

**Defense Environmental Programs
Annual Report to Congress
for Fiscal Year 2019**



April 2020

**Office of the Under Secretary of Defense for
Acquisition and Sustainment**

**The estimated cost of this report or study
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I. INTRODUCTION

This Defense Environmental Programs Annual Report to Congress for Fiscal Year (FY) 2019 contains information to satisfy the following requirements:

- The funding invested in and progress of the Department of Defense's (DoD) environmental programs – Environmental Restoration, Environmental Quality (EQ), and Environmental Technology – in accordance with title 10, United States Code (U.S.C.), section 2711 (Sections II-IV);
- The President's budget submitted to Congress under section 1105(a) of title 31, U.S.C., includes funds to investigate perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) as described in the DoD "Remediation Plan for Cleanup of Water Contaminated with Perfluorooctane Sulfonate or Perfluorooctanoic Acid" the Office of the Under Secretary of Defense for Acquisition and Sustainment will submit in June 2020 to Congress to satisfy section 345 of the National Defense Authorization Act (NDAA) for FY 2020 (Public Law 116-92) (Section II);
- The Department's ongoing decontamination activities on withdrawn or reserved lands in accordance with section 2916(b) of the NDAA for FY 2014 (Public Law 113-66) (Section V); and
- A list of DoD installations and Formerly Used Defense Sites (FUDS) properties where DoD obligated funding for environmental restoration activities in FY 2019, as well as reasons for increases in cleanup cost estimates since FY 2018, in accordance with language in House Report (H.R.) 113-113, accompanying H.R. 2397, the DoD Appropriations Bill, FY 2014, page 114 (Section VI, Appendix A, and Appendix B).

The Department's priorities for its environmental programs are: (1) protect the environment to ensure that DoD has the land, water, and airspace needed for military readiness; (2) protect the health of the military and civilian personnel and their families who live and work on DoD bases; (3) ensure DoD operations do not adversely affect the health or environment of surrounding communities; and (4) preserve resources for future generations. To achieve these objectives, DoD is committed to continuous improvement, greater efficiency, and the use of new technology where feasible. In FY 2019, DoD obligated approximately \$3.6 billion for its environmental programs. This includes \$1.5 billion for environmental restoration activities, \$2.0 billion for EQ activities, and \$157.4 million for environmental technology activities. In the President's FY 2021 budget, DoD is requesting just over \$3.6 billion for its environmental programs to continue ensuring the protection of human health and the environment, and to sustain the resources required to support the readiness of our Nation's Armed Forces.

Table 1 summarizes the overall DoD environmental program funding from FY 2015 through FY 2021.

Table 1: Overall DoD Environmental Program Funding (millions of dollars)*

	FY 2015 Actual	FY 2016 Actual	FY 2017 Actual	FY 2018 Actual	FY 2019 Actual	FY 2020 Appropriated	FY 2021 Requested
Environmental Restoration							
Active Installations and FUDS	\$1,221.0	\$1,161.1	\$1,082.3	\$1,210.4	\$1,200.0	\$1,415.7	\$1,073.1
Base Realignment and Closure (BRAC) Locations ⁺	\$609.6	\$415.5	\$347.0	\$351.5	\$324.0	\$374.0 ^{**}	\$277.5 ^{**}
Restoration Total	\$1,830.6	\$1,576.6	\$1,429.3	\$1,561.9	\$1,524.0	\$1,789.7	\$1,350.6
EQ							
Compliance	\$1,306.0	\$1,271.8	\$1,511.8	\$1,356.6	\$1,416.5	\$1,630.9	\$1,593.6
Natural and Cultural Resources	\$377.2	\$443.4	\$429.0	\$498.1	\$470.6	\$466.3	\$476.8
Pollution Prevention	\$94.3	\$87.1	\$67.2	\$62.8	\$63.2	\$67.7	\$68.1
EQ Total	\$1,777.5	\$1,802.3	\$2,008.0	\$1,917.5	\$1,950.3	\$2,164.9	\$2,138.5
Environmental Technology							
Technology Total	\$184.5	\$189.3	\$183.0	\$224.8	\$157.4	\$180.9	\$136.6
DoD Total***	\$3,792.5	\$3,568.2	\$3,620.3	\$3,704.2	\$3,631.7	\$4,135.5	\$3,625.7

* Includes all applicable congressional funding additions for FY 2015 through FY 2020.

⁺ BRAC FY 2015 through FY 2019 actuals include prior year funds and land sale revenue. Omits Defense Logistics Agency (DLA) actuals.

^{**} Excludes \$121.6 million of planned obligations from prior year funds and anticipated land sale revenue.

^{**} Excludes \$8.9 million of planned obligations from prior year funds and anticipated land sale revenue.

^{***} Due to rounding, subtotals may not equal FY totals.

For more information on DoD's environmental programs, please visit:
<http://www.denix.osd.mil>.

II. ENVIRONMENTAL RESTORATION PROGRAM

The Department began environmental restoration in 1975 with the Installation Restoration Program (IRP). The IRP addresses contamination from hazardous substances, pollutants, or contaminants at active installations, FUDS properties, and BRAC locations in the United States. In 2001, DoD established the Military Munitions Response Program (MMRP) to address defense sites known or suspected to contain unexploded ordnance (UXO), discarded military munitions, or munitions constituents (i.e., closed military ranges); these sites are referred to as munitions response sites (MRSs). Through these programs, DoD complies with the federal cleanup law, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as Superfund.

The Department remains focused on continuously improving its environmental restoration program by developing technologies to reduce costs and accelerate cleanup, and establishing policies and guidance that maximize cleanup program efficiency and effectiveness. DoD also partners with regulatory and community stakeholders throughout the cleanup process to maximize transparency, public participation, and collaboration. Partnering is vital to ensuring DoD makes cost-effective and efficient decisions. These initiatives help ensure that DoD makes the best use of available resources to steadily move sites through the cleanup process and achieve program goals while protecting human health, safety, and the environment. The Department measures cleanup progress against the Response Complete (RC) milestone, which occurs when the cleanup activities are complete (although DoD or a subsequent owner may continue to monitor the site). Of the nearly 39,600 IRP sites and MRSs in the inventory, DoD has achieved the RC milestone at over 33,800 sites (85 percent).

Environmental Restoration Goals

The Department maintains and tracks cleanup progress against environmental restoration goals to assist in driving IRP sites and MRSs toward achieving the RC milestone. The DoD Components prioritize resources to meet the goals listed in Table 2 in a cost-effective manner. The goals demonstrate progress in a streamlined and transparent fashion.

Table 2 lists the RC goals and summarizes the Department’s progress toward achieving them. The table presents the number of sites subject to the goals, the total number and percentage of sites that have achieved the goals from the beginning of the program through FY 2019, the number and percentage of sites projected to achieve the goals in FY 2020 and FY 2021, and the total number and percentage of sites projected to achieve the goals from the beginning of the program through FY 2021.

Table 2: RC Goals and Progress*

Goals	Number of Sites Subject to the Goals	Total Number (and Percentage) of Sites that Achieved the Goals through FY 2019	Number (and Percentage) of Sites Projected to Achieve the Goals in FY 2020	Number (and Percentage) of Sites Projected to Achieve the Goals in FY 2021	Total Number (and Percentage) of Sites Projected to Achieve the Goals through FY 2021
Achieve RC at 90% and 95% of IRP sites and MRSs at active installations and BRAC locations, and IRP sites at FUDS properties, by the end of FY 2018 and FY 2021, respectively	36,972	32,626 (88%)	291 (1%)	718 (2%)	33,635 (91%)

* Excludes FUDS MRSs; potentially responsible party sites, which are sites where DoD has identified that an individual or company is potentially responsible for contributing to the contamination; and sites where a DoD Component cannot obtain rights of entry to complete investigations.

The Department fell just short of the 90 percent goal, having achieved RC at 88 percent of IRP sites and MRSs at active installations and BRAC locations, and IRP sites at FUDS properties through FY 2018. Through FY 2019, the RC percentage at these sites remained at 88 percent. DoD is currently projecting that it will also fall short of the FY 2021 RC goal; it anticipates achieving RC at 91 percent of IRP sites and MRSs at active installations and BRAC locations, and IRP sites at FUDS properties, by the end of FY 2021. This projection is based on the sites in the Defense Environmental Restoration Program (DERP) inventory as of the end of FY 2019.

In addition to achieving the RC milestone, the Department is reducing the potential risk to human health and the environment posed by FUDS MRSs where cleanup is not expected to start for an extended period of time. To accomplish this objective, the Department began interim risk management activities in FY 2015. These activities include mailing letters and postcards that provide explosives safety education material to property owners and maintaining a call center to answer questions. As of the end of FY 2019, DoD has mailed over 21,000 letters and 52,700 postcards and received nearly 700 calls.

Additional information about the status of DoD’s cleanup efforts and funding can be found on the DoD Cleanup website at <https://www.denix.osd.mil/cleanup/>.

IRP Site Status and Funding

Table 3 summarizes the cleanup status of IRP sites at active installations, FUDS properties, and BRAC locations. The table presents the number of sites in the inventory, the number of sites at Remedy In Place (RIP) and RC through FY 2018 and FY 2019, and the changes in RIP and RC status from FY 2018 to FY 2019.¹

Table 3: IRP Site Status

	Total IRP Inventory (FY 2019)	RIP			RC		
		Number of IRP Sites at RIP through FY 2018	Number of IRP Sites at RIP through FY 2019	Change in RIP Status from FY 2018 to FY 2019	Number of IRP Sites at RC through FY 2018	Number of IRP Sites at RC through FY 2019	Change in RC Status from FY 2018 to FY 2019
Active Installations							
Army	11,325	10,615	10,641	26	10,331	10,354	23
Department of the Navy (DON)*	4,015	3,693	3,708	15	3,446	3,473	27
Air Force	6,931	6,113	6,203	90	5,639	5,744	105
DLA	222	194	195	1	185	187	2
Active Total	22,493	20,615	20,747	132	19,601	19,758	157
FUDS Properties							
FUDS Total	3,123	2,665	2,707	42	2,621	2,656	35
BRAC Locations							
Army	2,110	2,020	2,029	9	1,982	1,981	-1*
DON*	1,151	1,117	1,113	-4**	985	983	-2**
Air Force	5,141	5,005	5,033	28	4,861	4,882	21
DLA	48	48	48	0	47	47	0
BRAC Total	8,450	8,190	8,223	33	7,875	7,893	18
DoD Total	34,066	31,470	31,677	207	30,097	30,307	210

* DON includes Navy and Marine Corps; DON manages Navy and Marine Corps environmental restoration activities as a combined program.

* The number of sites at RC decreased because the Army discovered additional contamination at a site reported at RC in FY 2018.

** The number of sites at RIP and RC decreased because DON transferred BRAC sites at the Guam Navy Ship Repair Facility to the active program in FY 2019.

Despite the RIP and RC accomplishments at IRP sites, DoD's progress has been impacted by chemicals of emerging concern. For example, in recent years, per- and polyfluoroalkyl substances (PFAS) have become a national issue that requires national solutions.

In May 2016, the United States Environmental Protection Agency (EPA) issued Safe Drinking Water Act (SDWA) lifetime Health Advisories (HAs) recommending the individual or combined levels of PFOS and PFOA in drinking water be at or below 70 parts per trillion. While the HA is only guidance under the SDWA and not a required or enforceable drinking water standard, DoD began taking actions to address impacted drinking water and developed strategies to start proactively investigating and addressing DoD releases of PFAS.

¹ The Department measures the number of sites at RIP, which occurs when cleanup systems are constructed and operational.

If there was PFOS/PFOA in on- or off-base drinking water above EPA's HA resulting from DoD activities, the Department proactively initiated short-term actions (e.g., providing bottled water or installing point of use filters) and long-term actions (e.g., installing municipal connections or filtration systems) to address the drinking water exposure. No one on or off base is drinking water above EPA's HA where DoD is the known source of PFOS and PFOA. The remaining cleanup efforts are primarily to address PFAS in groundwater. The DoD Components continue to conduct investigations and take action under the federal cleanup law (i.e., CERCLA) at installations where there are known or suspected releases of PFAS.

In July 2019, the Secretary of Defense established a PFAS Task Force to ensure the Department has a coordinated, aggressive, and holistic approach to addressing PFAS across the nation. To support the Department's commitment to the health and safety of the women and men in uniform, their families, the DoD civilian workforce, and the communities in which DoD serves, the Task Force has focused on three goals. One of those goals focuses on fulfilling DoD's cleanup responsibility related to PFAS.

In addition to these efforts, the Department has provided \$30 million to the Agency for Toxic Substances and Disease Registry (ATSDR) to conduct exposure assessments and a study on the human health implications of PFAS at current and former military installations, as required by the NDAA for FY 2018. DoD will provide an additional \$10 million to ATSDR for the exposure assessments and study in FY 2020.

Information about DoD's initiatives in technology related to PFAS can be found in Section IV below and at <https://www.serdp-estcp.org/Featured-Initiatives/Per-and-Polyfluoroalkyl-Substances-PFASs>.

Additional information about the DoD's efforts related to PFAS can be found at <https://www.defense.gov/pfas/>.

Table 4 summarizes IRP funding from FY 2015 through FY 2021 at active installations, FUDS properties, and BRAC locations.

Table 4: IRP Funding* (millions of dollars)

	FY 2015 Actual	FY 2016 Actual	FY 2017 Actual	FY 2018 Actual	FY 2019 Actual	FY 2020 Appropriated	FY 2021 Requested
Active Installations							
Army	\$216.8	\$200.5	\$139.6	\$195.8	\$181.1	\$197.1	\$144.4
DON ⁺	\$240.9	\$243.5	\$238.5	\$289.6	\$301.9	\$319.1	\$283.9
Air Force	\$398.2	\$352.9	\$333.1	\$336.3	\$339.2	\$442.1	\$265.2
Defense-Wide ^{**}	\$7.9	\$5.8	\$6.6	\$7.7	\$7.1	\$18.7	\$8.6
Active Total	\$863.9	\$802.8	\$717.8	\$829.4	\$829.4	\$977.1	\$702.1
FUDS Properties							
FUDS Total	\$143.8	\$156.5	\$149.4	\$147.0	\$156.5	\$150.6	\$118.0
BRAC Locations^{**}							
Army	\$106.1	\$66.7	\$43.9	\$50.1	\$38.2	\$72.8	\$41.0
DON ⁺	\$181.1	\$149.9	\$148.9	\$185.3	\$157.4	\$180.5	\$100.8
Air Force	\$94.1	\$79.0	\$81.9	\$64.4	\$63.7	\$98.5	\$100.7
Defense-Wide ^{**}	\$2.6	\$2.0	\$2.5	\$3.0	\$3.5	\$2.5	\$2.9
BRAC Total	\$384.0	\$297.7	\$277.2	\$302.9	\$262.8	\$354.3	\$245.4
DoD Total^{***}	\$1,391.6	\$1,256.9	\$1,144.5	\$1,279.3	\$1,248.8	\$1,482.1	\$1,065.4

* This table includes funding for all program management requirements at active installations, FUDS properties, and BRAC locations.

⁺ DON includes Navy and Marine Corps; DON manages Navy and Marine Corps environmental restoration activities as a combined program.

^{**} Defense-Wide accounts include other defense agencies and DLA.

⁺⁺ BRAC FY 2014 through FY 2019 actuals include prior year funds and land sale revenue. FY 2020 appropriated and FY 2021 requested amounts also include prior year funds and anticipated land sale revenue.

^{***} Due to rounding, subtotals may not equal FY totals.

As seen in Table 4 above, IRP funding has generally increased over the past few years. This increase is due in large part to the cleanup of chemicals of emerging concern, such as PFAS. DoD has obligated \$727.2 million through FY 2019 for investigating and cleaning up releases of PFAS caused by past DoD activities at Environmental Restoration Account-funded and BRAC Account-funded sites.² The FY 2021 request includes funding to investigate groundwater as described in the forthcoming “Remediation Plan for Cleanup of Water Contaminated with Perfluorooctane Sulfonate or Perfluorooctanoic Acid” Report to Congress.

² DoD obligated an additional \$23.1 million for investigating and cleaning up PFAS caused by National Guard activities at Army National Guard and Air National Guard Operation and Maintenance-funded sites.

MRS Status and Funding

Table 5 summarizes the cleanup status of MRSs at active installations, FUDS properties, and BRAC locations. The table presents the number of MRSs in the inventory, the number of MRSs at RIP and RC through FY 2018 and FY 2019, and the changes in RIP and RC status from FY 2018 to FY 2019.

Table 5: MRS Status

	Total MRS Inventory (FY 2019)	RIP			RC		
		Number of MRSs at RIP through FY 2018	Number of MRSs at RIP through FY 2019	Change in RIP Status from FY 2018 to FY 2019	Number of MRSs at RC through FY 2018	Number of MRSs at RC through FY 2019	Change in RC Status from FY 2018 to FY 2019
Active Installations							
Army	1,373	1,145	1,149	4	1,139	1,146	7
DON*	421	188	205	17	186	203	17
Air Force	1,022	805	828	23	805	828	23
DLA	7	0	0	0	0	0	0
Active Total	2,823	2,138	2,182	44	2,130	2,177	47
FUDS Properties							
FUDS Total	2,313	1,029	1,044	15	1,029	1,044	15
BRAC Locations							
Army	180	131	144	13	130	143	13
DON*	42	20	20	0	19	19	0
Air Force	142	127	137	10	124	134	10
DLA*	0	N/A	N/A	N/A	N/A	N/A	N/A
BRAC Total	364	278	301	23	273	296	23
DoD Total	5,500	3,445	3,527	82	3,432	3,517	85

* DON includes Navy and Marine Corps; DON manages Navy and Marine Corps environmental restoration activities as a combined program.

+ DLA does not have MRSs at BRAC locations.

Table 6 summarizes MMRP funding from FY 2015 through FY 2021 at active installations, FUDS properties, and BRAC locations.

Table 6: MMRP Funding (millions of dollars)*

	FY 2015 Actual	FY 2016 Actual	FY 2017 Actual	FY 2018 Actual	FY 2019 Actual	FY 2020 Appropriated	FY 2021 Requested
Active Installations							
Army	\$53.1	\$34.3	\$30.6	\$40.0	\$33.4	\$54.6	\$63.2
DON⁺	\$45.4	\$56.2	\$50.8	\$76.3	\$63.6	\$65.9	\$52.0
Air Force	\$30.8	\$15.0	\$38.4	\$16.2	\$24.9	\$42.9	\$38.7
Defense-Wide^{**}	\$0.0	\$2.6	\$1.6	\$0.1	\$0.0 ⁺⁺	\$0.3	\$0.5
Active Total	\$129.3	\$108.2	\$121.3	\$132.6	\$121.9	\$163.6	\$154.4
FUDS Properties							
FUDS Total	\$84.1	\$93.7	\$93.6	\$101.4	\$92.2	\$124.4	\$98.6
BRAC Locations^{***}							
Army	\$181.8	\$42.1	\$48.2	\$24.7	\$53.9	\$42.2	\$17.5
DON⁺	\$22.0	\$11.8	\$12.3	\$17.1	\$6.8	\$27.9	\$15.6
Air Force	\$2.6	\$1.1	\$0.4	\$0.0 ⁺⁺	\$0.0 ⁺⁺	\$0.0 ⁺⁺	\$4.8
Defense-Wide^{**}	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BRAC Total	\$206.4	\$55.0	\$60.9	\$41.8	\$60.7	\$70.1	\$37.9
DoD Total⁺⁺⁺	\$419.8	\$256.9	\$275.9	\$275.7	\$274.8	\$358.1	\$290.9

* This table does not include program management for the MMRP.

⁺ DON includes Navy and Marine Corps; DON manages Navy and Marine Corps environmental restoration activities as a combined program.

^{**} Defense-Wide accounts include other defense agencies and DLA. DLA does not have MRSs at BRAC locations.

⁺⁺ Funding is less than \$0.1 million.

^{***} BRAC FY 2015 through FY 2019 actuals include prior year funds and land sale revenue. FY 2020 appropriated and FY 2021 requested amounts also include prior year funds and anticipated land sale revenue.

⁺⁺⁺ Due to rounding, subtotals may not equal FY totals.

BRAC Planning and Compliance Funding

Table 7 summarizes funding for planning and compliance projects, such as facility assessments and surveys, at BRAC locations from FY 2015 through FY 2021.

Table 7: BRAC Planning and Compliance Funding* (millions of dollars)

	FY 2015 Actual	FY 2016 Actual	FY 2017 Actual	FY 2018 Actual	FY 2019 Actual	FY 2020 Appropriated	FY 2021 Requested
BRAC Locations							
Army	\$18.5	\$64.5	\$10.7	\$10.0	\$4.0	\$71.1	\$2.6
DON⁺	\$0.4	\$0.2	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Air Force	\$0.3	\$0.1	\$0.5	\$0.0	\$0.0	\$0.0	\$0.5
Defense-Wide^{**}	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
DoD Total⁺⁺	\$19.2	\$64.9	\$11.2	\$10.0	\$4.0	\$71.1	\$3.1

* Includes prior year funding and land sale revenue.

⁺ DON includes Navy and Marine Corps; DON manages Navy and Marine Corps environmental restoration activities as a combined program.

^{**} Defense-Wide accounts include other defense agencies and DLA.

⁺⁺ Due to rounding, account subtotals may not equal FY totals.

Beginning in FY 2014, Congress consolidated the BRAC accounts, providing DoD with increased flexibility to use unobligated prior year funds across the BRAC cleanup inventory. The Department continues to use its remaining balances from prior years and its anticipated land sale revenue to supplement its annual appropriations and accelerate BRAC cleanup.

Table 8 summarizes BRAC funding, including annual appropriations, prior year funds, and land sale revenue from FY 2019 through FY 2021.

Table 8: BRAC Funding Breakout (millions of dollars)

	FY 2019 Actual	FY 2020 Appropriated	FY 2021 Requested
Army			
Annual Appropriation	\$54.2	\$67.0	\$55.1
Prior Year Funds	\$5.5	\$98.2	\$0.0
Land Sale Revenue	\$36.4	\$20.9	\$6.0
Army Total Funding*	\$96.1	\$186.1	\$61.1
DON*			
Annual Appropriation	\$158.1	\$208.4	\$116.4
Prior Year Funds	\$6.1	\$0.0	\$0.0
Land Sale Revenue	\$0.0	\$0.0	\$0.0
DON Total Funding*	\$164.2	\$208.4	\$116.4
Air Force			
Annual Appropriation	\$63.4	\$98.6	\$106.0
Prior Year Funds	\$0.3	\$0.0	\$0.0
Land Sale Revenue	\$0.0	\$0.0	\$0.0
Air Force Total Funding*	\$63.7	\$98.6	\$106.0
DLA**			
Annual Appropriation	\$0.0	\$0.0	\$0.0
Prior Year Funds	\$3.5	\$2.5	\$2.9
Land Sale Revenue	\$0.0	\$0.0	\$0.0
DLA Total Funding*	\$3.5	\$2.5	\$2.9
DoD Total**			
Annual Appropriation	\$274.7	\$374.0	\$277.5
Prior Year Funds	\$11.9	\$98.2	\$0.0
Land Sale Revenue	\$36.4	\$20.9	\$6.0
DoD Total Funding*	\$324.0	\$493.1	\$283.5

* Due to rounding, subtotals and the DoD Total may not equal FY totals.

+ DON includes Navy and Marine Corps; DON manages Navy and Marine Corps environmental restoration activities as a combined program.

** DLA funding is from a settlement received from Sunoco to perform cleanup activities at the former Defense Supply Center Philadelphia.

++ DoD total does not include DLA.

III. EQ PROGRAMS

The Department’s EQ Programs address compliance with environmental laws and regulations, protection of natural and cultural resources on DoD lands, and pollution prevention.

Compliance

The Department provides resources through its Compliance Program to comply with applicable requirements, such as Federal, State, and local environmental laws, regulations, and ordinances, for installations located in the United States. Additionally, the Compliance Program includes applicable environmental compliance, remediation, and planning requirements for installations located outside of the United States. Under this program, DoD activities include sampling and analyzing pollutant discharges to air and water, maintaining environmental permits for regulated activities, providing safe drinking water, and disposing of regulated waste. The Compliance Program also includes projects to upgrade wastewater treatment facilities and install air pollution controls to meet new regulatory standards. In FY 2019, the Department maintained a Clean Water Act permit compliance rate of 93 percent and a drinking water compliance rate above 96 percent at regulated DoD Public Water Systems. In addition, DoD’s overall solid waste diversion rate including non-hazardous solid waste and construction and demolition debris was 70 percent in FY 2019, an increase of 2 percent from FY 2018.

Table 9 summarizes Compliance Program funding from FY 2015 through FY 2021 for the Army, Navy, Air Force, Marine Corps, and Defense-Wide accounts.

Table 9: Compliance Program Funding (millions of dollars)

	FY 2015 Actual	FY 2016 Actual	FY 2017 Actual	FY 2018 Actual	FY 2019 Actual	FY 2020 Appropriated	FY 2021 Requested
Army	\$347.6	\$368.8	\$397.5	\$383.6	\$404.7	\$472.9	\$487.5
Navy	\$354.9	\$359.8	\$351.1	\$362.0	\$368.6	\$421.9	\$401.0
Air Force	\$283.5	\$302.2	\$358.6	\$288.8	\$272.4	\$385.4	\$332.1
Marine Corps	\$148.1	\$103.4	\$119.1	\$106.4	\$98.1	\$91.2	\$124.1
Defense-Wide*	\$171.9	\$137.8	\$285.5	\$215.8	\$272.7	\$259.5	\$248.9
DoD Total†	\$1,306.0	\$1,271.8	\$1,511.8	\$1,356.6	\$1,416.5	\$1,630.9	\$1,593.6

* Defense-Wide accounts include DLA and other defense agencies.

† Due to rounding, account subtotals may not equal FY totals.

Overall Trend Analysis

Overall DoD Compliance Program funding decreased from FY 2015 through FY 2016, in part because the Budget Control Act (BCA) led to a trend in reduced funding across the Department. In FY 2017, DoD total funding increased across most of the DoD Components to fund efforts that were delayed in previous FYs due to the BCA. In FY 2018 through FY 2020, funding levels fluctuate due to military construction projects required to maintain legal compliance. FY 2021 requested funding remains relatively consistent with FY 2020.

Explanation of Significant Changes in Funding Amounts

- From FY 2019 to FY 2020, Army funding increased by 16.9 percent primarily due to an increase in funding for miscellaneous compliance activities. Navy funding increased by 14.5 percent largely as a result of an increase in environmental impact analysis funding. Air Force funding increased by 41.5 percent primarily due to increased funding for storage and disposal and water compliance activities.
- From FY 2020 to FY 2021, Air Force requests a decrease of 13.8 percent due to a realignment of funds for higher priority conservation requirements. Marine Corps requests an increase of 36.1 percent primarily due to an increase in environmental impact analysis funding

The Department is committed to ensuring safe drinking water for the people living and working on our installations. DoD provides drinking water to approximately 2 million people on its installations worldwide. The Department began testing DoD-operated drinking water systems worldwide in June 2016 to identify drinking water that exceeded EPA's HA for PFOS and PFOA. DoD completed testing of all 524 DoD-owned drinking water systems worldwide in August 2017. These tests determined that 24 DoD drinking water systems contained PFOS and/or PFOA above the EPA HA. Accordingly, though not required by law or regulation, DoD has followed the EPA HA recommendations, to include providing consumers bottled water or additional water treatment. In cases where DoD purchases drinking water, the Department identified 12 drinking water systems where the results were above the EPA HA level. These installations are working with the drinking water supplier(s) to take appropriate actions. Currently, no one is known to be drinking water above the HA level.

Natural and Cultural Resources

The Department manages its natural and cultural resources and complies with existing laws (e.g., Endangered Species Act, Sikes Act, National Historic Preservation Act) to enable continued access to testing and training lands, and ensure the long-term sustainability of our Nation's natural and cultural heritage. The Department manages approximately 25 million acres of land that contain high quality, often unique habitats, that provide food and shelter for more than 550 species at-risk and nearly 500 federally listed threatened or endangered species. Of these species, 60 listed species and 74 species at-risk are found only on DoD lands. The Department also manages and maintains cultural resources at more than 350 DoD installations that contain more than 134,000 archaeological sites.

Table 10 summarizes natural and cultural resources funding from FY 2015 through FY 2021 for the Army, Navy, Air Force, Marine Corps, and Defense-Wide accounts.

Table 10: Natural and Cultural Resources Funding (millions of dollars)

	FY 2015 Actual	FY 2016 Actual	FY 2017 Actual	FY 2018 Actual	FY 2019 Actual	FY 2020 Appropriated	FY 2021 Requested
Army	\$182.2	\$187.3	\$209.2	\$189.8	\$187.6	\$187.0	\$183.2
Navy	\$57.2	\$65.6	\$60.5	\$79.1	\$64.9	\$75.5	\$87.5
Air Force	\$53.4	\$88.4	\$53.4	\$99.5	\$92.5	\$55.1	\$86.0
Marine Corps	\$27.3	\$26.8	\$36.8	\$33.4	\$37.8	\$42.8	\$40.6
Defense-Wide*	\$57.1	\$75.3	\$69.1	\$96.3	\$87.8	\$105.9	\$79.5
DoD Total*	\$377.2	\$443.4	\$429.0	\$498.1	\$470.6	\$466.3	\$476.8

* Defense-Wide accounts include DLA and other defense agencies.

* Due to rounding, account subtotals may not equal FY totals.

Overall Trend Analysis

Funding for natural and cultural resources activities increased overall between FY 2015 and FY 2018, primarily due to a congressional add in FY 2018 for the Readiness and Environmental Protection Integration (REPI) Program. In addition, Air Force funding increased in FY 2018 due to additional Integrated Natural Resources Management Plans and Threatened and Endangered Species requirements. FY 2019 funding remains relatively stable and FY 2020 appropriated funding decreases with a return to normal funding levels for the Air Force. The FY 2021 requested funding for natural and cultural resources increased slightly above the FY 2020 appropriated funding.

Explanation of Significant Changes in Funding Amounts

- From FY 2018 to FY 2019, Navy funding decreased by 18.0 percent primarily due to decreases in funding to address listed and at-risk species and conservation manpower funding. Marine Corps funding increased by 13.2 percent primarily due to increased funding to address listed and at-risk species.
- From FY 2019 to FY 2020, Navy funding increased by 16.3 percent primarily due to increased conservation manpower funding especially for natural resources. Air Force funding decreased by 40.4 percent primarily due to decreased funding for archaeological/curation activities and integrated natural resources planning. Marine Corps funding increased by 13.2 percent for historic building surveys and other requirements in support of efforts to optimize the Marine Corps facilities' footprint. Defense-Wide funding increased by 20.6 percent primarily due to a congressional add for the REPI.
- From FY 2020 to FY 2021, Navy requests an increase of 15.9 percent due to increased requirements in support of the Navy mission for natural and cultural resources program areas and conservation projects. Air Force requests an increase of 56.1 percent to align with historical funding levels before FY 2020. Defense-Wide funding increases 24.9 percent primarily due to decreased REPI funding after a congressional add in FY 2020.

Pollution Prevention

The Department created the Pollution Prevention Program to reduce or eliminate the use of hazardous materials, minimize waste generation, and reduce air emissions from industrial processes and pollutant discharges to wastewater treatment systems. DoD also implements energy, water, and fuel efficiency measures that, while not funded with environmental dollars, further reduce pollution and better use existing resources. Together, these pollution prevention investments have the potential to reduce costs throughout DoD. The flexible framework for this program not only helps DoD prioritize cost-effective initiatives, but also ensures safe, uninterrupted operations, and sustains military readiness.

Table 11 summarizes Pollution Prevention Program funding from FY 2015 through FY 2021 for the Army, Navy, Air Force, Marine Corps, and Defense-Wide accounts.

Table 11: Pollution Prevention Program Funding (millions of dollars)

	FY 2015 Actual	FY 2016 Actual	FY 2017 Actual	FY 2018 Actual	FY 2019 Actual	FY 2020 Appropriated	FY 2021 Requested
Army	\$36.2	\$27.4	\$21.2	\$22.5	\$20.7	\$14.4	\$16.0
Navy	\$4.1	\$8.3	\$4.2	\$4.6	\$3.7	\$3.0	\$3.0
Air Force	\$21.0	\$23.0	\$18.2	\$18.0	\$18.0	\$21.6	\$22.6
Marine Corps	\$20.7	\$13.4	\$12.9	\$6.8	\$7.7	\$15.3	\$14.0
Defense-Wide*	\$12.3	\$15.0	\$10.7	\$10.9	\$13.1	\$13.4	\$12.5
DoD Total*	\$94.3	\$87.1	\$67.2	\$62.8	\$63.2	\$67.7	\$68.1

* Defense-Wide accounts include DLA and other defense agencies.

* Due to rounding, account subtotals may not equal FY totals.

Overall Trend Analysis

Overall funding for the Pollution Prevention Program decreased from FY 2015 through FY 2019. The DoD Components reduced pollution prevention funding to preserve funding for other programs as most pollution prevention is proactive, but not directly linked to legal requirements.

Explanation of Significant Changes in Funding Amounts

- From FY 2018 to FY 2019, Navy funding decreased by 19.6 percent, Marine Corps funding increased by 13.2 percent, and Defense-Wide funding increased by 20.2 percent due to fluctuations in funding for pollution prevention manpower and pollution prevention projects.
- From FY 2019 to FY 2020, Army funding decreased by 30.4 percent primarily due to a decrease in funding for hazardous material/hazardous and solid waste reduction projects. Navy funding decreased by 18.9 percent due to a realignment of funds to other priorities. Air Force funding increased by 20 percent and Marine Corps funding increased by 98.7 percent due to additional funding provided for pollution prevention manpower and pollution prevention projects.

IV. ENVIRONMENTAL TECHNOLOGY PROGRAMS

The Office of the Secretary of Defense oversees the Military Departments' and Defense-Wide environmental technology programs and manages the Strategic Environmental Research and Development Program (SERDP) and the Environmental Security Technology Certification Program (ESTCP). The mission of the environmental technology programs is to address high priority environmental challenges. The DoD Components' environmental technology investments focus on unique Military Service requirements and complement other Defense-Wide investments. SERDP, ESTCP, and the DoD Components work together to coordinate and leverage these investments.

Table 12 summarizes environmental technology program funding from FY 2015 through FY 2021 for the Army, Navy, Air Force, and Defense-Wide accounts.

Table 12: Environmental Technology Program Funding (millions of dollars)

	FY 2015 Actual	FY 2016 Actual	FY 2017 Actual	FY 2018 Actual	FY 2019 Actual	FY 2020 Appropriated	FY 2021 Requested
Army*							
Army Total	\$44.9	\$54.7	\$60.3	\$90.9	\$17.6	\$32.3	\$15.4
DON*							
DON Total	\$28.8	\$35.5	\$33.4	\$34.3	\$34.4	\$34.0	\$31.1
Air Force							
Air Force Total	\$9.3	\$8.3	\$0.0	\$0.0	\$0.2	\$3.0	\$0.0
Defense-Wide**							
SERDP**	\$56.4	\$54.3	\$63.2	\$63.1	\$75.5	\$66.2	\$53.9
ESTCP**	\$39.4	\$31.3	\$21.2	\$31.4	\$23.8	\$39.3	\$36.2
Defense Warfighter Protection Program	\$5.7	\$5.3	\$4.9	\$5.1	\$5.9	\$6.1	-.+++
Defense-Wide Total	\$101.5	\$90.7	\$89.3	\$99.6	\$105.2	\$111.6	\$90.1
DoD Total***	\$184.5	\$189.2	\$183.0	\$224.8	\$157.4	\$180.9	\$136.6

* The National Defense Center for Energy and Environment is included in the Army Program line.

+ DON includes Navy and Marine Corps.

** Defense-Wide accounts include other defense agencies.

++ SERDP/ESTCP values are for environmental projects only and do not include energy projects.

*** Due to rounding, account subtotals may not equal FY totals.

+++ Defense Warfighter Protection funding for FY 2021 is included in Army Research, Development, Test, and Evaluation (RDT&E) funding.

Overall Trend Analysis

The Department's funding for environmental technology increased between FY 2015 and FY 2016, but decreased in FY 2017 because DoD progressively captured environmental technology requirements in other funding lines such as material substitution, production processes, operation and maintenance, and weapons system acquisition program elements. Funding increased again significantly in FY 2018 due to additional investment in Defense-Wide environmental technology initiatives, including research and product development to address replacing aqueous film forming foam (AFFF) containing PFOS and PFOA. DoD funding

decreases from FY 2018 to FY 2020 due to reprioritization of SERDP and ESTCP funds and decreases in Army funding after congressional adds in FY 2018 and FY 2019.

Explanation of Significant Changes in Funding Amounts

- From FY 2018 to FY 2019, Army funding decreased by 80.6 percent despite a congressional add as funds were reprioritized to support Army modernization initiatives. SERDP funding increases by 19.7 percent and ESTCP decreases by 24.2 percent due to a rephasing correction to synchronize obligation and expenditure rates.
- From FY 2019 to FY 2020, Army funding increased by 83.5 percent primarily due to an increase in compliance RDT&E funding. ESTCP funding increased by 65.1 percent due to recapture of the rephasing correction, reprioritization to replacement AFFF demonstrations, and a congressional add for the Sustainable Technology Demonstration Program. SERDP funding decreased by 12.3 percent as a return to prior funding levels.
- From FY 2020 to FY 2021, Army requested funding decreases by 52.3 percent primarily due to compliance RDT&E funding returning to previous levels. SERDP funding decreases by 18.6 percent as a return to prior funding levels.

Progress in Achieving Objectives and Goals

Advances in environmental technology have allowed the Department to be more cost efficient when spending resources for environmental cleanup and compliance. For example, DoD is developing groundwater cleanup technologies for use across the Department and in the private sector. Through its environmental technology programs, DoD is currently improving its fundamental understanding of environmental restoration sites and developing new technologies to manage or remediate them.

Looking ahead, environmental technology investments will continue to focus on DoD's evolving needs. SERDP solicited research into the occurrence, fate, transport, and remediation of PFOS and PFOA shortly after the EPA released the 2009 Provisional Health Advisories for these compounds. Follow-on research has targeted developing several approaches for characterizing and treating groundwater containing PFOS, PFOA, and other PFAS. In FY 2018, SERDP initiated 18 proof-of-concept projects to investigate mobile, on-site alternatives to incineration; these projects are now nearing completion with several showing promise and moving into larger scale efforts. Other projects focused on in situ treatment of contaminated groundwater have matured into field demonstrations under ESTCP. In FY 2019, ESTCP continued demonstrating these groundwater treatment options for PFAS with additional demonstrations to begin in FY 2020. In FY 2019, SERDP and ESTCP also initiated a joint effort with the EPA to develop and validate additional analytical techniques for quantification of PFAS in soil, sediments, groundwater, wastewater, surface water, biosolids, and tissues.

SERDP is continuing efforts aimed at developing fluorine-free firefighting foams to replace AFFF containing PFAS including initiating follow-on projects for some of the early proof of concept studies. ESTCP is conducting demonstrations to determine how close commercially-available replacement foams come to meeting DoD's "Military Specification" (or "MILSPEC") requirements and validating replacements as they emerge from the research

program. In FY 2020, ESTCP is initiating a series of projects looking at the feasibility of cleaning Aircraft Rescue and Firefighting trucks as the Department transitions to fluorine-free foams.

Additional work will be initiated in FY 2020 primarily focused on improved sampling and analysis of PFAS. The Department continues to assess the impacts from adopting the American Conference of Governmental Industrial Hygienist's stringent threshold limit values for chromium compounds and developed a technology roadmap in FY 2019 to identify future technology investments to help minimize exposure to chrome.

The Department will continue to invest in current initiatives and focus on future initiatives, including developing and demonstrating technologies to address munitions in the underwater environment; identifying the science and tools needed to meet DoD's obligations to adapt to a changing environment; and researching technologies to manage and treat chemicals of emerging concern. The Department is also continuing the critical work of reducing future liability and life-cycle costs by eliminating toxic and hazardous materials through our defense acquisition process and during the production, operation, and maintenance of our weapons systems and platforms.

V. ONGOING DECONTAMINATION ACTIVITIES

In accordance with section 2916(b) of the NDAA for FY 2014, the Department maintains “decontamination” programs to remove UXO resulting from Defense-related activities on withdrawn or reserved lands. Below are updates on DoD’s “decontamination” activities during FY 2019 at ranges identified in the NDAA for FY 2014 (Public Law 113-66).

Limestone Hills Training Area, Montana

The Army conducted ongoing decontamination activities on the 173 acres of withdrawn land at the Limestone Hills Training Area.

White Sands Missile Range, New Mexico

The Army did not conduct decontamination activities on the 5,100 acres of withdrawn land at White Sands Missile Range.

Chocolate Mountain Aerial Gunnery Range California

The Marine Corps did not conduct any decontamination activities on withdrawn lands at Chocolate Mountain Aerial Gunnery Range.

Marine Corps Air Ground Combat Center Twentynine Palms, California

The Marine Corps did not conduct any decontamination activities on the withdrawn lands at Marine Corps Air Ground Combat Center Twentynine Palms.

Naval Air Weapons Station China Lake, California

The Navy conducted ongoing decontamination activities on 5,000 acres of withdrawn land at Naval Air Weapons Station China Lake, including surface clearance, trash removal, destroying UXO, venting operations, soil stabilization, and grading target sites.

VI. FY 2019 FUNDING FOR ENVIRONMENTAL RESTORATION ACTIVITIES AND REASONS FOR INCREASES IN COST ESTIMATES SINCE FY 2018

H.R. 113-113, accompanying H.R. 2397, the DoD Appropriations Bill, 2014, page 114, requests that the Secretary of Defense provide information regarding funds invested in the DERP and the cost to complete cleanup at environmental restoration sites (hereinafter referred to as the “cost estimate”). Specifically, the report must:

1. Provide the amount of funding obligated at each DoD installation and FUDS property for environmental restoration activities in FY 2019; the change in the cost estimate from FY 2018 to FY 2019; and an explanation if the cost estimate did not decrease by at least the amount obligated in FY 2019 (detailed in Appendix A); and
2. Account for any increase of 10 percent or more in an installation’s or property’s projected cost estimate over the prior year estimate (detailed in Appendix B).

Appendix A lists the 493 DoD installations and 393 FUDS properties where DoD obligated funds for environmental restoration activities in FY 2019. It also compares the cost estimates at the end of FY 2018 and FY 2019 to determine how much the Department reduced its liability at each location.³ At 187 DoD installations and 208 FUDS properties, the cost estimates either decreased by the amount invested or decreased to zero, and therefore no explanation is needed. At the remaining 306 DoD installations and 185 FUDS properties, the cost estimates did not decrease by at least the amount invested for environmental restoration activities in FY 2019. Appendix A includes an explanation of why the liability was not reduced by the amount of funding invested at each of these locations.⁴

Appendix B lists the 198 DoD installations and 156 FUDS properties where the FY 2019 cost estimates increased by 10 percent or more over the FY 2018 estimates. It compares the cost estimates at the end of FY 2018 and FY 2019 to determine the dollar amount and percentage increases at each location.³ Appendix B also includes the reason(s) the cost estimates increased between FY 2018 and FY 2019 at each location.⁵

³ The FY 2018 cost estimates are adjusted for inflation and work completed in FY 2019 to compare the estimates more accurately.

⁴ If a location’s liability was not reduced by the amount of funding invested for environmental activities in FY 2019, but the cost estimate change was less than \$25,000, DoD did not provide an explanation because it considers \$25,000 to be within the margin of error for that location.

⁵ If a location’s FY 2019 cost estimate increased by 10 percent or more over the FY 2018 estimate, but the cost estimate change was less than \$25,000, DoD did not provide an explanation because it considers \$25,000 to be within the margin of error for that location.