there are opportunities to build partnerships and solve problems. The AI process should be conducted over a period of time. To be successful, participation must be consistent and with the same groups of people.

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Improving Process and Relationships

Implementing Standard Operating Procedures Improves Permitting Decisions

Brief Descriptions:

The Region 5 Underground Injection Control (UIC) Branch is directly responsible for implementation of the full UIC program in Michigan and Minnesota and parts of the program in all other states in the Region. The permitting Standard Operating Procedure (SOP) provides clear direction to the 11 staff and three managers who are responsible for timely development of protective draft and final permit decisions by the Division Director. The SOP identifies the 42 steps required to process a permit application to a final decision, identifying the key milestones and timelines. The SOP includes embedded links to key technical and legal resources that permit writers need to make and document decisions as they progress through the steps, and provides practical advice and direction with respect to the six federal laws and two executive orders that apply or may apply to a UIC permit. When combined with performance standards issued to staff, the SOP reflects customer service values by requiring regular status reports and feedback to a permit applicant as well as an opportunity for applicants to review their draft Class I permit, as well as any Class II permit that contains novel conditions, prior to public notice of the same.

Region 9's Water Division (NPDES Permits Section) and Enforcement Division (Information Management Section and Wastewater Enforcement Section) carried out a LEAN process to establish new NPDES Permit Lifecycle SOPs. The process also identified data management tools and systems to better coordinate the NPDES permitting process across multiple divisions and sections in Region 9. Using the LEAN process allowed the Region to effectively evaluate existing coordination and data/information flow processes across program lines and develop a new information sharing system to enable different programs to better coordinate with each other. This led to more efficient data and information transfer, improving permit quality by ensuring fuller access by all involved offices to relevant permit, monitoring, inspection, and other facility information.

HIGHLIGHTS

Region 5 Underground Injection Control (UIC) Permitting Standard Operating Procedures (SOP)

WHAT | In August 2017, the Region 5 UIC Branch completed a SOP for the work performed upon receipt of an application for a permit to inject fluid underground.

WHO | Region 5

WHY | The SOP is one of three developed since 2014 to improve the quality of practice in the principal lines of work in the Branch.

Region 9 National Pollution Discharge Elimination System (NPDES) Permit Lifecycle Standard Operating Procedures

WHAT | Completed LEAN project to delineate SOPs that establish clear interoffice coordination procedures and program responsibilities for NPDES permit data and information management associated with permits issued by EPA Region 9.

WHO | Region 9 Water Division (NPDES Permits Section) and Enforcement Division (Information Management Section and Wastewater Enforcement Section)

WHY | To ensure more complete and efficient information and data transfer throughout the NPDES permitting lifecycle.

Current Status:

Staff in Region 5 are currently implementing the SOP.

In April 2017, Region 9 issued a new SOP document, with each section formally agreeing to follow these procedures, and then established a new SharePoint site to facilitate information sharing. The Region has conducted training classes for staff and started implementing the new process in late

spring 2017. In addition, they also started having monthly NPDES Direct Implementation coordination meetings in which staff from each section regularly participate to discuss pending issues and improve process coordination.

Outcomes:

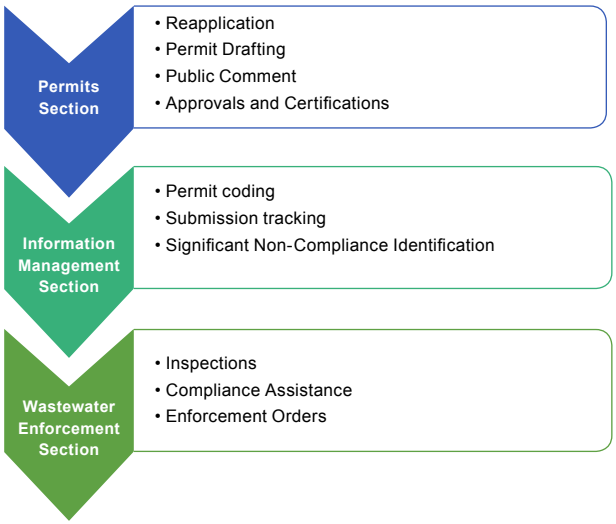
Region 5 anticipates that the SOP will improve the quality, timeliness, and defensibility of fluid injection permits going forward. The SOP will provide an objective basis to evaluate the performance of permit writers and the management team in the Region 5 UIC Branch. In October, Region 10 requested and received a copy of the SOP. Region 10 wanted to read and understand the SOP as they consider one or more applications for permits for fluid injection in Idaho. The EPA Office of Ground Water and Drinking Water also requested and received a copy of the SOP in October, for consideration as the Office of Water seeks to identify and employ business process improvement strategies under Objective 3.4 in the draft Strategic Plan.

Following initiation of the new SOPs, program offices in Region 9 are viewing the permits process as a continuous lifecycle requiring an ongoing commitment of section staff to continue improving coordination throughout the permitting process. This new process will accelerate new permit issuance with better coordination in scheduling inspections in advance of new permit issuance and ensuring inspection and Discharge Monitoring Report information are available in a timely fashion prior to new permit development. The Region will be tracking permit issuance timeframes more closely in FY18.

Lessons Learned/Recommendations:

Region 5 has learned that for complex projects that are undertaken on a routine basis, development and periodic review of SOPs provides a framework in which management and staff can test assumptions as to the reason why a given task is performed or performed in a given way. Committing procedures to writing and ensuring peer, management, and legal review promotes clarity and completeness.

NPDES Permit Lifecycle



In Region 9, participating in the LEAN process highlighted that prior coordination processes were not successful and as a result, relevant facility information and data were not available at key steps in the permitting process. The permitting lifecycle is a continuous process requiring close coordination among work teams, instead of a set of uncoordinated, discrete steps taken by separate organizations. In addition, it is critical to create explicit work sharing databases and the SOPs necessary to formalize responsibilities for data/workflow management and timeframes for actions.

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Improving Process and Relationships

Pretreatment Program Assistance Can Reduce Pollution and Improve Compliance

Brief Description:

The National Pollution Discharge Elimination System (NPDES) permitting and enforcement units in Region 8 began an initiative in FY15 to survey and inspect industrial users (IUs) in cities without Pretreatment Programs where the EPA has direct implementation of the Pretreatment Program. The purpose of these inspections was to assess the Publicly Owned Treatment Works's (POTW) implementation of pretreatment related requirements in its NPDES permit, determine if any of the IUs are significant industrial users (SIUs) including categorical SIUs, and assess the potential impact of industrial discharges on the POTW. Based on results from the initial surveys the initiative was further refined in the following years to target POTWs with effluent violations that could be caused by overloading of conventional pollutants from the food processing sector. These violations included those that could be related to organic overloading.

The Region used a list of food processors pulled by Standard Industrial Classification code from Reference USA and Dunn & Bradstreet, and Excel formulas to match the POTWs having conventional pollutant effluent violations with potential food processors in their service area. The Region also pulled Biochemical Oxygen Demand (BOD) influent data from Integrated Compliance Information System and highlighted POTWs with BOD that was either higher in concentration than would be expected from a typical domestic-only service area or that receive more pounds of BOD per day than would be expected based on the service population.

Current Status:

Region 8 visited over 16 municipalities without approved Pretreatment Programs in Colorado and Montana where EPA is the Control Authority, to provide outreach regarding their authority and responsibility to protect the POTW under the Pretreatment Program. Region 8 is planning to add POTWs in Wyoming to the effort in the future.

HIGHLIGHTS

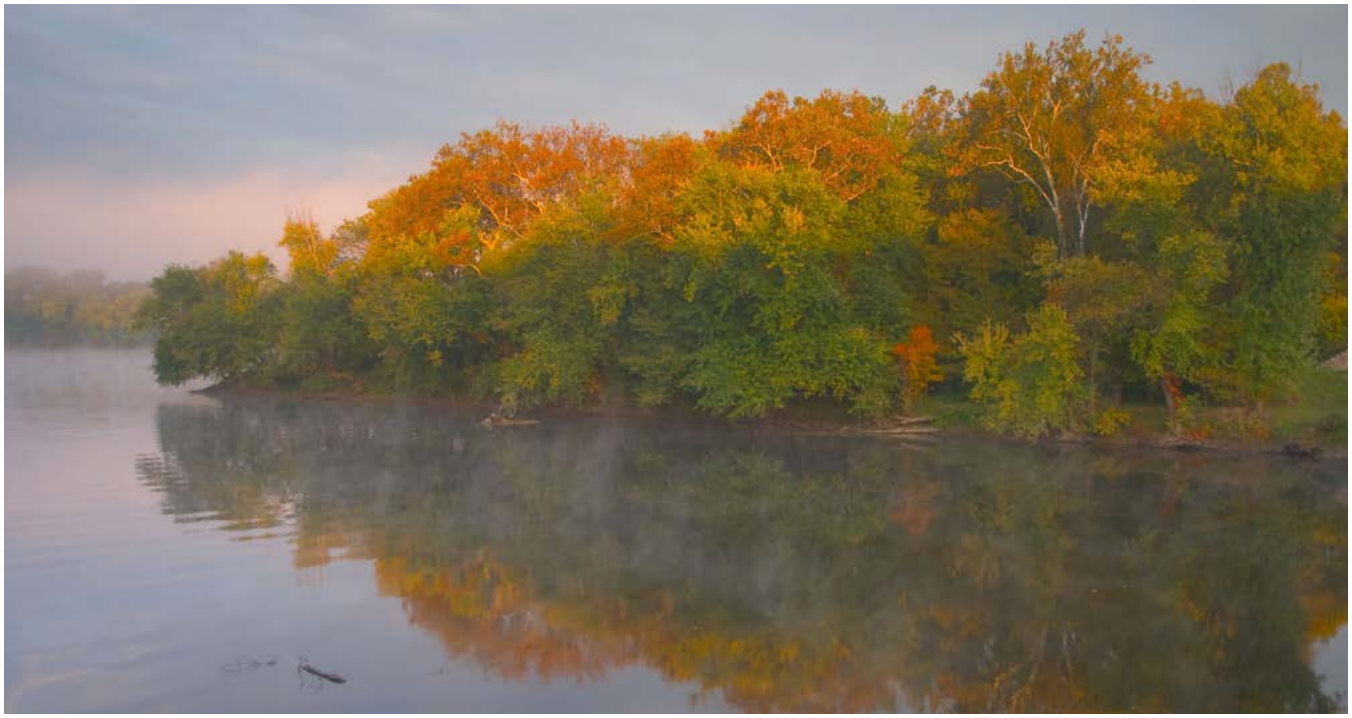
WHAT | An initiative targeting Pretreatment Program compliance assistance and enforcement to cities without approved Pretreatment Programs.

WHO | EPA Region 8 Wastewater Unit, Office of Water Protection.

WHY | While approximately 1,600 publicly owned treatment works (POTWs) have approved Pretreatment Programs, 90% of POTWs do not and are potentially vulnerable to impacts from uncontrolled industrial contributions.

Outcomes:

This initiative has identified at least two instances where IUs have caused repeated violations and provided data for the regional Pretreatment Program to consider in deciding whether to require several cities to develop approved Pretreatment Programs. In addition, Region 8 worked with municipal staff and provided training in their service area on pretreatment implementation procedures such as conducting a survey of industrial users in the service area, performing facility inspections/sampling, determining significant pollutant loading and the impact on the POTW, implementing best management practices for restaurants and car washes/automotive garages, and discussing other control strategies for IUs in the service area. These POTW visits have opened the lines of communication and Region 8 receives significantly more phone calls and emails for compliance assistance from these cities and neighboring cities.



Lessons Learned/Recommendations:

Municipalities without approved Pretreatment Programs are required to protect their POTWs from impacts of industrial pollutants in non-domestic wastewater to comply with their NPDES permit. Most of these municipalities do not have the expertise, resources, or awareness of their authority to protect their POTWs using implementation methods under the pretreatment regulations. Focusing this effort on cities with effluent limit violations has increased the environmental impact and focused our limited resources for compliance assistance to cities with the greatest need. While Region 8's targeting has focused on food processors and conventional pollutants, this idea can be adapted to focus on different pollutants and IU types. The project is easily scalable up or down depending on resource constraints and the universe of potential cities to target.

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Modernizing Water Quality Monitoring

Tracking Down Sources of Bacteria Pollution Helps Restore a New Jersey River

Brief Description:

EPA Region 2 partnered with the Interstate Environmental Commission (IEC) to perform a pilot monitoring project that incorporated an innovative microbial source tracking technique involving DNA analysis for human-associated bacteria. The Region used the analysis, together with traditional pathogen indicator sampling and analysis, to identify human sources of pathogens and, as a secondary objective, to determine compliance with water quality standards in the Second River. Although the Second River has some of the highest pathogen indicators in the entire New York-New Jersey Harbor area, it has no identified sources of human pathogens.

The team employed an adaptive management strategy, choosing approximately 20 initial monitoring sites designed to provide a broad geographic coverage of the study area and to collect data at locations with potentially large sources of pathogens, such as tributaries and outfalls. After being first analyzed for traditional pathogen indicators to determine compliance with existing water quality standards and to prioritize the subsequent DNA analysis for human-associated bacteria, samples were filtered and then frozen for the subsequent DNA analysis (Human-Associated Bacteroides in Water by Quantitative Polymerase Chain Reaction (QPCR) Assay). As the study progressed, monitoring locations with low pathogen indicator results were discontinued and additional locations were added near sites with elevated results to identify the specific pathogen source(s), as well as to other areas to obtain more extensive geographic coverage. A total of 40 sites were sampled.

The project was successful in many ways and met the project's primary objective by identifying the sources of human-derived pathogens at several locations. In addition, Division of Environmental Science and Assessment (DESA) successfully demonstrated competency in an important, new analytical method that was critical to the project's success.

HIGHLIGHTS

WHAT | EPA Region 2 pilot project utilizing conventional pathogen indicators coupled with microbial source tracking/DNA analytical techniques to identify several significant sources of human pathogen pollution to the Second River in New Jersey.

WHO | EPA Region 2 Clean Water Division and Division of Environmental Science and Assessment, and the Interstate Environmental Commission.

WHY | To identify the contribution of human sources of pathogens to support the subsequent implementation of targeted pathogen control measures.

Current Status:

The team is performing outreach about project results to regional and state partners, as well as to local municipalities, sewage treatment plants, and community groups. We are also conducting additional monitoring at select problematic locations to identify specific sources of pathogen pollution.

Outcomes:

The project identified human sources as a major contributor to elevated pathogen levels in the Second River. The project identified specific sources of human pathogens at several sites along the Second River so that targeted control measures may be implemented. The Region developed an important partnership with the IEC in this trackdown study. The IEC took the lead in performing field sampling activities in all kinds of weather and without their participation and support the project would not have materialized. The project also

Two sampling sites in the Second River.

made efficient use of scarce resources by obtaining additional support through the involvement of interns and part-time support through the EPA Skills Marketplace program; these additional personnel provided key support at DESA, in the field and in analyzing project data. We also received valuable input from our state partner, the New Jersey Department of Environmental Protection.

We are working with our state partners to incorporate pathogen trackdown monitoring as a key component of their compliance/enforcement strategy to find and fix human sources of pathogens. This approach is scalable and can be replicated in other states and regions.

Lessons Learned/Recommendations:

Pathogen trackdown programs utilizing microbial source tracking/DNA techniques are effective in identifying sources of pathogens. Many older urban areas have significant water quality problems due to human sources of pathogens. Early and frequent communication with regional and state agencies involved in water programs (permitting, sampling, compliance/enforcement) is critical to project success and in working with communities to implement pathogen control measures and strategies.

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Modernizing Water Quality Monitoring

Assisting Citizen Groups to Conduct High Quality Monitoring

Brief Description:

Launched in 2015, the Region 2 Equipment Loan Program provides water quality monitoring equipment to citizen scientists (non-governmental organizations, academia, community groups, volunteer monitors, students, etc.) throughout New York, New Jersey, Puerto Rico, the U.S. Virgin Islands and Tribal Nations. The program currently has 11 sets of the following equipment:

- Water Quality Array: multiparameter sonde, GPS unit and turbidity tube
- Bacteriological Array: Idexx Quanti-tray sealer, incubator, thermometers, UV light box, etc.
- Benthic Macroinvertebrate Collection Array: kick-net, specimen tray, tweezers and magnifying glass
- Two manta trawls for microplastic sampling

Recipients apply for equipment and are selected by a panel of EPA Region 2 reviewers. Recipients receive training on all the equipment and must prepare a Quality Assurance Project Plan (QAPP). Loan recipients are also bound by the terms of the EPA Personal Property Loan Agreement (EPA 1780-1) and must provide regular updates throughout the loan, as well as a report outlining the work performed with the equipment provided to them.

Current Status:

In 2017, the program added the benthic macroinvertebrate collection array in New York and New Jersey. In 2016, with aid from the Trashfree Waters Program, Region 2 was able to purchase two manta trawls for microplastic collection, which led to several Train-the-Trainer events held in New Jersey and several locations in Puerto Rico. Region 2 is currently running pilot loans of the trawls with the San Juan Bay Estuary Program and New Jersey Fish and Wildlife.

HIGHLIGHTS

WHAT | Region 2 Citizen Science Water Monitoring Equipment Loan Program.

WHO | EPA Region 2 Division of Environmental Science and Assessment.

WHY | Many citizen scientists do not have the resources to purchase their own instrumentation for their work; therefore, EPA Region 2 created this program to allow citizen scientists access to equipment used in the agency's own work.

Region 2 Division of Environmental Science and Assessment (DESA) continues to work with our state and citizen scientist partners to potentially expand the range of equipment the agency can loan, with current options including spectrophotometers, continuous sensors, and other advanced monitoring equipment.

Outcomes:

The Region 2 Equipment Loan Program has been successful in providing equipment to citizen scientists who may not otherwise have been able to complete their work. The program has allowed opportunities for outreach, education, collaboration, and better communication between the Region and citizens.

The Region can actively expand environmental knowledge and stewardship by providing physical resources as well as training on equipment and project planning to our citizen scientists. There have been ongoing improvements and expansions to the program each year and a similar program could be executed in other regions and applied to different equipment and media.

2016 & 2017 Equipment Loan Recipients

New York & New Jersey
Bard College
Manhasset Bay Protection Committee
New Jersey City University
NY/NJ Harbor Estuary Program with 2 sub-grantees
NYC Water Trails Association
Operation S.P.L.A.S.H.
Raritan Headwaters Association
Rockland County Soil & Water Conservation District
Save the Sound/Connecticut Fund for the Environment, Inc.
Seneca Nation Environmental Protection Department

Puerto Rico & US Virgin Islands
Desarrollo Integral del Sur, Inc.
Escuela Jose Aponte de la Torre
Grupo Estudios Cientificos del Caribe LLC
Pontifical Catholic University of Puerto Rico
Surfrider Foundation Rincon
University of Puerto Rico - Mayaguez
University of the Virgin Islands - St. Thomas

Lessons Learned/Recommendations:

- Based on our experience in managing this program we have learned the following:
- Create requirements, not suggestions, for loan recipients (i.e., QAPPs, reports, status updates).
- Be strict once those requirements are set (i.e., QAPPs, loan ending periods, and extensions).
- Be clear on recipient responsibilities.
- Always be open to expanding/modifying the program based on the recipient's and EPA's needs.
- Be aware that the program is time and resource consuming: Beyond the paperwork and planning for the training day and pickup, there is the need to maintain equipment and to offer technical assistance for citizen scientists throughout the loan period.

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Additional Information:

http://www.epa.gov/citizenscience

Modernizing Water Quality Monitoring

Using a Customizable Tool to Measure Changes in Stream Function

Brief Description:

The Stream Quantification Tool (SQT) is an objective, measurable, and repeatable stream assessment originally developed in North Carolina, and tailored and adapted for use in western streams in Wyoming and Colorado. Technical workgroups consisting of representatives from appropriate state agencies provided data and information to assist in the modification.

In order to create the market for stream restoration projects through mitigation banking and in-lieu fee programs, a consistent currency needs to be established and should be based on the gains (credits) and losses (debits) of aquatic resource function. Without a function-based approach, stream mitigation accounting has relied on linear foot measurements with no consideration of functional changes. The SQT calculates a new unit – functional feet – which considers stream length in combination with an estimate of functional change within a project area to provide a more meaningful way to determine credits and debits.

Current Status:

A beta version of the Wyoming tool and user manual were released for public comment and testing in July 2017, with public comments due by December 2017. Current efforts include developing a beta version of the tool in Colorado, developing the technical support document outlining the methods for developing regional performance curves within the tool, and revising the Wyoming tool based on beta testing results and public comment. A training session for regional Corps, EPA, and Interagency Review Team (IRT) staff was conducted in mid-November 2017.

Outcomes:

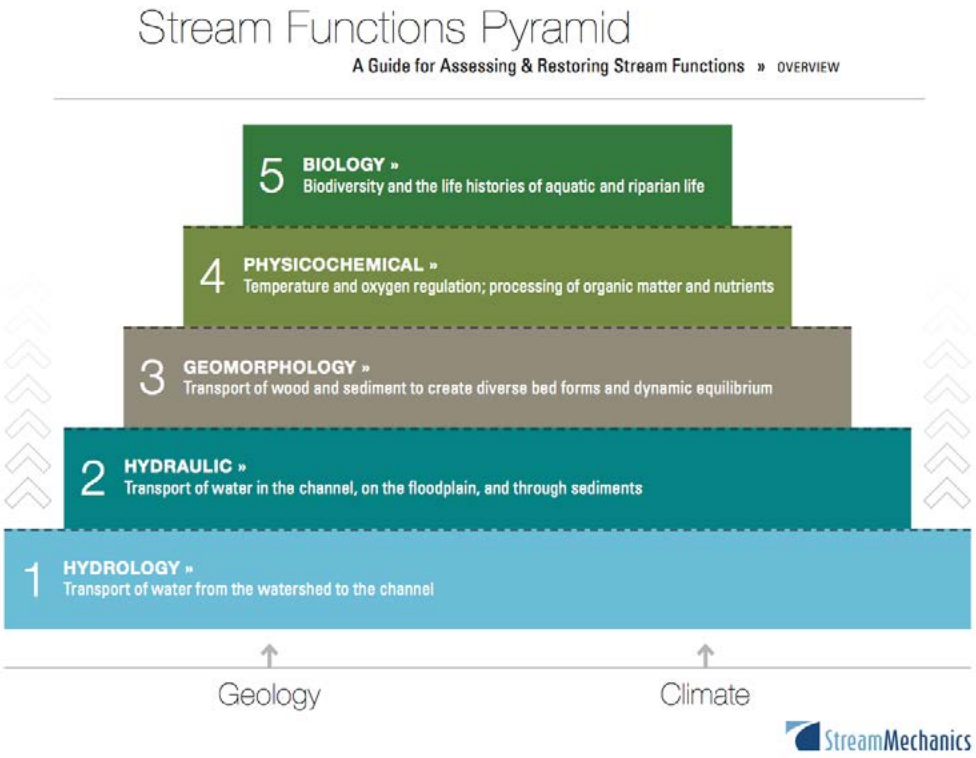
The SQT provides federal and state agencies and non-governmental organizations an objective way to measure changes in stream function at a project site. The tool can be used for planning restoration projects, long-term project monitoring, and setting performance standards to measure accrual and attainment of aquatic resource functions. Additionally, it can be used to communicate success of restoration projects to support financing and funding of projects. The adaptation of the North Carolina SQT for use in two western states demonstrates that the tool framework is transferrable across significantly different regions. Efforts are ongoing to regionalize this tool in Tennessee and Michigan, and agency partners in other parts of the country have also expressed interest in adapting the tool for their use. Additionally, because the tool is informed by reference datasets, performance curves can be developed for specific areas using region-specific data.

HIGHLIGHTS

WHAT | The Stream Quantification Tool is a spreadsheet and field-based method developed to quantify changes in stream functional attributes, pre-and post-project, which can inform Clean Water Act Section 404 permitting and mitigation decisions.

WHO | EPA Region 8 Aquifer and Aquatic Resources Protection Unit, Office of Water Protection, the Omaha, Sacramento, and Albuquerque Corps Districts and several Interagency Review Team members, including Wyoming Game and Fish Department, Wyoming Department of Environmental Quality, Colorado Department of Natural Resources and Colorado Department of Public Health and the Environment.

WHY | The 2008 Mitigation Rule defines credits and debits in the context of accrual or attainment (lift) of aquatic functions at a compensatory mitigation site, and the loss of aquatic functions at an impact or project site, respectively. While various assessments and policies have been developed in other parts of the country, there is currently no assessment method to quantify lift and loss of stream functions in Colorado and Wyoming.



Lessons Learned/Recommendations:

The Colorado and Wyoming regionalization processes included convening a steering committee made up of IRT member agencies. This steering committee contributes expertise, regional information, and data. While convening a steering committee can take more time than having a dedicated contractor doing more of the research and legwork, this approach allows integration of expertise from state resource agencies to bring local knowledge and data to the process, co-learning opportunities for IRT members, and facilitation of new ideas for regionalizing the tool for a specific state.

Consideration should also be given to peer review and beta testing for the tool. A beta testing period is recommended, as is internal peer review (e.g., by the Corps' Environmental Research and Development Center) and external peer review of technical analyses and development of performance standards.

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Additional Information:

https://stream-mechanics.com/stream-functions-pyramid-framework/

Modernizing Water Quality Monitoring

Identifying Nonpoint Sources of Pollution in Puget Sound to Improve Shellfish Beds

Brief Description:

Pollution Identification and Correction (PIC) programs provide local partners with innovative tools to protect and restore shellfish beds and protect people from water-borne pathogens. PIC programs 1) collect water samples, 2) investigate fecal bacteria sources of water pollutions, and 3) take action to correct problems. PIC programs also offer technical and financial assistance to help homeowners and farmers treat their sewage and address livestock waste.

PIC programs in Puget Sound employ innovative methods. For example:

- Kitsap County's PIC program conducts shoreline monitoring to investigate malfunctioning and failing septic systems that could directly impact the shoreline and/or a shellfish growing area. The program conducts records reviews, field inspections, and sampling/dye testing to verify septic system issues, and help to correct confirmed septic system failures.
- In addition to water quality sampling to assess trends and identify bacteria sources, Skagit County's PIC program has brought in "Crush," a sewage sniffing dog, to detect human sewage.
- Snohomish County's PIC program works with partners to track down and reduce discharges from onsite septic systems and livestock. The program provides technical assistance and cost share to help landowners correct pollution problems.
- The Hood Canal Coordinating Council's PIC program is developing strategies to investigate and correct shoreline hotspots and conduct parcel surveys in high priority areas – fixing all septic system failures and correcting all other fecal pollution sources they find. They are building on social marketing strategies to carry out a regional outreach plan for the program.

HIGHLIGHTS

WHAT | Pollution Identification and Correction (PIC) programs identify and remove bacteria sources to ensure that surface waters are safe and sanitary, protecting people who swim or eat shellfish from them.

WHO | The National Estuary Program, EPA Region 10, and local partners in PIC programs in all 12 Puget Sound counties.

WHY | Puget Sound PIC programs work to improve water quality and protect people's health from fecal pollution. Local governments have used PIC to protect and restore commercial, tribal, and recreational shellfish growing area closures and to reverse declining water quality trends.

Current Status:

The Puget Sound National Estuary Program supports PIC programs in all 12 Puget Sound counties. PIC programs contributed to a net increase of 1,196 acres of shellfish bed openings in FY17 alone. PIC programs have helped to improve water quality throughout Puget Sound, despite increasing population growth and urbanization across the region. This is an important accomplishment, since Puget Sound is the only commercially viable shellfish growing area in the U.S. that is located in an urban watershed.

Outcomes:

Due in part to EPA's support of Puget Sound PIC programs, FY17 saw openings of several large shellfish growing areas in Puget Sound, including 810 acres in Drayton Harbor, 760 acres in Liberty Bay, and 272 acres in Dungeness Bay. PIC has been a valuable resource in the elimination of fecal pollution sources and can also be used for nutrients, sediment, temperature and other pollutants.

Pollution Identification and Correction (PIC)

Lessons Learned/Recommendations:

- Successful PIC programs need sustained coordination and clear roles across the various partner entities that work together to carry out the effort (e.g., local health jurisdictions, conservation districts, public utilities, the Washington Department of Ecology, the Washington State Department of Agriculture, tribes, EPA, etc.).
- Adaptive management is a key component of the PIC programs. PIC staff regularly review water quality outcomes and the relative success of various interventions to form a constant feedback loop.
- PIC programs take the work to the local level, where water quality staff and partners are intimately familiar with local conditions and constraints. Locals know their watersheds best, and are in the best position to work collaboratively toward solutions.
- Successful PIC programs require continuous effort and outreach as septic systems age, more residents move to an area, and new landowners start managing a property.

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Additional information:

https://www.doh.wa.gov/CommunityandEnvironment/Shellfish/EPAGrants/PathogensGrant/PIC

Appendix A: Acronyms

AOC	Area of Concern
BOD	Biochemical Oxygen Demand
BUI	Beneficial Use Impairment
CAFO	Concentrated Animal Feeding Operation
CIU	Categorical Industrial User
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
IU	Industrial User
NEP	National Estuary Program
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
SOP	Standard Operating Procedures
POTW	Publicly Owned Treatment Works
PWS	Public Water System
QAPP	Quality Assurance Project Plan
SIU	Significant Industrial User
STA	Stormwater Treatment Area
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus

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