

Defense Environmental Programs

Annual Report to Congress

for Fiscal Year 2020



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Office of the Under Secretary of Defense for
Acquisition and Sustainment

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I. INTRODUCTION

This Defense Environmental Programs Annual Report to Congress for Fiscal Year (FY) 2020 contains information to satisfy the following requirements:

- The funding invested in and progress of the Department of Defense’s (DoD’s) 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., which includes funds to address the cleanup of perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) as described in the “DoD Remediation Plan for Cleanup of Water Impacted with Perfluorooctane Sulfonate or Perfluorooctanoic Acid;” the Office of the Under Secretary of Defense for Acquisition and Sustainment submitted this plan 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- The Department’s ongoing decontamination activities on withdrawn or reserved lands in accordance with section 2916(b) of the NDAA for FY 2014 (Public Law 113-66) (Section V); and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 2020, as well as reasons for increases in cleanup cost estimates since FY 2019, in accordance with language in House Report (H.R.) 113-113, accompanying H.R. 2397, the DoD Appropriations Bill, FY 2014 (Section VI, Appendix A, and Appendix B).

The Department’s priorities for its environmental programs are (1) to protect the environment to ensure that DoD has the land, water, and airspace needed for military readiness; (2) to protect the health of the military and civilian personnel and their families who live and work on DoD bases; (3) to ensure DoD operations do not adversely affect the health or environment of surrounding communities; and (4) to preserve resources for future generations. To achieve these objectives, DoD is committed to continuous improvement, greater efficiency, and the incorporation of advanced technologies, best practices, and new knowledge as rapidly as possible. In FY 2020, DoD obligated approximately \$4.0 billion for its environmental programs. This includes \$1.7 billion for environmental restoration activities, \$2.1 billion for EQ activities, and \$178.9 million for environmental technology activities. In the President’s FY 2022 budget, DoD is requesting \$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 the Nation’s Armed Forces.

Table 1 summarizes the overall DoD environmental program funding from FY 2016 through FY 2022.

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

	FY 2016 Actual	FY 2017 Actual	FY 2018 Actual	FY 2019 Actual	FY 2020 Actual	FY 2021 Appropriated	FY 2022 Requested
Environmental Restoration							
Active Installations and FUDS Properties	\$1,161.1	\$1,082.3	\$1,210.4	\$1,200.0	\$1,423.2	\$1,503.4	\$1,028.0
Base Realignment and Closure (BRAC) Locations⁺	\$415.5	\$347.0	\$351.5	\$324.0	\$264.8	\$457.3 ^{**}	\$263.7 ^{**}
Restoration Total	\$1,576.6	\$1,429.3	\$1,561.9	\$1,524.0	\$1,688.0	\$1,960.7	\$1,291.7
EQ							
Compliance	\$1,271.8	\$1,511.8	\$1,356.6	\$1,416.5	\$1,549.4	\$1,648.4	\$1,526.9
Natural and Cultural Resources	\$443.4	\$429.0	\$498.1	\$470.6	\$532.5	\$512.5	\$577.2
Pollution Prevention	\$87.1	\$67.2	\$62.8	\$63.2	\$53.2	\$69.3	\$72.5
EQ Total	\$1,802.3	\$2,008.0	\$1,917.5	\$1,950.3	\$2,135.1	\$2,230.2	\$2,176.6
Environmental Technology							
Technology Total	\$189.3	\$183.0	\$224.8	\$157.4	\$178.9	\$185.5	\$131.9
DoD Total^{***}	\$3,568.2	\$3,620.3	\$3,704.2	\$3,631.7	\$4,002.0	\$4,376.5	\$3,600.2

* Includes all applicable congressional funding additions for FY 2016 through FY 2021.

⁺ BRAC FY 2016 through FY 2020 actuals include prior year funds and land sale revenue; omits Defense Logistics Agency (DLA) actuals.

^{**} Excludes \$96.3 million of planned obligations from prior year funds and anticipated land sale revenue.

^{**} Excludes \$58.8 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 or 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 (e.g., closed military ranges) known or suspected to contain unexploded ordnance (UXO), discarded military munitions, or munitions constituents; 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 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 40,000 IRP sites and MRSs in the inventory, DoD has achieved the RC milestone at nearly 34,000 sites (85 percent).

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 2 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)¹ and RC through FY 2019 and FY 2020, and the changes in RIP and RC status from FY 2019 to FY 2020.

Table 2: IRP Site Status

	Total IRP Inventory (FY 2020)	RIP			RC		
		Number of IRP Sites at RIP through FY 2019	Number of IRP Sites at RIP through FY 2020	Change in RIP Status from FY 2019 to FY 2020	Number of IRP Sites at RC through FY 2019	Number of IRP Sites at RC through FY 2020	Change in RC Status from FY 2019 to FY 2020
Active Installations							
Army	11,389	10,641	10,654	13	10,354	10,372	18
Department of the Navy (DON)*	4,030	3,708	3,711	3	3,473	3,477	4
Air Force	7,305	6,203	6,105	-98*	5,744	5,703	-41*
DLA	222	195	195	0	187	187	0
Active Total	22,946	20,747	20,665	-82	19,758	19,739	-19
FUDS Properties							
FUDS Total	3,124	2,707	2,747	40	2,656	2,696	40
BRAC Locations							
Army	2,110	2,029	2,032	3	1,981	1,987	6
DON*	1,151	1,113	1,114	1	983	999	16
Air Force	5,147	5,033	5,048	15	4,882	4,917	35
DLA	48	48	48	0	47	47	0
BRAC Total	8,456	8,223	8,242	19	7,893	7,950	57
DoD Total	34,526	31,677	31,654	-23	30,307	30,385	78

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

* The number of sites at RIP and RC decreased because the Air Force discovered new contamination at sites reported at RIP and RC in FY 2019.

While the Department has made significant progress, the remaining sites represent more complex cleanups requiring more time or a remedy based on more advanced technology, or they are sites 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 U.S. Environmental Protection Agency (EPA) issued Safe Drinking Water Act lifetime Health Advisories (HAs) for drinking water systems with individual or combined levels of PFOS and PFOA greater than 70 parts per trillion. DoD follows EPA's recommended actions to address drinking water impacted by DoD releases of PFOS and PFOA

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

above the EPA drinking water HAs. This is consistent with EPA's PFOS and PFOA groundwater cleanup guidance.²

DoD's priority is to use CERCLA authority to address PFOS and PFOA in drinking water where it is above EPA's HAs and where it is the direct result of DoD's activities, such as aqueous film forming foam (AFFF) use. DoD's actions are consistent with EPA's recommended actions, which include providing bottled water, using filtering systems, and conducting other cleanup actions in accordance with CERCLA. Under the CERCLA process, the Military Departments prioritize sites to first address those that pose greater potential risk to human health and the environment. DoD works in collaboration with EPA, other Federal agencies, and communities throughout this process.

In July 2019, the Secretary of Defense stood up a Task Force to ensure a coordinated, aggressive, and holistic approach to DoD-wide efforts to proactively address PFAS. The Task Force is focused on four goals, one of which is to fulfill our cleanup responsibilities to support the Department's commitment to the health and safety of our personnel and the communities in which DoD serves. Additional information about DoD's efforts related to PFAS can be found at <https://www.defense.gov/pfas/>.

In addition, the Department has provided \$40 million to the Agency for Toxic Substances and Disease Registry through FY 2020, and is transferring another \$30 million through FY 2022, to conduct exposure assessments in the communities around eight current and former military installations and a multi-site health study.

² U.S. EPA *Interim Recommendations to Address Groundwater Contaminated with Perfluorooctanoic Acid and Perfluorooctanesulfonate*, Office of Land and Emergency Management Directive No. 9283.1-47 (Dec 19, 2019).

Table 3 summarizes IRP funding from FY 2016 through FY 2022 at active installations, FUDS properties, and BRAC locations.

Table 3: IRP Funding (millions of dollars)*

	FY 2016 Actual	FY 2017 Actual	FY 2018 Actual	FY 2019 Actual	FY 2020 Actual	FY 2021 Appropriated	FY 2022 Requested
Active Installations							
Army	\$200.5	\$139.6	\$195.8	\$181.1	\$205.5	\$203.3	\$169.6
DON⁺	\$243.5	\$238.5	\$289.6	\$301.9	\$299.4	\$322.4	\$249.7
Air Force	\$352.9	\$333.1	\$336.3	\$339.2	\$458.0	\$434.4	\$282.1
Defense-Wide^{**}	\$5.8	\$6.6	\$7.7	\$7.1	\$7.0	\$18.3	\$8.3
Active Total	\$802.8	\$717.8	\$829.4	\$829.4	\$969.9	\$978.3	\$709.6
FUDS Properties							
FUDS Total	\$156.5	\$149.4	\$147.0	\$156.5	\$159.0	\$158.9	\$102.9
BRAC Locations^{**}							
Army	\$66.7	\$43.9	\$50.1	\$38.2	\$37.8	\$85.7	\$49.2
DON⁺	\$149.9	\$148.9	\$185.3	\$157.4	\$97.5	\$176.6	\$92.9
Air Force	\$79.0	\$81.9	\$64.4	\$63.7	\$91.9	\$172.1	\$123.7
Defense-Wide^{**}	\$2.0	\$2.5	\$3.0	\$3.5	\$2.3	\$3.2	\$4.6
BRAC Total	\$297.7	\$277.2	\$302.9	\$262.8	\$229.6	\$437.7	\$270.4
DoD Total^{***}	\$1,256.9	\$1,144.5	\$1,279.3	\$1,248.8	\$1,358.4	\$1,574.9	\$1,082.9

* 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 2016 through FY 2020 actuals include prior year funds and land sale revenue. FY 2021 appropriated and FY 2022 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 3, IRP funding has generally increased over the past few years. This increase is largely due to funding for the cleanup of chemicals of emerging concern, such as PFAS. DoD obligated \$1,024.3 million through FY 2020 for investigating and cleaning up releases of PFAS caused by past DoD activities at Environmental Restoration Account-funded and BRAC Account-funded sites.³ However, the FY 2022 request reflects a funding decrease after Congress provided \$571.9 million of additional funding in FY 2021 for active installations, FUDS properties, and BRAC locations. The FY 2022 request includes funding to address remediation efforts as described in the “Remediation Plan for Cleanup of Water Impacted with Perfluorooctane Sulfonate or Perfluorooctanoic Acid” Report to Congress the Under Secretary of Defense for Acquisition and Sustainment submitted to Congress in June 2020. Based on current information, the Department estimates obligations for PFAS remediation for beyond FY 2021 to exceed \$2 billion. DoD expects this estimate to increase as it completes initial assessments and gathers more information about the required extent of the cleanup. The Department will plan and program for these requirements as it defines them.

³ DoD obligated an additional \$61.8 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 4 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 2019 and FY 2020, and the changes in RIP and RC status from FY 2019 to FY 2020.

Table 4: MRS Status

	Total MRS Inventory (FY 2020)	RIP			RC		
		Number of MRSs at RIP through FY 2019	Number of MRSs at RIP through FY 2020	Change in RIP Status from FY 2019 to FY 2020	Number of MRSs at RC through FY 2019	Number of MRSs at RC through FY 2020	Change in RC Status from FY 2019 to FY 2020
Active Installations							
Army	1,378	1,149	1,175	26	1,146	1,172	26
DON*	422	205	212	7	203	210	7
Air Force	1,033	828	852	24	828	852	24
DLA	7	0	0	0	0	0	0
Active Total	2,840	2,182	2,239	57	2,177	2,234	57
FUDS Properties							
FUDS Total	2,307	1,044	1,030	-14⁺	1,044	1,030	-14⁺
BRAC Locations							
Army	180	144	136	-8**	143	135	-8**
DON*	42	20	21	1	19	21	2
Air Force	142	137	137	0	134	134	0
DLA**	0	N/A	N/A	N/A	N/A	N/A	N/A
BRAC Total	364	301	294	-7	296	290	-6
DoD Total	5,511	3,527	3,563	36	3,517	3,554	37

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

⁺ The number of MRSs at RIP and RC decreased because the U.S. Army Corps of Engineers made corrections to the FUDS data in FY 2020, such as removing MRSs from the Defense Environmental Restoration Program (DERP) inventory that never existed and were reported in error.

** The number of MRSs at RIP and RC decreased because the Army reopened these milestones for nine MRSs reported at RIP and RC in FY 2019.

** DLA does not have MRSs at BRAC locations.

Table 5 summarizes MMRP funding from FY 2016 through FY 2022 at active installations, FUDS properties, and BRAC locations.

Table 5: MMRP Funding (millions of dollars)*

	FY 2016 Actual	FY 2017 Actual	FY 2018 Actual	FY 2019 Actual	FY 2020 Actual	FY 2021 Appropriated	FY 2022 Requested
Active Installations							
Army	\$34.3	\$30.6	\$40.0	\$33.4	\$75.7	\$61.0	\$31.3
DON⁺	\$56.2	\$50.8	\$76.3	\$63.6	\$75.3	\$98.8	\$48.6
Air Force	\$15.0	\$38.4	\$16.2	\$24.9	\$27.0	\$74.9	\$19.7
Defense-Wide^{**}	\$2.6	\$1.6	\$0.1	\$0.0 ^{**}	\$0.1	\$1.7	\$0.5
Active Total	\$108.2	\$121.3	\$132.6	\$121.9	\$178.2	\$236.4	\$100.0
FUDS Properties							
FUDS Total	\$93.7	\$93.6	\$101.4	\$92.2	\$116.1	\$129.9	\$115.7
BRAC Locations^{***}							
Army	\$42.1	\$48.2	\$24.7	\$53.9	\$12.0	\$54.7	\$38.0
DON⁺	\$11.8	\$12.3	\$17.1	\$6.8	\$16.6	\$19.5	\$7.1
Air Force	\$1.1	\$0.4	\$0.0 ^{**}	\$0.0 ^{**}	\$0.1	\$7.6	\$4.5
Defense-Wide^{**}	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BRAC Total	\$55.0	\$60.9	\$41.8	\$60.7	\$28.6	\$81.8	\$49.6
DoD Total^{***}	\$256.9	\$275.9	\$275.7	\$274.8	\$322.9	\$448.1	\$265.3

* 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 2016 through FY 2020 actuals include prior year funds and land sale revenue. FY 2021 appropriated and FY 2022 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 6 summarizes funding for planning and compliance projects, such as facility assessments and surveys, at BRAC locations from FY 2016 through FY 2022.

Table 6: BRAC Planning and Compliance Funding (millions of dollars)*

	FY 2016 Actual	FY 2017 Actual	FY 2018 Actual	FY 2019 Actual	FY 2020 Actual	FY 2021 Appropriated	FY 2022 Requested
BRAC Locations							
Army	\$64.5	\$10.7	\$10.0	\$4.0	\$8.5	\$33.2	\$1.7
DON⁺	\$0.2	\$0.0	\$0.0	\$0.0	\$0.1	\$0.3	\$0.6
Air Force	\$0.1	\$0.5	\$0.0	\$0.0	\$0.3	\$0.6	\$0.0
Defense-Wide^{**}	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
DoD Total^{**}	\$64.9	\$11.2	\$10.0	\$4.0	\$8.9	\$34.1	\$2.3

* 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 any BRAC land sale revenue to supplement its annual appropriations and accelerate BRAC cleanup.

Table 7 summarizes BRAC funding, including annual appropriations, prior year funds, and land sale revenue from FY 2020 through FY 2022.

Table 7: BRAC Funding Breakout (millions of dollars)

	FY 2020 Actual	FY 2021 Appropriated	FY 2022 Requested
Army			
Annual Appropriation	\$8.3	\$90.1	\$58.2
Prior Year Funds	\$50.0	\$60.6	\$21.0
Land Sale Revenue	\$0.0	\$22.9	\$9.9
Army Total Funding*	\$58.3	\$173.6	\$89.1
DON*			
Annual Appropriation	\$98.8	\$196.4	\$100.6
Prior Year Funds	\$15.4	\$0.0	\$0.0
Land Sale Revenue	\$0.0	\$0.0	\$0.0
DON Total Funding*	\$114.2	\$196.4	\$100.6
Air Force			
Annual Appropriation	\$90.4	\$170.7	\$100.9
Prior Year Funds	\$1.4	\$9.6	\$27.3
Land Sale Revenue	\$0.5	\$0.0	\$0.0
Air Force Total Funding*	\$92.3	\$180.3	\$128.2
DLA**			
Annual Appropriation	\$0.0	\$0.0	\$4.0
Prior Year Funds	\$2.3	\$3.2	\$0.6
Land Sale Revenue	\$0.0	\$0.0	\$0.0
DLA Total Funding*	\$2.3	\$3.2	\$4.6
DoD Total**			
Annual Appropriation	\$197.5	\$457.3	\$263.7
Prior Year Funds	\$69.0	\$73.4	\$48.8
Land Sale Revenue	\$0.5	\$22.9	\$9.9
DoD Total Funding*	\$264.8	\$550.3	\$321.9

* 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 in the Prior Year Funds row.

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. In addition, the Compliance Program includes applicable environmental compliance, remediation, and planning requirements for installations located outside of the United States.

Under the 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 program also includes projects to upgrade wastewater treatment facilities and install air pollution controls to meet new regulatory standards.

In FY 2020, the Department maintained a Clean Water Act permit compliance rate of 93 percent and a drinking water compliance rate of nearly 96 percent at regulated DoD Public Water Systems. In FY 2020, DoD efforts to minimize the environmental impacts of solid waste disposal resulted in more than 50,000 tons of composted materials, nearly 250,000 tons of recycled materials, and over 110,000 tons of materials sent to waste-to-energy facilities.

Table 8 summarizes Compliance Program funding from FY 2016 through FY 2022 for the Army, Navy, Air Force, Marine Corps, and Defense-Wide accounts.

Table 8: Compliance Program Funding (millions of dollars)*

	FY 2016 Actual	FY 2017 Actual	FY 2018 Actual	FY 2019 Actual	FY 2020 Actual	FY 2021 Appropriated	FY 2022 Requested
Army	\$368.8	\$397.5	\$383.6	\$404.7	\$474.8	\$511.4	\$485.7
Navy	\$359.8	\$351.1	\$362.0	\$368.6	\$409.7	\$384.6	\$385.2
Air Force	\$302.2	\$358.6	\$288.8	\$272.4	\$326.7	\$347.3	\$335.7
Marine Corps	\$103.4	\$119.1	\$106.4	\$98.1	\$101.8	\$137.2	\$129.9
Defense-Wide*	\$137.8	\$285.5	\$215.8	\$272.7	\$236.4	\$267.9	\$190.4
DoD Total**	\$1,271.8	\$1,511.8	\$1,356.6	\$1,416.5	\$1,549.4	\$1,648.4	\$1,526.9

* Does not include funding for classified programs.

+ 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 increased from FY 2016 to FY 2017 to fund efforts that were delayed in previous FYs due to the Budget Control Act. Funding steadily increased from FY 2018 to FY 2021 and returns to FY 2020 levels in the FY 2022 request.

Explanation of Significant Changes in Funding Amounts

- From FY 2019 to FY 2020, Army funding increased by 17.3 percent primarily due to an increase in funding for miscellaneous compliance activities. Navy funding increased by 11.2 percent due to increased manpower funding. Air Force funding increased by 19.9 percent primarily due to a congressional add and transfer from the Environmental Restoration Account to support Air National Guard operations and maintenance activities. These increases are partially offset by a 13.3 percent decrease in Defense-Wide funding primarily due to a decrease in DLA funding for other compliance-related cleanup.
- From FY 2020 to FY 2021, Marine Corps funding increased by 34.8 percent due to increased funding for environmental impact analyses. Defense-Wide funding increased by 13.3 percent primarily due to increased DLA storage and disposal funding.
- From FY 2021 to FY 2022, the Defense-Wide request decreases 28.9 percent due to the total reduction of DLA military construction funding and a decrease in DLA's storage and disposal funding.

The Department is committed to ensuring safe drinking water for the approximately two million people living and working 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 lifetime HA for PFOS and PFOA. In March 2020, the Department issued a policy for continued periodic testing of DoD-operated drinking water systems for certain PFAS, including PFOS and PFOA. Enhancing vigilance, the Military Departments ensured that they completed sampling of all DoD-operated drinking water systems by December 31, 2020. In accordance with DoD policy and EPA recommendations, the Department provides alternate water to consumers at locations with detections above EPA's lifetime HA until drinking water results show consistent levels below the EPA HA. DoD will resample these systems periodically based on the results.

In addition, for consistency across the Nation, in July 2020 the Department issued a policy to monitor the drinking water it purchases for use on installations to prevent and address exposure to certain PFAS. If recent PFAS sampling data is not available from the drinking water provider, or the provider will not re-sample, the military installation samples the drinking water supplied at the point closest to the entry into the DoD distribution system.

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 the Nation’s natural and cultural heritage. The Department manages 26.9 million acres of land that contain high-quality, often unique habitats providing food and shelter for more than 550 species at-risk and nearly 500 Federally listed threatened or endangered species. Of these species, 61 listed species and 74 species at-risk are found only on DoD lands. The Department also manages and maintains cultural resources at 337 DoD installations that contain more than 131,000 archaeological sites.

Table 9 summarizes natural and cultural resources funding from FY 2016 through FY 2022 for the Army, Navy, Air Force, Marine Corps, and Defense-Wide accounts.

Table 9: Natural and Cultural Resources Funding (millions of dollars)*

	FY 2016 Actual	FY 2017 Actual	FY 2018 Actual	FY 2019 Actual	FY 2020 Actual	FY 2021 Appropriated	FY 2022 Requested
Army	\$187.3	\$209.2	\$189.8	\$187.6	\$191.3	\$183.1	\$186.8
Navy	\$65.6	\$60.5	\$79.1	\$64.9	\$77.2	\$87.4	\$89.1
Air Force	\$88.4	\$53.4	\$99.5	\$92.5	\$113.4	\$87.1	\$99.9
Marine Corps	\$26.8	\$36.8	\$33.4	\$37.8	\$46.1	\$46.5	\$46.8
Defense-Wide⁺	\$75.3	\$69.1	\$96.3	\$87.8	\$104.5	\$108.4	\$154.6
DoD Total^{**}	\$443.4	\$429.0	\$498.1	\$470.6	\$532.5	\$512.5	\$577.2

* Does not include funding for classified programs.

⁺ 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 from FY 2016 through FY 2020, in part due to steady increases in Defense-Wide funding for the Readiness and Environmental Protection Integration (REPI) Program and also due to significant funding increases for all of the DoD Components in FY 2020 except for the Army. The increased FY 2022 request includes more funding for the REPI Program.

Explanation of Significant Changes in Funding Amounts

- From FY 2019 to FY 2020, Navy funding increased by 19.0 percent primarily due to increased manpower costs. Air Force funding increased by 22.6 percent primarily due to increased funding for integrated natural resources planning. Marine Corps funding increased by 22.0 percent primarily due to increased funding for historic structures. Defense-Wide funding increased by 19.0 percent primarily due to an increase in funding for the REPI Program.
- From FY 2020 to FY 2021, Navy funding increased by 13.2 percent primarily due to increased funding for listed and at-risk species. Air Force funding decreased by 23.2 percent primarily due to a decrease in integrated natural resources planning.

- From FY 2021 to FY 2022, the Air Force requests an increase of 14.7 percent primarily due to increased funding for integrated natural resources planning. The Defense-Wide request is an increase of 42.6 percent is primarily due to an increase in funding for the REPI Program.

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 10 summarizes Pollution Prevention Program funding from FY 2016 through FY 2022 for the Army, Navy, Air Force, Marine Corps, and Defense-Wide accounts.

Table 10: Pollution Prevention Program Funding (millions of dollars)*

	FY 2016 Actual	FY 2017 Actual	FY 2018 Actual	FY 2019 Actual	FY 2020 Actual	FY 2021 Appropriated	FY 2022 Requested
Army	\$27.4	\$21.2	\$22.5	\$20.7	\$13.5	\$16.0	\$15.8
Navy	\$8.3	\$4.2	\$4.6	\$3.7	\$3.1	\$3.2	\$3.3
Air Force	\$23.0	\$18.2	\$18.0	\$18.0	\$17.3	\$22.6	\$23.1
Marine Corps	\$13.4	\$12.9	\$6.8	\$7.7	\$7.6	\$15.4	\$17.2
Defense-Wide*	\$15.0	\$10.7	\$10.9	\$13.1	\$11.7	\$12.2	\$13.1
DoD Total**	\$87.1	\$67.2	\$62.8	\$63.2	\$53.2	\$69.3	\$72.5

* Does not include funding for classified programs.

+ 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 2016 through FY 2020. The DoD Components reduced pollution prevention funding to preserve funding for other programs, as most pollution prevention is proactive and is not directly linked to legal requirements. FY 2021 funding increased primarily to support hazardous material and waste reduction projects. This trend continues with the increased FY 2022 request.

Explanation of Significant Changes in Funding Amounts

- From FY 2019 to FY 2020, Army funding decreased by 34.8 percent and Navy funding decreased by 16.2 percent due to decreased funding for miscellaneous pollution prevention activities and pollution prevention projects, primarily hazardous material/hazardous and solid waste reduction. Defense-Wide funding decreased by 10.7 percent primarily due to decreased DLA manpower costs.

- From FY 2020 to FY 2021, Army funding increased by 18.5 percent due to increased funding for miscellaneous pollution prevention activities and air pollution reduction projects. Air Force funding increased by 30.6 percent due to increased manpower costs and pollution prevention projects, primarily hazardous material/hazardous and solid waste reduction. Marine Corps funding increased by 102.6 percent due to increases in manpower, miscellaneous pollution prevention activities, and pollution prevention projects, primarily hazardous material/hazardous and solid waste reduction.
- From FY 2021 to FY 2022, the Marine Corps request is an increase of 11.7 percent to support initiatives for hazardous material and waste reduction.

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 11 summarizes environmental technology program funding from FY 2016 through FY 2022 for the Army, Navy, Air Force, and Defense-Wide accounts.

Table 11: Environmental Technology Program Funding (millions of dollars)

	FY 2016 Actual	FY 2017 Actual	FY 2018 Actual	FY 2019 Actual	FY 2020 Actual	FY 2021 Appropriated	FY 2022 Requested
Army*							
Army Total	\$54.7	\$60.3	\$90.9	\$17.6	\$32.3	\$21.1	\$17.5
DON*							
DON Total	\$35.5	\$33.4	\$34.3	\$34.4	\$33.6	\$30.0	\$31.0
Air Force							
Air Force Total	\$8.3	\$0.0	\$0.0	\$0.2	\$2.9	\$0.0	\$0.0
Defense-Wide**							
SERDP**	\$54.3	\$63.2	\$63.1	\$75.5	\$69.9	\$85.4	\$51.9
ESTCP**	\$31.3	\$21.2	\$31.4	\$23.8	\$35.7	\$48.9	\$31.5
Defense Warfighter Protection Program	\$5.3	\$4.9	\$5.1	\$5.9	\$4.5	_.+++	_.+++
Defense-Wide Total	\$90.7	\$89.3	\$99.6	\$105.2	\$110.1	\$134.3	\$83.4
DoD Total***	\$189.2	\$183.0	\$224.8	\$157.4	\$178.9	\$185.5	\$131.9

* 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 and FY 2022 is included in Army Research, Development, Test, and Evaluation (RDT&E) funding.

Overall Trend Analysis

The Department's funding for environmental technology increased overall between FY 2016 and FY 2018, but decreased in FY 2019. This decrease was due to a significant decrease in Army funding, despite a congressional add, as funds were reprioritized to support Army modernization initiatives. DoD funding increased from FY 2019 to FY 2021 with a decreased request in FY 2022 as Defense-Wide funding returns to previous funding levels.

Explanation of Significant Changes in Funding Amounts

- From FY 2019 to FY 2020, Army funding increased by 83.5 percent primarily in compliance technology funding, and Air Force funding increased by 1,350.0 percent in pollution prevention technology funding.
- From FY 2020 to FY 2021, Army funding decreased by 34.7 percent primarily in compliance technology funding. DON funding decreased by 10.7 percent in pollution prevention technology funding. Defense-Wide funding increased by 22.0 percent due to increases in funding for SERDP and ESTCP in all areas.
- From FY 2021 to FY 2022, the Army request decreases by 17.1 percent primarily due to a congressional add in FY 2021 for biopolymers research. Defense-Wide funding decreases by 37.9 percent due to RDT&E funding returning to previous 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.

Future 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 EPA released the 2009 Provisional HAs for these compounds. Follow-on research has focused on developing several approaches for characterizing and treating groundwater containing an expanding range of 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 impacted groundwater have matured into field demonstrations under ESTCP. In FY 2020, ESTCP continued demonstrating these groundwater treatment options for PFAS, and additional demonstrations will begin in FY 2021. In addition, ESTCP has planned substantial efforts for PFAS treatment field assessments in FY 2021; ESTCP has initiated several new projects and will be able to complete field work for projects that missed a season due to COVID-19 impacts. SERDP's efforts in FY 2021 will focus on further understanding the efficacy of thermal treatment of PFAS-impacted matrices.

PFAS characterization is a critical component of SERDP and ESTCP efforts. In FY 2020, SERDP and ESTCP began the first phase of a joint effort with EPA to develop and validate additional analytical techniques for the quantification of PFAS in soil, sediments, groundwater, wastewater, surface water, biosolids, and tissues. COVID-19 shutdowns delayed this effort, but, in the coming year, the single lab validation of these methods will be completed and the multi-lab validation will start. Additional PFAS characterization work began in FY 2020 to develop passive sampling approaches to allow rapid field measurements of PFAS; this work will progress substantially in FY 2021.

SERDP is continuing efforts aimed at developing PFAS-free firefighting foams to replace AFFF containing PFAS; the follow-on projects for some of the early proof-of-concept studies are making good progress. ESTCP is continuing 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. Surge efforts to gather data to support development of a new MILSPEC will conclude in FY 2021, but demonstrations of fire extinguishing performance of newly developed formulations will continue as needed. In FY 2020, ESTCP started a series of projects looking at the feasibility of cleaning Aircraft Rescue and Firefighting trucks as the Department transitions to PFAS-free foams. These studies will near completion in FY 2021.

The Department continues to assess the impacts from adopting the stringent threshold limit values of the American Conference of Governmental Industrial Hygienists for chromium compounds, and DoD 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 the defense acquisition process and during the production, operation, and maintenance of weapons systems and platforms.

V. ONGOING DECONTAMINATION ACTIVITIES

In accordance with section 2916(b), of the NDAA for FY 2014 (Public Law 113-66), the Department maintains “decontamination” programs to remove UXO resulting from Defense-related activities on withdrawn lands. Below are updates on DoD’s decontamination activities during FY 2020 at ranges identified in the FY 14 NDAA.

Limestone Hills Training Area, Montana

The Army conducted decontamination activities on 85 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.

VI. FY 2020 FUNDING FOR ENVIRONMENTAL RESTORATION ACTIVITIES AND REASONS FOR INCREASES IN COST ESTIMATES SINCE FY 2019

House Report 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 2020; the change in the cost estimate from FY 2019 to FY 2020; and an explanation if the cost estimate did not decrease by at least the amount obligated in FY 2020 (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 484 DoD installations and 372 FUDS properties where DoD obligated funds for environmental restoration activities in FY 2020. It also compares the cost estimates at the end of FY 2019 and FY 2020 to determine how much the Department reduced its liability at each location.⁴ At 196 DoD installations and 152 FUDS properties, the cost estimates either decreased by the amount invested or decreased to zero, and therefore no explanation is needed. At the remaining 288 DoD installations and 220 FUDS properties, the cost estimates did not decrease by at least the amount invested for environmental restoration activities in FY 2020. Appendix A includes an explanation of why the liability was not reduced by the amount of funding invested at each of these locations.⁵

Appendix B lists the 198 DoD installations and 156 FUDS properties where the FY 2020 cost estimates increased by 10 percent or more over the FY 2019 estimates. It compares the cost estimates at the end of FY 2019 and FY 2020 to determine the dollar amount and percentage increases at each location.⁴ Appendix B also includes the reason(s) the cost estimates increased between FY 2019 and FY 2020 at each location.⁶

⁴ The FY 2019 cost estimates are adjusted for inflation and work completed in FY 2020 to compare the estimates more accurately.

⁵ If a location’s liability was not reduced by the amount of funding invested for environmental activities in FY 2020, 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.

⁶ If a location’s FY 2020 cost estimate increased by 10 percent or more over the FY 2019 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.