United States Environmental Protection Agency

FISCAL YEAR 2023

Justification of Appropriation Estimates for the Committee on Appropriations

Tab 04: Science and Technology

EPA-190-R-22-001

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Environmental Protection Agency
FY 2023 Annual Performance Plan and Congressional Justification

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APPROPRIATION: Science & Technology
Resource Summary Table

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Science & Technology				
Budget Authority	$626,895	$729,329	$864,155	$134,826
Total Workyears	2,039.2	1,987.7	2,190.9	203.2

*For ease of comparison, Superfund transfer resources for the audit and research functions are shown in the Superfund account.

Bill Language: Science & Technology

For science and technology, including research and development activities, which shall include research and development activities under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980; necessary expenses for personnel and related costs, for executive oversight of regional laboratories, and travel expenses; procurement of laboratory equipment and supplies; hire, maintenance, and operation of aircraft; and other operating expenses in support of re- search and development,$863,155,000, to remain available until September 30, 2024.

Note.—A full-year 2022 appropriation for this account was not enacted at the time the Budget was prepared; therefore, the Budget assumes this account is operating under the Continuing Appropriations Act, 2022 (Division A of Public Law 117-43, as amended). The amounts included for 2022 reflect the annualized level provided by the continuing resolution.

Program Projects in S&T

(Dollars in Thousands)

Program Project	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Clean Air and Climate				
Clean Air Allowance Trading Programs	$4,809	$6,793	$8,800	$2,007
Climate Protection	$7,057	$7,895	$10,169	$2,274
Federal Support for Air Quality Management	$8,661	$7,154	$10,420	$3,266
Federal Vehicle and Fuels Standards and Certification	$87,233	$96,783	$152,209	$55,426

Program Project	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Subtotal, Clean Air and Climate	$107,760	$118,625	$181,598	$62,973
Indoor Air and Radiation				
Indoor Air: Radon Program	$112	$157	$157	$0
Radiation: Protection	$1,645	$1,735	$2,224	$489
Radiation: Response Preparedness	$3,063	$3,096	$4,383	$1,287
Reduce Risks from Indoor Air	$296	$161	$173	$12
Subtotal, Indoor Air and Radiation	$5,115	$5,149	$6,937	$1,788
Enforcement				
Forensics Support	$11,761	$14,000	$15,532	$1,532
Homeland Security				
Homeland Security: Critical Infrastructure Protection	$9,653	$10,380	$14,526	$4,146
Homeland Security: Preparedness, Response, and Recovery	$21,877	$24,852	$25,890	$1,038
Homeland Security: Protection of EPA Personnel and Infrastructure	$500	$501	$501	$0
Subtotal, Homeland Security	$32,031	$35,733	$40,917	$5,184
IT / Data Management / Security				
IT / Data Management	$2,782	$3,072	$3,195	$123
Operations and Administration				
Facilities Infrastructure and Operations	$65,093	$67,500	$68,912	$1,412
Pesticides Licensing				
Pesticides: Protect Human Health from Pesticide Risk	$2,431	$2,803	$2,917	$114
Pesticides: Protect the Environment from Pesticide Risk	$1,805	$2,207	$2,252	$45
Pesticides: Realize the Value of Pesticide Availability	$645	$876	$984	$108
Subtotal, Pesticides Licensing	$4,881	$5,886	$6,153	$267
Research: Air, Climate and Energy				
Research: Air, Climate and Energy	$76,733	$95,250	$132,924	$37,674

Program Project	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Research: Safe and Sustainable Water Resources				
Research: Safe and Sustainable Water Resources	$92,719	$112,250	$119,286	$7,036
Research: Sustainable Communities				
Research: Sustainable and Healthy Communities	$112,717	$133,000	$141,477	$8,477
Research: Chemical Safety for Sustainability				
Health and Environmental Risk Assessment	$35,251	$37,482	$42,355	$4,873
Research: Chemical Safety for Sustainability				
Endocrine Disruptors	$13,859	$16,304	$17,095	$791
Computational Toxicology	$18,509	$21,487	$22,542	$1,055
Research: Chemical Safety for Sustainability (other activities)	$43,598	$51,727	$58,456	$6,729
Subtotal, Research: Chemical Safety for Sustainability	$75,966	$89,518	$98,093	$8,575
Subtotal, Research: Chemical Safety for Sustainability	$111,217	$127,000	$140,448	$13,448
Ensure Safe Water				
Drinking Water Programs	$4,088	$4,364	$6,776	$2,412
Clean and Safe Water Technical Assistance Grants				
Water Quality Research and Support Grants	$0	$7,500	$0	-$7,500
TOTAL S&T	**$626,895**	**$729,329**	**$864,155**	**$134,826**

*For ease of comparison, Superfund transfer resources for the audit and research functions are shown in the Superfund account.

Clean Air

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Environmental Programs & Management	$12,920	$13,153	$23,523	$10,370
Science & Technology	***$4,809***	***$6,793***	***$8,800***	***$2,007***
Total Budget Authority	$17,729	$19,946	$32,323	$12,377
Total Workyears	66.2	63.7	82.0	18.3

Program Project Description:

This program is responsible for managing the Clean Air Status and Trends Network (CASTNET), an ambient monitoring network that has been continuously collecting data for more than 30 years. CASTNET serves as the Nation's primary source for assessing long-term trends in atmospheric sulfur and nitrogen deposition, regional ground-level ozone, and other forms of particulate and gaseous air pollution. CASTNET sites are uniquely situated in remote and high elevation areas within 39 states and seven tribal boundaries. The network provides valuable data to support the ozone National Ambient Air Quality Standards (NAAQS) in many areas not monitored by state, local, and tribal monitoring agencies. Under this program, independent audits and performance evaluations are performed to meet the NAAQS requirements and provide high-quality data. Additionally, CASTNET ozone data are used for exceptional event assessments of international transport, background concentrations, wildfire events, and stratospheric ozone intrusions often leading to ozone exceedances. States are required to provide exceptional event demonstrations in order to exclude monitoring data from the NAAQS design values. Used in conjunction with the National Atmospheric Deposition Program's wet deposition networks and other ambient air quality networks, CASTNET's data products also are used to determine the effectiveness of national and regional emission control programs, validate satellite measurements, and provide near-real time data to support AirNow and Air Quality Index (AQI) reporting tools.

The CASTNET program provides spatial and temporal trends in ambient air quality and is the largest network in the world reporting atmospheric deposition used to assess ecological impacts in sensitive ecosystems (e.g., national parks, freshwater bodies, and subalpine regions). The sites also fill in critical data gaps from urban networks that lack information on air quality issues affecting downwind population centers, such as oil and gas, wildfire smoke, and wood smoke in mountain valleys. Rural CASTNET sites are intentionally located away from stationary emission sources but are often located in or near low-income communities or communities of color. Maintaining the CASTNET monitoring network continues to be critical for assessing the environmental benefits realized from regional emission reduction programs (thereby reducing secondary pollutant formation of ozone and fine particles), as well as aiding states in exceptional events determinations. During the pandemic, EPA has addressed the disparate impacts of COVID-19 on

areas with poor air quality by using CASTNET to track local air quality and assess how pandemic-related policies and changes in economic activity have affected air quality.

EPA works closely with tribal governments to build tribal air monitoring capacity through partnerships with the CASTNET program. Since 2002, CASTNET has added seven sites on tribal lands, including two new sites in the northwest U.S. By expanding tribal partnerships, CASTNET can fill important spatial gaps in ambient and deposition monitoring while simultaneously integrating sites operated by tribes into a national program. Tribes will benefit from dedicated tribal monitoring sites that build tribal technical skills, provide near-real time air quality data to the community, and provide environmental data that help tribes assess the impacts of air pollution on cultural or natural resources on tribal lands.

To support modernization efforts, CASTNET will use the existing network infrastructure to fill in gaps in continuous measurements necessary to evaluate changes in atmospheric chemistry and global climate impacts on air quality and deposition. The Program is well-situated to measure background or regional levels of air toxics (e.g., ethylene oxide) and persistent chemicals of concern (e.g., PFAS compounds). Measuring speciated reactive nitrogen will provide valuable data that states can use to determine which species are driving PM formation and make more informed decisions on emission control strategies. Furthermore, continuing to expand capacity while modernizing the CASTNET infrastructure ensures data can be made available in near-real time to address short-term changes in air quality resulting from meteorological conditions, such as temperature inversions, or natural disasters, such as wildfires.

This program also is responsible for managing EPA's Long-Term Monitoring (LTM) program, which was created to assess the health of lakes and streams in response to changes in deposition of atmospheric pollutants. Today, it ensures that the Clean Air Act continues to be effective in reducing the impact of atmospheric pollutants (e.g., strong acid anions) on surface waters in New England, the Adirondack Mountains, the Northern Appalachian Plateau (including the Catskill mountains), and the Blue Ridge region. This program is operated cooperatively with partners in state agencies, academic institutions, and other federal agencies. The LTM surface water chemistry monitoring program provides field measurements for understanding biogeochemical changes in sulfur, nitrogen, acid neutralizing capacity, aluminum, and carbon in streams and lakes in relation to reductions in pollutant emissions and a changing climate. The LTM program is one of the longest running programs at EPA, providing a longitudinal dataset based on sampling and measurements since 1983.

This program also supports the Clean Air Allowance Trading Programs, which are nationwide and multi-state programs that address air pollutants that are transported across state, regional, and international boundaries. Programs designed to control SO_2 and NO_X include Title IV (the Acid Rain Program) of the Clean Air Act, the Cross-State Air Pollution Rule (CSAPR), the CSAPR Update (which was revised in 2021 in response to a court remand). The infrastructure for the Clean Air Allowance Trading Programs also supports implementation of other state and federal programs to control SO_2, hazardous air pollutants, and greenhouse gases.

Both the CSAPR and the CSAPR Update Rule require 27 states in the eastern U.S. to limit their emissions of SO_2 and/or NO_x in order to reduce or eliminate the states' contributions to fine

particulate matter and/or ground-level ozone pollution in other states. These programs set emissions limitations that are defined in terms of maximum statewide "budgets" for emissions of annual SO_2, annual NO_x, and/or ozone-season NOx from each state's large electric generating units. EPA is supporting state efforts with respect to best available retrofit technology, reasonable progress, and interstate visibility transport, as those obligations relate to SO_2 emissions from electricity generating units.[1] The air quality and other environmental information gathered through this program support other Clean Air Allowance Trading Program-related rulemakings, such as EPA's proposal to reduce emissions contributing to interstate air pollution under the 2015 O3 NAAQS and rulemakings associated with Regional Haze.

FY 2023 Activities and Performance Plan:

Work in this program directly supports Goal 4/Objective 4.1, Improve Air Quality and Reduce Localized Pollution and Health Impacts in the *FY 2022 - 2026 EPA Strategic Plan*.

In FY 2023, EPA will:

- Continue to support 64 CASTNET, including seven tribal sites, 31 NADP National Trends Network (NTN), 71 NADP Ammonia Monitoring Network (AMoN), and LTM monitoring sites that provide long-term atmospheric concentrations, deposition, and surface water quality data. Data are used to analyze and assess air quality, trends in sulfur and nitrogen deposition, critical loads, and other indicators of ecosystem health.

- Provide support for independent audits and required performance evaluations to assure high-quality data to support the NAAQS and environmental assessments.

- Continue progress toward increasing monitoring capacity by working to identify new tribal partners that would benefit from joining a national air monitoring program.

- Invest in technology and small businesses by replacing aging equipment, repairing monitoring shelters more than 30 years old that have deteriorated due to extreme weather and deploying new equipment and monitoring sites in rural, often low-income/minority areas. The CASTNET contractor allocates 55 percent of their subcontract dollars to small businesses responsible for performing calibrations, managing site operators, and data analyses.

- Upgrade aging CASTNET equipment. To improve overall data quality EPA will replace continuous ozone analyzers, and procure new gas analyzers (e.g., CO, VOCs, speciated nitrogen) that will support NAAQS assessments, emission control strategies, and regulatory actions in the future. Analyzers will be integrated into the existing automated calibration systems to improve network resiliency.

- Utilize existing infrastructure to expand network capacity by adding measurement systems for background and regional concentrations of air toxics and emerging pollutants of

[1] Clean Air Act § 110 and § 169A; refer to 40 CFR 52.2312.

concern. Data will complement urban measurements and provide valuable information on atmospheric pathways and chemical transformations that will impact health risks.

- Continue to modernize the data reporting tools and visualizations to improve user experiences and data access, particularly during emergencies (e.g., COVID-19 pandemic). Strengthening front-end and back-end data management platforms will improve system reliability and allows state and local agencies to quickly make critical decisions. Providing real-time air quality data during such events is valuable for informing vulnerable populations about health risks.

- Assure the continuation of ongoing SO_2 and NO_X emission reductions from power plants in the eastern half of the U.S. by implementing CSAPR and the CSAPR Update, and across the contiguous U.S. by implementing the Acid Rain Program.[2]

- Ensure accurate and consistent results for the Clean Air Allowance Trading Programs. Continue work on performance specifications and investigating monitoring alternatives and methods to improve the efficiency of monitor certification and emissions data reporting.

- Work with states to implement emission reduction programs to comply with CAA Section 110(a)(2)(D)(i)(I) requirements, including conducting environmental justice analyses to consider the distributional impacts of emissions on overburdened communities.[3]

Performance Measure Targets:

(PM NOX) Tons of ozone season NOx emissions from electric power generation sources.	**FY 2022 Target**	**FY 2023 Target**
	355,000	344,000

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- (+$2,007.0) This program change is an increase to support CASTNET modernization efforts including increasing monitoring capacity, investing in technology, upgrading equipment, and improving user experience.

Statutory Authority:

Clean Air Act.

[2] Clean Air Act §§ 110(a)(2)(D) and 401.
[3] For more information on program performance, please see: https://www.epa.gov/airmarkets/progress.

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Environmental Programs & Management	$91,632	$97,000	$125,216	$28,216
Science & Technology	***$7,057***	***$7,895***	***$10,169***	***$2,274***
Total Budget Authority	$98,689	$104,895	$135,385	$30,490
Total Workyears	211.3	214.1	236.9	22.8

Program Project Description:

The Climate Protection Program supports implementation and compliance with greenhouse gas (GHG) emission standards for light-duty and heavy-duty vehicles developed under EPA's Federal Vehicle and Fuels Standards and Certification Program. Resources under this program also support compliance activities for implementing the National Highway Traffic Safety Administration's (NHTSA) Corporate Average Fuel Economy (CAFE) standards. Under authorities contained in the Clean Air Act and the Energy Policy Act, EPA is responsible for issuing certificates and ensuring compliance with both the GHG and CAFE standards.

FY 2023 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.1, Reduce Emissions that Cause Climate Change in the *FY 2022 - 2026 EPA Strategic Plan.*

Resources under this program will support implementation and compliance activities associated with EPA's GHG and NHTSA's fuel economy standards for light-duty and heavy-duty vehicles and engines. Resources will support the following activities:

Certification and Compliance

Implementation of the GHG emission standards for light-duty and heavy-duty vehicles and engines has significantly increased EPA's certification and compliance responsibilities. These responsibilities play a critical role in ensuring that the programs achieve their climate goals. Over time, in an effort to provide greater compliance flexibility for manufacturers, EPA has introduced numerous innovative features into the vehicle certification process. These features include new and more comprehensive trading programs, credits for off-cycle emission reductions, and new federal test procedures. In FY 2023, EPA will be implementing a substantially expanded "Phase 2" of the heavy-duty vehicle and engine GHG program. This implementation requires significant expansions of EPA's information technology systems, which provide an efficient means for manufacturers to apply for and receive certificates of conformity, and for EPA to audit and oversee manufacturer compliance with the revised requirements of the new heavy-duty GHG standards.

Vehicle and Engine Testing Services

EPA's National Vehicle & Fuel Emissions Laboratory (NVFEL) has invested significant resources to maintain its critical vehicle and engine testing capabilities and to upgrade them as needed to implement new standards for fuel, vehicle, and engine emissions. These investments have included updates to its four-wheel drive dynamometers and analytical systems needed to perform regulation development and certification testing of light-duty, medium-duty, and heavy-duty vehicles, including battery electric and hybrid electric technologies. This modernized test environment has led to such developments as new test methods for accurately measuring the efficiency and range of electrified vehicles and new processes for gathering and analyzing in-use fuel efficiency data from vehicles tested on the road.

In FY 2023, NVFEL will continue to direct resources in expanded electric vehicle charging infrastructure in the laboratory to support anticipated future test requirements for light-duty and heavy-duty vehicles and is preparing for testing of hydrogen fuel cell technologies. NVFEL's ongoing facility modernization has been essential to the implementation of requirements for EPA's Phase 2 GHG regulations for heavy-duty and medium-duty vehicles. Importantly, it also has enabled greater production of scientific data on new and emerging vehicle and engine technologies, leading to the development of more advanced computer models to support EPA's rulemaking activities. Equipment modernization is critical for keeping pace with technology advancements in the industry, as well as maintaining NVFEL's role as a trusted testing standard for foreign and domestic manufacturers to compare against in certifying their products and as a deterrent against non-compliance.

In addition to investing in emerging needs, NVFEL will continue to maintain, repair, and replace aging laboratory equipment needed to sustain its core compliance testing activities. In FY 2023, NVFEL plans to extensively replace aging or obsolete test equipment supporting its engine compliance and fuels enforcement programs. This represents a continuation of annual and ongoing capital equipment maintenance associated with the expansion of lab testing programs needed to implement light-duty and heavy-duty criteria pollutant and GHG regulations, which have increased NVFEL's operation and maintenance costs by an estimated $2.1 million per year.

Performance Measure Targets:

EPA's FY 2023 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- (+$227.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to annual payroll increases, adjustments to provide essential workforce support, and changes to benefits costs.

- (+$2,047.0 / +2.3 FTE) This program change is an increase in support of the National Vehicle and Fuel Emissions Laboratory compliance/certification work and mobile source vehicle emissions analyses. Additional resources at the lab support restoring capacity to

test and certify engines, fuels, and vehicles to ensure compliance with regulatory standards, and to generate emissions data to support regulatory development work essential to tackling the climate change crisis. This includes $393.0 thousand in payroll.

Statutory Authority:

Clean Air Act; Pollution Prevention Act (PPA), §§ 6602-6605; National Environmental Policy Act (NEPA), § 102; Clean Water Act, § 104; Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA), § 8001; Energy Policy Act of 2005, § 756.

Federal Support for Air Quality Management

Program Area: Clean Air and Climate
Goal: Ensure Clean and Healthy Air for All Communities
Objective(s): Improve Air Quality and Reduce Localized Pollution and Health Impacts

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Environmental Programs & Management	$131,015	$138,020	$289,010	$150,990
Science & Technology	***$8,661***	***$7,154***	***$10,420***	***$3,266***
Total Budget Authority	$139,676	$145,174	$299,430	$154,256
Total Workyears	832.7	843.0	945.4	102.4

Program Project Description:

Federal support for the criteria pollutant and air toxics programs includes a variety of tools to characterize ambient air quality and the level of risk to the public from air pollutants and to measure national progress toward improving air quality and reducing associated risks. The Federal Support for Air Quality Management Program supports development of State Implementation Plans (SIPs) through modeling and other tools and assists states in implementing, attaining, maintaining, and enforcing the National Ambient Air Quality Standards (NAAQS) for criteria pollutants. The Program also supports development and provision of information, training, and tools to assist state, tribal, and local agencies, as well as communities, to reduce air toxics emissions and risks specific to their local areas. In addition, the Program supports activities related to the Clean Air Act (CAA) stationary source residual risk and technology review program. EPA is required to assess the level of risk remaining after promulgation of National Emission Standards for Hazardous Air Pollutants (NESHAP) that are based on Maximum Available Control Technology (MACT) within eight years of that promulgation. In addition, the Agency is required to review all NESHAP at least every eight years to determine if revisions are needed to reflect developments in practices, processes, and control technologies.

FY 2023 Activities and Performance Plan:

Work in this program directly supports Goal 4/Objective 4.1, Improve Air Quality and Reduce Localized Pollution and Health Impacts in the *FY 2022 - 2026 EPA Strategic Plan.*

During FY 2023, as part of implementing key activities in support of attainment of the NAAQS, EPA will provide states and local air agencies with scientifically and technically sound assistance in developing SIPs. This assistance includes providing models, modeling inputs and tools, and technical data and guidance and identifying emission control options. EPA ensures national consistency in how air quality modeling is conducted as part of regulatory decision-making, including federal and state permitting programs, SIP-related actions, as well as how conformity determinations are conducted across the U.S. The Agency will work with states and local air

agencies to ensure that particulate matter (PM) hot-spot analyses are conducted in a manner consistent with the transportation conformity regulation and guidance.

One of EPA's priorities is to fulfill its statutory and court-ordered obligations. In FY 2023, EPA will continue to conduct the periodically required "technology reviews" of NESHAP and conduct required risk assessments for MACT-based NESHAP. EPA will enhance risk assessment capabilities to better identify and determine impacts on communities. The Agency also will transition to an approach to share air toxics data faster and more regularly to the public, allowing for increased transparency and the ability to see trends and risks over time. By 2023, EPA will start reporting the most current air toxics data each year in the annual Air Trends Report and an online interactive tool instead of the current three to four-year cycle and provide that data at increased spatial resolution. EPA will prioritize work with an emphasis on meeting court-ordered deadlines and also incorporate environmental justice considerations as part of the decision-making process.

EPA will continue to provide information and assistance to states and communities through documents, websites, webinars, and training sessions on tools to help them provide input to environmental justice assessments that can inform risk reduction strategies for air toxics. EPA will continue to communicate effectively to, and collaborate with, communities with environmental justice concerns to address air toxics issues. EPA will continue its multi-pollutant air quality management work with state and local areas, factoring environmental justice into prioritization efforts, including providing tools to support state, tribal and local governments in strategy development. EPA will continue to look at multiple pollutants in an industrial sector and identify ways to take advantage of the co-benefits of pollution control. The focus of these efforts is to address an individual sector's emissions comprehensively and to prioritize regulatory efforts to address the sources and pollutants of greatest concern to overburdened communities. In developing sector and multi-pollutant approaches, EPA is building innovative solutions that address the differing and cumulative nature of the multiple pollutants and associated industrial sectors.

In FY 2023, EPA will continue to work with internal and external stakeholders to improve ambient air quality monitoring networks and measurement techniques to fill data gaps and to provide better input to estimation of population exposure to criteria and toxic air pollutants. To ensure data quality, EPA will continue to implement and manage independent quality assurance programs for national monitoring networks as well as for federal and commercial laboratories that produce ambient air monitoring data.

In FY 2023, EPA will continue to work with partners to improve emissions factors and inventories, including the National Emissions Inventory. This effort includes gathering improved activity data from emissions monitoring and using geographic information systems and satellite remote sensing systems, where possible, for key point, area, mobile, and fugitive sources, and global emission events.

Performance Measure Targets:

Work under this program supports performance results in the Federal Support for Air Quality Management program under the EPM appropriation.

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- (+$588.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to annual payroll increases, adjustments to provide essential workforce support, and changes to benefits costs.

- (+$2,678.0 / +11.0 FTE) This program change is an increase in the development of science, technology, and methodologies to better implement the Clean Air Act, including: enhancing risk assessment capabilities to better identify and determine impacts on communities; communicating and collaborating with environmental justice communities to address air toxics concerns; and improving ambient air monitoring networks and measurement techniques to fill data gaps and better estimate the population's exposure to criteria and toxic air pollutants. This investment includes $2.234 million in payroll.

Statutory Authority:

Clean Air Act.

Federal Vehicle and Fuels Standards and Certification

Program Area: Clean Air and Climate
Goal: Tackle the Climate Crisis
Objective(s): Reduce Emissions that Cause Climate Change

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Science & Technology	***$87,233***	***$96,783***	***$152,209***	***$55,426***
Total Budget Authority	$87,233	$96,783	$152,209	$55,426
Total Workyears	315.5	308.5	350.5	42.0

Program Project Description:

Under the Federal Vehicle and Fuels Standards and Certification Program, EPA develops, implements, and ensures compliance with national emission standards to reduce mobile source related air pollution from: light-duty cars and trucks; heavy-duty trucks and buses; nonroad engines and equipment; and from the fuels that power these engines. The Program also evaluates new emission control technology and provides state, tribal, and local air quality managers and transportation planners with guidance, tools, and other information to develop additional strategies and place-based transportation programs to reduce mobile source pollution.

As part of ensuring compliance with national emission standards, the Program tests vehicles, engines, and fuels, and establishes test procedures for federal emissions and fuel economy standards. The Program operates test cells that simultaneously measure criteria pollutants and greenhouse gas (GHG) emissions, reviews certification applications for light-duty vehicles and heavy-duty engines to approve applications for criteria pollutant and GHG emission standards and examines for potential violations.

National Vehicle and Fuel Emissions Laboratory (NVFEL)
The NVFEL ensures air quality benefits and fair competition in the marketplace by conducting testing operations on motor vehicles, heavy-duty engines, nonroad engines, and fuels to certify that all vehicles, engines, and fuels that enter the U.S. market comply with all federal clean air, GHG, and fuel economy standards. The NVFEL conducts vehicle and engine emission tests as part of pre-production tests, certification audits, in-use assessments, and recall programs to ensure compliance with mobile source programs. The NVFEL also produces critical test data on new and emerging vehicle and engine technologies to support the development of future greenhouse gas and criteria pollutant regulations. Through cooperative partnerships and committee involvement, the lab leads the development and implementation of test methods and procedures for vehicles, engines, and fuels to ensure consistent data quality among manufacturers' labs, measure fuel efficiency, and verify compliance of electrified and conventional vehicles with EPA standards.

Renewable Fuel Standard (RFS)
The RFS Program was created under the Energy Policy Act of 2005 (EPAct), which amended the Clean Air Act, and was expanded under the Energy Independence and Security Act of 2007 (EISA). The RFS Program requires a certain volume of renewable fuel to replace or reduce the quantity of petroleum-based transportation fuel, heating oil, or jet fuel.

Supporting Tribal, State and Local Governments
EPA works with tribal, state, and local governments to ensure the technical integrity of the mobile source control emission benefits, including in State Implementation Plans (SIPs) and transportation conformity determinations. EPA develops and provides information and tools to assist tribal, state, and local agencies, as well as communities, to reduce criteria pollutant and air toxics emissions and risks specific to their local areas. Reductions in emissions of mobile source air pollution, such as components of diesel exhaust, are achieved through: guidance and technical assistance for state and local Clean Air Act mobile source programs in nonattainment and maintenance areas for the National Ambient Air Quality Standards (NAAQS); establishing national emissions standards for vehicles, equipment, and fuels, research of public health impacts and mitigation options; methods for quantifying multi-pollutant emission reductions for place-based strategies; and partnership approaches working with tribal, state, and local governments, as well as a variety of non-governmental stakeholder groups.

Prioritizing Environmental Justice
In response to the Administration's priorities and goals, EPA's mobile source programs will further integrate environmental justice (EJ) and equity considerations. This includes: 1) outreach and inclusion throughout the regulatory development process; 2) analysis of current conditions to understand economic inequities potentially related to EPA's regulatory policies – as well as disparities in exposure to mobile source air pollution experienced by people of color, low-income populations, and tribal communities; 3) analysis of the equity and air quality improvements from EPA's regulatory actions and voluntary programs; 4) technical assistance to state and local governments to reduce regional and localized criteria pollutant and other emissions through regulatory and non-regulatory strategies, including nearby communities with environmental justice concerns, and within the context of meeting Clean Air Act SIP and transportation conformity requirements; and 5) exploration of non-regulatory mitigation measures to further target improvements in air quality for those disproportionately exposed to air pollution from mobile sources.

FY 2023 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.1, Reduce Emissions that Cause Climate Change in the *FY 2022 - 2026 EPA Strategic Plan*.

To support this work, EPA is requesting $30 million and 42 FTE in FY 2023 to invest in program activities to address the climate crisis. This includes the development of analytical methods, regulations and analyses to support climate protection by controlling greenhouse gas emissions from light-duty, medium-duty, and heavy-duty vehicles.

Federal Vehicle and Fuels Standards and Certification Program

In FY 2023, the Federal Vehicle and Fuels Standards and Certification Program will continue to focus its efforts on certification responsibilities. The Agency will continue to perform its compliance oversight functions on priority matters, conducting compliance oversight tests where evidence suggests noncompliance. EPA will continue to conduct pre-certification confirmatory testing activities for emissions and fuel economy for passenger cars and will increase on-road measurements of in-use vehicle emissions. EPA anticipates reviewing and approving about 4,700 vehicle and engine emissions certification requests from vehicle and engine manufacturers, including light-duty vehicles, heavy-duty diesel engines, nonroad engines, marine engines, locomotives, and others. Demand for EPA's certification services has increased significantly, due in part to the addition of exhaust and fuel evaporative emissions certification requirements for marine, other nonroad, and small spark-ignited engines. Accordingly, NVFEL will increase compliance testing in each of these areas in FY 2023.

EPA utilizes in-use emissions data provided by light-duty vehicle manufacturers to measure compliance and determine if any follow-up evaluation or testing is necessary. Since CY 2000, light-duty vehicle manufacturers have been required to test a number of newer and older in-use vehicles and provide the data to EPA. The Agency receives over 6,000 emissions tests results from more than 2,000 vehicles annually. EPA reviews the data and determines if there are any specific vehicles, models, or manufacturers that are failing in-use emissions standards. The Agency will use this information submitted by light-duty manufacturers, together with emissions data collected at NVFEL, to determine if there are vehicle models which should be recalled and repaired to address excess in-use emissions and that should be identified for testing for the upcoming model year prior to granting the manufacturer a certificate of conformity, which allows the manufacturer to sell vehicles in the U.S.

Emission Standards for New Motor Vehicles

In FY 2023, EPA will take action to reduce air pollution and GHG emissions by focusing on the transportation sector's largest contributors to criteria pollutant and GHG emissions: light-duty vehicles (LDVs) and heavy-duty vehicles (HDVs). Work also supports EPA's long-term performance goal to promulgate final rules that will reduce GHG emissions from light duty, medium-duty, and heavy-duty vehicles; electric utility generating units; and the oil and gas industry.

In FY 2022, EPA completed a revision of the light-duty vehicle GHG standards established in April 2020 (the Safer Affordable Fuel Efficient Vehicles Rule). In August 2021, EPA issued a proposed rule setting revised "near-term" standards through model year (MY) 2026 and issued a final rule in December 2021. In March 2022, EPA reinstated California's authority under the Clean Air Act (CAA) to implement its own GHG emission standards and zero emission vehicle (ZEV) sales mandate. As a result of this action, other states may choose to adopt and enforce California's GHG emission standards in lieu of the Federal standards, consistent with section 177 of the Clean Air Act.

The near-term light duty rule will serve as a stepping-off point for longer-term standards. In FY 2023, EPA will develop a longer-term emissions standard rulemaking proposal for new multi-pollutant emissions standards, including for greenhouse gas emissions, for light- and medium-duty vehicles beginning with MY 2027 and extending through and including at least MY 2030. These

standards will help transition the fleet to zero and near-zero emissions. Many automakers have recently announced ambitious plans for electrifying their new LDV fleets in the 2030 to 2040 timeframe. This rulemaking also will be a key measure in contributing to the President's commitment under the Paris Agreement to reduce U.S. GHG emissions by 50-52 percent from 2005 levels by 2030.

By December 2022, EPA will propose and finalize a rulemaking to reduce nitrogen oxides (NOx) emissions from MY 2027 and later heavy-duty engines and vehicles. This rule also will update the Phase 2 GHG standards for 2027 and later by taking into consideration the role that zero-emission heavy-duty vehicles have in reducing emissions from certain heavy-duty market segments. Pollution from trucks has been a long-standing obstacle to advancing environmental justice, as many low-income communities and communities of color live near highways or in heavily polluted areas with frequent truck congestion and idling. Setting clear and stringent standards for truck pollution is critical to delivering on the President's commitment to delivering tangible benefits to historically underserved and overburdened communities.

In FY 2023, EPA will work on a rulemaking under the CAA to establish new GHG emissions standards for heavy-duty engines and vehicles to begin as soon as MY 2030. This rule will reduce GHG and other emissions from highway HDVs, the second-largest source of transportation GHG emissions. This action will build off of the heavy-duty MY 2027 rulemaking and accelerate the transition to zero emission vehicles. A key focus for the GHG elements of this effort will be the shift from HDVs powered by internal combustion engines to those powered by zero emission technologies, such as battery electric and fuel-cell technologies. EPA's future GHG standards for HDVs will build upon these industry commitments.

EPA will invest significant resources to address a myriad of new technical challenges to support these two sets of long-term rulemakings, which will include added LDV and HDV testing and modeling capabilities at NVFEL. Key to this technical work is to understand the cost, feasibility, and infrastructure impacts of electrifying the broad range of products in the LDV and HDV sectors. This will include vehicle demonstration projects focused on emerging technologies, that are still in the pre-production stage with manufacturers, but are expected to be strategically important in achieving future standards.

Fuel Economy Labeling Requirements

In FY 2023, EPA also will oversee compliance with vehicle fuel economy labeling requirements. In past years, EPA conducted in-use audits of manufacturer "coast-down" data, revealing issues in manufacturer data submitted to EPA and, as a result, found inaccurate fuel economy labels on more than a million vehicles from several manufacturers. While EPA temporarily suspended its coast-down testing due to the COVID-19 pandemic, the Agency will resume this testing when public health guidance allows it.

Tier 3 Standards

In FY 2023, EPA will continue implementing the Tier 3 standards for light-duty vehicles and certifying manufacturers' fleets for vehicle MY 2023 and MY 2024. EPA is responsible for establishing the test procedures needed to measure tailpipe emissions and for verifying manufacturers' vehicle fuel economy data. As a result, the Agency will continue to maintain its

critical laboratory equipment and testing resources to ensure that new cars and trucks comply with the Tier 3 emissions standards.

Marine and Aircraft Emission Reduction Measures

EPA will continue working with the International Maritime Organization (IMO) and the International Civil Aviation Organization (ICAO) on programs to control pollutant emissions from marine and aircraft engines, respectively. EPA is supporting the State Department and Coast Guard on technical issues related to establishing measures to achieve GHG targets established at IMO. In FY 2022, EPA expects to transition from work on short-term to more ambitious medium-term measures. This work will continue through FY 2023. At ICAO, EPA will actively participate in the development of new CO2 standards for decision in February 2025 as well as technical work that could lead to future NOx/PM standards. Additionally, EPA is developing a domestic rule for aircraft engine PM standards, expected to be finalized in November 2022.

In addition to the international efforts for aviation, EPA is continuing its work to address lead in aviation gasoline. In coordination with the Federal Aviation Administration and working with airports, local air agencies, and communities, EPA is evaluating potential exposures to lead from the use of leaded aviation gasoline in piston-engine aircraft as well as potential mitigation measures.

Emissions Modeling

The Motor Vehicle Emission Simulator (MOVES) is the Agency's emission modeling system that estimates emissions for on-road and nonroad mobile sources at the national, county, and project levels for criteria air pollutants, GHGs, and air toxics. In FY 2023, the official version of EPA's model, MOVES3, will be used to estimate impacts of the Agency's emission control programs and will be used by states and metropolitan planning organizations (MPOs) in their work to meet the NAAQS, including the development of SIPs and transportation conformity analyses. The Agency also will support users on any new model releases that incorporate the best available data and science and account for the latest emission standards.

National Vehicle and Fuel Emissions Laboratory Facility Infrastructure

NVFEL provides all laboratory testing and support functions necessary for the Agency to certify that all vehicles, engines, and fuels sold in the United States are in compliance with U.S. emission standards, representing 4,700 certificates issued to vehicle and engine manufacturers on an annual basis.

In FY 2023, the mechanical, electrical, control, and building management systems for the HVAC (heating, ventilation, and air conditioning) at NVFEL will be at or beyond the end of useful life with the completion of the current, 25-year, Energy Savings Performance Contract (ESPC). ESPCs, private/public partnership contract vehicles coordinated through the Department of Energy, use facilities' energy and operational savings to offset many of the contract costs.

Given these needs, EPA is pursuing an infrastructure upgrade project for the NVFEL facility, and the Agency is evaluating a new ESPC. In FY 2023, $20 million in additional resources are requested to support renewal of the ESPC. EPA anticipates signing the proposed ESPC in FY 2022 or FY 2023 with potential implementation costs in excess of $24 million. The energy savings to

be realized when the ESPC is fully implemented is estimated to be 33,000 MBTU annually, with water conservation of 1.3 million gallons annually.

Resources for the renewal of the ESPC are critical to support the ability of NVFEL to carry-out its mission-critical work of certifying vehicle compliance. Ensuring industry's compliance is a priority for EPA and an essential safeguard of fair market competition for manufacturers of vehicles and engines introduced into commerce in the United States.

Renewable Fuel Standards

EPA activity in the fuel sector will be centered on the implementation of the RFS program. Congress established renewable fuel volume targets through CY 2022, leaving it to the Agency to establish the volumes for CY 2023 and beyond. EPA's schedule currently calls for the Agency to issue a final "RFS Set Rule" establishing such volumes in early FY 2023.

In addition, EPA will continue the efforts associated with the ongoing implementation of the program. These include: 1) updating and revising the regulations to improve program implementation and effectiveness and enable new sources of renewable fuel volumes; 2) evaluating applications for new biofuels and/or their feedstocks; 3) registering new renewable fuel facilities to enable them to generate renewable fuel credits known as Renewable Identification Numbers (RINs); 4) building critical new capability in EPA's Moderated Transaction System (EMTS) for tracking the generation, transfer, and use of RINs for compliance; 5) evaluating and implementing, if appropriate, enhancements to improve program operations, oversight and enforceability; 6) evaluating and implementing IT systems modifications and enhancements that provide the greatest returns on investment through continuous improvement; 7) ensuring the integrity of the RFS program through enforcement actions against those using the program for fraudulent gain; and 8) supporting the Department of Justice in defending the Agency's implementation of the RFS program in numerous challenges in court.

In addition to the RFS program, EPA will continue to implement gasoline and diesel fuel quality standards and obligations under the Clean Air Act. This includes many of the same compliance and enforcement oversight activities mentioned above for the RFS. In addition, in late 2020 EPA finalized a fuel regulation streamlining rule that included updated registration, recordkeeping, and reporting requirements. EPA will continue efforts in FY 2023 to implement these requirements through continuous improvement of IT registration and reporting systems to deliver the full impact and benefit of the investment made in the streamlined regulations. These include automation and reduced registration, administration, and reporting burdens for both the regulated community and EPA. Finally, in FY 2023 EPA will continue its ongoing research into new opportunities to improve and/or protect fuel quality in ways that can reduce air pollution and improve public health and welfare.

EPA will continue to operate and maintain the credit trading systems under the RFS. EISA expanded the renewable fuels provisions of EPAct and requires additional studies in various areas of renewable fuel use. EISA also requires EPA to develop a comprehensive lifecycle GHG methodology to implement the Act's GHG threshold requirements for the RFS. Producers of new and advanced biofuels regularly seek to qualify their fuels under RFS, and EPA will continue to

evaluate such feedstocks and fuels to determine eligibility for the program. The Agency also will look at ways to update the science and data analysis that supports EPA's evaluation methodology.

In FY 2023, EPA will maintain oversight of the RFS program and continue to evaluate compliance with RFS provisions through its system, which is used to track the creation, trades, and use of billions of RINs for compliance. The tracking system handles 4,000 to 6,000 submissions per day, typically averaging more than 20,000 transactions per day, and the generation of more than 1.4 billion RINs per month. RINs are generated with the production of qualifying renewable fuel and are used to achieve national RFS programmatic goals of reducing or replacing the quantity of petroleum-based transportation fuel, heating oil, or jet fuel produced.

In FY 2023, EPA will continue to work with stakeholders to implement a new electronic reporting portal for its Fuel and Fuel Additive (FFA) program. EPA implemented an electronic registration system for the FFA program in FY 2020; companies once registered may then introduce FFA products into commerce. Companies still submit related quarterly and annual FFA reports to the Agency in formats that require EPA to manually transcribe the information into its fuels database. EPA plans to incorporate FFA reports into the eReporting system in FY 2023 after implementing eReporting for higher priority reporting needs in FY 2022.

Supporting Tribal, State and Local Governments

In FY 2023, EPA will continue to provide tribal, state and local governments with assistance in air quality planning, including SIPs and transportation conformity determinations, especially for nonattainment areas working to attain the ozone and PM2.5 NAAQS. EPA will continue to work with tribal, state, and local governments to ensure the technical integrity of the mobile source emission estimates in their SIPs and any Tribal Implementation Plans (TIPs). In addition, EPA will assist states in developing Clean Air Act-required programs—such as new inspection and maintenance (I/M), fuels, and vehicle miles travelled (VMT) offset programs—as well as identifying place-based control options and provide guidance for ozone nonattainment areas for the 2008 and 2015 ozone NAAQS that are bumped up to a higher classification. In addition, in partnership with the Department of Transportation, EPA will ensure national consistency in how transportation conformity determinations are conducted across the U.S. and in the development of motor vehicle emissions budgets in SIPs, EPA's adequacy findings on these budgets, and emission reduction strategies to ensure new transportation investments to support state air quality goals.

EPA will continue to provide regulations, guidance, state-of-the-science models (such as MOVES), and assistance to state and local agencies working on CAA-required PM2.5 and PM10 hot-spot analyses. This will help protect public health in local communities, including communities of color and low-income communities with environmental justice concerns, near new or expanded highway and freight terminal projects with significant increases in diesel truck traffic. In addition, EPA will continue to provide regulations, guidance, and support to states with respect to existing I/M programs that focus on in-use vehicles and engines. Basic and/or Enhanced I/M testing is currently being conducted in almost 30 states with EPA technical and programmatic guidance. EPA also will continue to provide regulatory actions and technical assistance to certain states considering changes or removal of low Reid Vapor Pressure (RVP) fuel programs. Finally, EPA will continue to develop methods for tribal, state and local agencies to quantify multi-pollutant emission reductions from available and newly emerging emission reduction strategies.

Prioritizing Environmental Justice

In FY 2023, EPA will continue to work with a broad range of stakeholders - including communities with environmental justice concerns - to develop targeted, sector-based, and place-based incentives for diesel fleets (including school buses, ports, and other goods movement facilities) to limit emissions from older diesel engines not subject to stringent emissions standards. Millions of people in the U.S. currently live and work near ports and can be exposed to air pollution associated with emissions from diesel engines at ports, including particulate matter, nitrogen oxides, ozone, and air toxics.[4] The near-port communities that bear the brunt of air pollution from these diesel engines are often comprised of low-income populations and people of color. EPA will focus its efforts on reducing mobile source emissions in and around ports through EPA's Ports Initiative.[5] EPA will assist tribal, state, and local governments to reduce emissions in or near communities with EJ challenges to meet CAA SIP and transportation conformity requirements. EPA also is working with industry to bring about field testing and emissions testing protocols for a variety of innovative energy-efficient, emissions reducing technologies for the legacy fleet. As discussed above, EPA also will be establishing new emission standards for highway heavy-duty commercial vehicles, which is a high priority for many communities with environmental justice concerns.

Performance Measure Targets:

(PM CRT) Number of certificates of conformity issued that demonstrate that the respective engine, vehicle, equipment, component, or system conforms to all applicable emission requirements and may be entered into commerce.	**FY 2022 Target**	**FY 2023 Target**
	4,700	4,700

(PM RUL) Number of final rules issued that will reduce GHG emissions from light duty, medium-duty, and heavy-duty vehicles; electric utility generating units; and the oil and gas industry.	**FY 2022 Target**	**FY 2023 Target**
	No Target Established	No Target Established

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- (+$5,104.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to annual payroll increases, adjustments to provide essential workforce support, and changes to benefits costs.

- (+$206.0) This change to fixed and other costs is an increase due to the recalculation of lab utilities.

- (+$20,000.0) This program change is an increase to support the renewal of the Ann Arbor Facility Energy Saving Performance Contract (ESPC), which supports the ability of NVFEL to carry out its mission-critical work of certifying vehicle compliance.

- (+$30,116.0 / +42.0 FTE) This program change is an increase that supports program activities to address the climate crisis. This includes the development of analytical

[4] For more information, please see the DERA Fourth Report to Congress, July 2019, which may be found at: https://www.epa.gov/cleandiesel/clean-diesel-reports-congress.

[5] For more information, please visit https://www.epa.gov/ports-initiative.

methods, regulations, and analyses to support climate protection by controlling greenhouse gas emissions from light duty, medium-duty, and heavy-duty vehicles. This investment includes $8.065 million in payroll.

Statutory Authority:

Title II of the Clean Air Act; Motor Vehicle Information Cost Savings Act; Alternative Motor Fuels Act of 1988; National Highway System Designation Act; Energy Policy Act of 1992; Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU); Energy Policy Act of 2005; Energy Independence and Security Act of 2007.

Enforcement

Forensics Support
Program Area: Enforcement
Goal: Enforce Environmental Laws and Ensure Compliance
Objective(s): Detect Violations and Promote Compliance

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Science & Technology	***$11,761***	***$14,000***	***$15,532***	***$1,532***
Hazardous Substance Superfund	$1,250	$1,145	$1,263	$118
Total Budget Authority	$13,010	$15,145	$16,795	$1,650
Total Workyears	59.9	68.9	70.3	1.4

Program Project Description:

The Forensics Support Program provides expert scientific and technical support for criminal and civil environmental enforcement cases, as well as technical support for the Agency's compliance efforts. EPA's National Enforcement Investigations Center (NEIC) is an environmental forensic center accredited for both laboratory analysis and field sampling operations that generate environmental data for law enforcement purposes. It is fully accredited under International Standards Organization (ISO) 17025, the main standard used by testing and calibration laboratories, as recommended by the National Academy of Sciences.[6] The NEIC maintains a sophisticated chemistry and physical science laboratory and a corps of highly trained inspectors and scientists with expertise across environmental media. The NEIC works closely with EPA's Criminal Enforcement Program to provide technical support (*e.g.*, sampling, analysis, consultation, and testimony) to criminal investigations. The NEIC also works closely with other EPA programs to provide technical support, consultation, on-site inspection, investigation, and case resolution services in support of the Agency's Civil Enforcement Program.

The Forensics Support Program will continue to provide expert scientific and technical support for EPA's criminal and civil enforcement efforts, focus its work on collecting and analyzing materials to characterize contamination, and attribute it to individual sources and/or facilities. The work NEIC performs typically represents the most complex cases nationwide, requiring a level of expertise and equipment not found elsewhere in EPA, as well as support to evaluate and leverage emerging technologies.

FY 2023 Activities and Performance Plan:

Work in this program directly supports Goal 3/Objective 3.2, Detect Violations and Promote Compliance in the *FY 2022 - 2026 EPA Strategic Plan*.

[6] Strengthening Forensic Science in the United States: A Path Forward, National Academy of Sciences, 2009, available at: http://www.nap.edu/catalog.php?record_id=12589.

In FY 2023, the Agency requests an additional $1.5 million and 1.3 FTE to ensure EPA has the capacity and technical expertise to investigate, analyze, sample, test, and transport hydrofluorocarbons (HFCs). The Forensics Support Program provides expert scientific and technical support for EPA's criminal and civil enforcement efforts. EPA will continue to provide analytical and scientific support for environmental forensics to ensure compliance with environmental laws, especially in overburdened, underserved, or vulnerable communities. Additionally, EPA will support critical climate change initiatives, including forensics support of climate change enforcement efforts both in civil and criminal enforcement. This is vital to EPA's ability to enforce the hydrofluorocarbons (HFCs) phase down regulations which are imperative to reducing climate impacts. NEIC will be making significant investments to assist with HFC-related enforcement capabilities, including inspector training, acquisition of field sampling equipment, and expansion of laboratory analytical capabilities to the meet the urgent demand for highly complex HFC analysis.

Effective enforcement relies on the best available science. In FY 2023, NEIC will strengthen our clean air and water protections, aligned with the Administration's goals to hold polluters accountable for their actions and deliver environmental justice (EJ) in communities across America. To achieve these goals, the Agency will employ NEIC's environmental forensics expertise to investigate violations of environmental statutes and prosecute environmental crimes in communities that are disproportionally affected by pollution and environmental crime, and to target those areas more effectively. NEIC supports EJ by targeting critical industry inspections in overburdened, underserved, or vulnerable communities, and utilizes the data we collect to work with the EPA regional office to take enforcement action that could ultimately improve air and water quality in such communities.

In FY 2023, NEIC will continue to streamline its forensics work and identify enhancements to the Agency's sampling and analytical methods, using existing and emerging technology. The NEIC also will build on its previous progress to maximize the efficiency and effectiveness of its operations, ensure timely completion of civil inspection reports, improve procurement processes, and continue to identify and implement further efficiencies in laboratory operations. Of paramount importance, NEIC will build on the work completed in FY 2021 and FY 2022 to support criminal and civil program efforts to combat climate change. The results of these efforts will inform EPA's work in FY 2023 and beyond.

The NEIC will seek to grow its support of EPA enforcement and compliance assurance programs. During FY 2019 and FY 2020, the NEIC accepted over 220 requests from all 10 EPA regions for technical enforcement support. In addition, the NEIC provided testimony and expert reports in support of over 28 cases covering a variety of highly technical areas.

Performance Measure Targets:

EPA's FY 2023 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- (+$484.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to annual payroll increases, adjustments to provide essential workforce support, and changes to benefits costs.

- (+$1,048.0 / +1.3 FTE) This program increase will ensure EPA has the capacity and technical expertise to investigate, analyze, sample, test, and transport HFCs. The increase in FTE will allow EPA analysts to research, assess, and coordinate with federal partners, private industry, and task force members. This investment includes $229.0 thousand for payroll.

Statutory Authority:

Reorganization Plan No. 3 of 1970, 84 Stat. 2086, as amended by Pub. L. 98–80, 97 Stat. 485 (codified at Title 5, App.) (EPA's organic statute); Act to Prevent Pollution from Ships (MARPOL Annex VI); Asbestos Hazard Emergency Response Act; Clean Air Act; Clean Water Act; Emergency Planning and Community Right-to-Know Act; Federal Insecticide, Fungicide, and Rodenticide Act; Marine Protection, Research, and Sanctuaries Act; Mercury-Containing and Rechargeable Battery Management Act; Noise Control Act; Oil Pollution Act; Resource Conservation and Recovery Act; Rivers and Harbors Act; Safe Drinking Water Act; Small Business Regulatory Enforcement Fairness Act; Toxic Substances Control Act; American Innovation and Manufacturing Act.

Homeland Security

Homeland Security: Critical Infrastructure Protection

Program Area: Homeland Security
Goal: Safeguard and Revitalize Communities
Objective(s): Prepare for and Respond to Environmental Emergencies

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Environmental Programs & Management	$733	$909	$1,014	$105
Science & Technology	***$9,653***	***$10,380***	***$14,526***	***$4,146***
Total Budget Authority	$10,386	$11,289	$15,540	$4,251
Total Workyears	23.7	26.6	32.6	6.0

Program Project Description:

Under the federal homeland security system, EPA is the Sector Risk Management Agency responsible for implementing statutory and Presidential directives relating to homeland security for the water sector. EPA's Water Security Program is implemented through close partnerships with the water sector, state emergency response and water program officials, and other federal agencies—most notably the Department of Homeland Security (DHS), the United States Army Corps of Engineers, and the Intelligence Community. The Water Security Program engages federal, state, and local entities in defining annual objectives and identifying high priorities for immediate action.

FY 2023 Activities and Performance Plan:

Work in this program directly supports Goal 6/Objective 6.3, Prepare for and Respond to Environmental Emergencies in the *FY 2022 - 2026 EPA Strategic Plan*. The program also will support the Agency's Infrastructure Investment and Jobs Act implementation priorities including preparing for and responding to cybersecurity challenges so that water systems are more resilient.

This program provides critical resources to coordinate and support protection of the Nation's critical water infrastructure from terrorist threats and all-hazard events. In FY 2023, EPA will continue to provide exercises and technical support to about 1,500 water utilities, state officials, and federal emergency responders to become more resilient to any natural or manmade incident that could endanger drinking water and wastewater services, with an emphasis on the threats posed by climate change and cybersecurity. EPA will provide tools, exercises, and technical assistance which will address the highest risks confronting the water sector. In providing this assistance, EPA will seek to engage overburdened and underserved communities, some of which may lack the technical capacity and resources to undertake preparedness and response actions in the absence of such external support.

Natural Disasters, Climate Change, and General Preparedness

Drought, floods, hurricanes, and other natural disasters represent a high risk to the water sector owing to their frequency of occurrence, their enormous potential for destruction, and the exacerbating effects of climate change. As evident from several recent natural disasters, the level of preparedness within the water sector varies significantly—with many utilities lacking adequate preparedness capabilities. In FY 2023, EPA will improve the preparedness of the water sector by providing nationwide exercises and technical support to address natural disasters and general preparedness with the objective to train water and wastewater systems, state officials, and emergency response partners.

Climate change and associated extreme weather events directly threaten water systems' ability to fulfill their public health and environmental missions as evident from the devastation borne by events like Superstorm Sandy. The EPA Creating Resilient Water Utilities (CRWU) initiative advances the long-term sustainability of the water sector by enabling utility owners and operators to integrate climate change considerations into their routine planning practices. CRWU provides innovative, but readily accessible, electronic tools that enable water systems to adapt to climate change and enhance their resiliency.

Specifically, EPA will:

- Provide in-person or virtual exercises, workshops, and technical assistance to the water sector, including Incident Command System / National Incident Management System exercises; drought response; flood response; state functional exercises (e.g., scenarios of hurricanes, floods, and earthquakes); resource typing and site access workshops; and regional interstate emergency response exercises (e.g., hurricane).

- Integrate new climate projection data into the flagship climate risk assessment tool, Climate Resilience Evaluation and Awareness Tool (CREAT), which incorporates the latest projection data for precipitation, temperature, sea-level rise, storm surge components, and hydrologic changes. EPA will continue to provide extensive nationwide training sessions for drinking water and wastewater systems as well as a series of train-the-trainer forums for technical assistance providers to reach smaller utilities, with a significant focus on overburdened and underserved communities. EPA also will provide direct technical assistance to large, medium, and small drinking water and wastewater utilities across the country in the application of CREAT and other CRWU tools.

- Support the water sector in preparing for and responding to supply chain disruptions that have the potential to impact the availability of water treatment chemicals and other critical materials needed for drinking water and wastewater system operation by: 1) reviewing and processing applications submitted under the authorities of SDWA 1441 and the Defense Production Act; 2) providing direct technical assistance to water systems, state primacy agencies, and other water sector stakeholders experiencing supply challenges that could not be solved through local efforts; 3) assessing the supply chain for critical water treatment chemicals in order to assess the risk of disruptions that could impact the water sector; and

4) developing a platform for tracking and sharing information about emerging and ongoing supply chain issues with the potential to impact water system operations.

- Conduct tabletop and functional exercises to improve the operation of intra-state and inter-state mutual aid agreements among water utilities.

- Implement lessons learned from the most recent hurricane seasons, as identified by reports from the Department of Homeland Security's Federal Emergency Management Agency, the Water Agency Response Network, and EPA's Inspector General.

- Continue to address high priority security areas, as identified in the stakeholder generated *2017 Roadmap to a Secure and Resilient Water and Wastewater Sector,*[7] with an emphasis on the following four priorities: 1) establishing the critical lifeline status of the drinking water and wastewater sector and translating that definition into strong support for the sector's needs and capabilities; 2) improving detection, response, and recovery to contamination incidents; 3) advancing preparedness and improving capabilities of the drinking water and wastewater sector for area-wide loss of water and power; and 4) advancing recognition of vulnerabilities and needed responses related to cybersecurity risk management.

- Conduct nationwide exercises with three critical, inter-dependent sectors: healthcare, emergency services, and energy. Most incidents, particularly natural disasters, have underscored the mutual reliance on the water sector with other lifeline sectors. Through exercises and technical support with officials at the local, state, and federal levels from these other sectors, EPA will seek to improve coordination among critical lifeline sectors.

- Sustain operation of the Water Desk in the Agency's Emergency Operations Center in the event of an emergency by updating roles and responsibilities, training staff in the incident command structure, ensuring adequate staffing during activation of the desk, and coordinating with EPA's regional field personnel and response partners.

- Develop annual assessments, as required under the National Infrastructure Protection Plan,[8] to describe existing water security efforts and progress in achieving the sector's key metrics.

Water Security Initiative (WSI) and Water Laboratory Alliance (WLA)

Water Security Initiative. WSI addresses the risk of contamination of drinking water distribution systems. It has designed and developed an effective system for timely detection and appropriate response to drinking water contamination threats and incidents through a pilot program that has broad application to the Nation's drinking water utilities in high-threat cities. The FY 2023 request includes $4.8 million for necessary WSI Surveillance and Response System (SRS) activities to: 1) continue refining technical assistance products based on the five full-scale SRS pilots; 2)

[7]For more information, please see: https://www.waterisac.org/sites/default/files/public/2017_CIPAC_Water_Sector_Roadmap_FINAL_051217.pdf.
[8] For more information, please see: https://www.cisa.gov/national-infrastructure-protection-plan.

implement a monitoring and response program for water utilities focused on source water chemical spills; and 3) provide direct technical assistance, as requested by water utilities, that seeks to leverage EPA's expertise in deploying their own warning system.

In FY 2023, EPA will:

- Continue efforts to promote the water sector's adoption of Water Quality Surveillance and Response Systems (WQ-SRS). EPA will facilitate user forums and promote the use of available tools and material to design and implement a WQ-SRS. These capabilities will help water systems rapidly detect and respond to water quality problems, such as contamination in the distribution system, to reduce public health and economic consequences.

- Build upon the Drinking Water Mapping Application to Protect Source Waters (DWMAPS)[9] and the new chemical spill and storage notification requirements in the America's Water Infrastructure Act of 2018 (AWIA). EPA will continue to collaborate with water sector stakeholders, water utilities, and state environmental agencies, to identify specific information (e.g., what chemicals are stored upstream from a surface water intake), including Emergency Planning and Community Right-to-Know Act (EPCRA) Tier 2 data, that is valuable to creating a comprehensive source water contamination threat inventory. EPA will develop guidance and a comprehensive listing of state and federal information resources that can be used to identify potential sources of contamination. This effort will help to ensure that drinking water utilities have access to the basic information (e.g., what chemicals are stored upstream from a surface water intake) necessary for understanding the risk of releases to their sources of drinking water, as required under AWIA Section 2013, and take steps to mitigate those risks.

- Provide technical support to EPA regions, state primacy agencies, and water systems during response to contamination incidents. EPA's Water Program has been providing technical assistance on contamination response for several years (e.g., following wildfires, following the jet fuel contamination incident in Honolulu, Hawaii) and anticipates that requests for this type of support will continue.

- Support water sector assessments of contamination detection and response capabilities through direct assessments of online water quality monitoring capabilities. EPA also will promote the SRS Capabilities Assessment Tool, an easy to use, web-based, decision support tool that presents the user with a series of questions to assess existing detection and response capabilities, compare these existing capabilities to a target capability, and identify potential enhancements to address gaps between the existing and target capabilities.

- Continue the successful SRS implementation pilot program[10] within the water sector. The purpose of the SRS Program is to: demonstrate the application of SRS tools in designing and operating an early warning system for contamination events; illustrate additional

[9] For more information, please see: https://www.epa.gov/sourcewaterprotection/drinking-water-mapping-application-protect-source-waters-dwmaps.
[10] For more information, please see: https://www.epa.gov/waterqualitysurveillance.

applications of SRS tools, such as extending the SRS approach to source water monitoring; and identify champions, within the water sector, for implementing surveillance and response systems.

Water Laboratory Alliance (WLA). In a contamination event, the sheer volume or unconventional type of samples requiring analysis could quickly overwhelm the capacity or capability of a single laboratory. To address this potential deficiency, EPA has established the national WLA comprised of laboratories from the local (e.g., water utility) to the federal level (e.g., the Centers for Disease Control and Prevention's Laboratory Response Network). In FY 2023, EPA will continue to promote, through exercises, expert workshops, and association partnerships, the WLA Plan.[11] The plan provides a protocol for coordinated laboratory response to a surge of analytical needs. Approximately 30 exercises or workshops will be completed in FY 2022. In FY 2023, under WLA, EPA plans to train approximately 50 laboratories to improve their ability to handle potential problems associated with surge capacity and analytical method capabilities during an emergency.

In FY 2023, EPA will:

- Continue to work with regional and state environmental laboratories to conduct exercises and continue efforts to automate the exercises, enabling laboratories and other members of the water sector to participate in exercises simultaneously and continue the innovative practice of pursuing validation of methods through exercises.

- Continue to expand the membership of the WLA with the intention of achieving nationwide coverage. The WLA has 160 member laboratories that are geographically diverse and can provide a wide range of chemical, biological, and radiological analyses.[12] For the WLA to become a robust network that can cover major population centers and address a diverse array of high priority contaminants, membership must continue to increase.

- Develop protocols for flushing contaminated premise plumbing systems that are based on the best available science and validated through both pilot-scale demonstration and computer simulation. Response to previous water contamination incidents has demonstrated inconsistent approaches to flushing premise plumbing systems, some of which could spread contamination further into the system. Science-based protocols that are adaptable to the specific conditions of an incident are important for responding to a range of distribution system contamination incidents, including release of volatile organic chemicals following exposure of pipe to high temperatures (e.g., as experienced during wildfires).

- Continue to implement specific recommendations of the Water Decontamination Strategy as developed by EPA and water sector stakeholders (e.g., defining roles and responsibilities of local, state, and federal agencies during an event).

[11] For more information, please see: https://www.epa.gov/waterlabnetwork.
[12] For more information, please see: https://www.epa.gov/dwlabcert/contact-information-certification-programs-and-certified-laboratories-drinking-water.

Cybersecurity

Cybersecurity represents a substantial concern for the water sector, given the ubiquitous access to critical water treatment systems from the internet. Recent attacks by outside actors and their clear potential to disrupt essential lifeline services, such as drinking water supplies, are prompting a growing recognition that the federal government should adopt a more aggressive posture towards cybersecurity. EPA will continue working with each state, territory, and tribe to develop and train a cadre of technical assistance providers who can work directly with individual water systems to assess and enhance their cybersecurity practices. This multi-year effort requires EPA to work with the Nation's 52,000 community water systems, many of which have limited or no technical capacity to address cybersecurity issues. EPA also will seek to integrate cybersecurity training into their sanitary survey assessments.

In addition to expanding direct technical assistance, and in discussions with the National Security Council, EPA is exploring regulatory and statutory options in the near-term for improving the water sector's cybersecurity posture.

In FY 2023, EPA will continue to fulfill its obligations under Executive Order 13636: *Improving Critical Infrastructure Cybersecurity*,[13] which designated EPA as the lead federal agency responsible for cybersecurity in the water sector. EPA will partner with the water sector to promote cybersecurity practices and gauge progress in the sector's implementation of these practices as directed by the Cybersecurity Enhancement Act of 2014. EPA will be conducting nationwide exercises and providing technical support on cybersecurity threats and countermeasures for about 200 water and wastewater utilities.

In FY 2023, EPA will evaluate its existing Cybersecurity Action Plan, as informed by recent discussions under the auspices of the National Security Council. The Agency also will review other strategic planning documents pertaining to the water sector to identify and clarify any opportunities to enhance the Agency's mission to improve the cybersecurity posture of the sector. Additionally, EPA's Office of Water and Office of Homeland Security will continue to develop an integrated strategy to work together more effectively to coordinate drinking water and wastewater sector-wide cybersecurity threat information and intelligence sharing efforts.

EPA will:

- Pursuant to regulatory and statutory requirements, EPA intends to issue guidance documents and conduct a national training program for states on evaluating cybersecurity practices at public water systems. In addition, EPA expects to provide corresponding guidance materials and training to help public water systems understand and strengthen the cybersecurity practices that may be assessed during a state survey and/or as a result of future statutory requirements. EPA plans to offer targeted training on the guidance documents to all public water systems and all states.

[13] For more information, please see: https://www.dhs.gov/publication/executive-order-13636-improving-critical-infrastructure-cybersecurity.

- Continue to expand the Cybersecurity Technical Assistance Provider Initiative, an effort which recognizes that many water systems, particularly rural and small systems and systems in underserved and overburdened communities, will not adopt cybersecurity practices without direct assistance. This effort trains a cadre of state and regional water sector technical assistance providers to assess cybersecurity practices at water and wastewater systems and guide systems through developing a cybersecurity action plan to reduce risks and enhance resilience.

- As required by Section 50113 of the Drinking Water and Wastewater Infrastructure Act of 2021, EPA, beginning in FY 2022, will develop an annual Cybersecurity Prioritization Framework to identify water systems whose disruption would lead to significant public health impacts. Based upon the Prioritization Framework, EPA will need to develop and implement a cybersecurity technical support plan for these systems.

- In FY 2022, EPA launched the Industrial Control Systems Cybersecurity Initiative – Water and Wastewater Sector Action Plan to promote and support the water sector's adoption of strategies for the early detection of cyber-threats and allow for the rapid sharing of cyber-threat data across the government to expedite analyses and action. This initiative will continue into FY 2023.

- Conduct classroom exercises, at locations across the country, on water sector cybersecurity. The exercises will address cybersecurity threats (including ransomware), vulnerabilities, consequences, best practices, and incident response planning.

- Update and/or develop new course materials to respond to the evolving nature of cybersecurity threats. One example of such updates are the FY 2022 alerts and training concerning the potential for Russian-state actors to infiltrate water system industrial control processes and business enterprise functions.

AWIA

In FY 2023, EPA will continue its efforts to fulfill the mandates of the Community Water System Risk and Resilience section of AWIA. It requires community water systems, serving more than 3,300 people, to prepare risk assessments and emergency response plans. EPA will provide technical assistance to these systems on how to conduct risk and resilience assessments (RRAs), prepare Emergency Response Plans (ERPs), and certify completion of these assessments and plans. In FY 2022, EPA completed four trainings on preparation of RRAs and ERPs. Additionally, 100 percent of large systems, 100 percent of medium systems, and 89 percent of small systems have certified the completion of their RRAs, while over 99 percent of large systems, over 99 percent of medium systems, and over 82 percent of small systems have certified the completion of their ERPs. EPA also will provide technical assistance to water systems to address drinking water vulnerabilities where EPA determines an urgent and immediate need exists.

Performance Measure Targets:

(PM DW-07) Number of drinking water and wastewater systems, tribal and state officials, and water sector partners provided with security, emergency preparedness, and climate resilience training and technical assistance.	FY 2022 Target	FY 2023 Target
	2,000	2,000

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- (+$238.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to annual payroll increases, adjustments to provide essential workforce support, and changes to benefits costs.

- (+$3,908.0 / +6.0 FTE) This program change is an increase of resources and FTE to enhance cyber incident preparation, response, recovery, information sharing, and intelligence for water utilities to protect infrastructure. This includes $1.072 million in payroll.

Statutory Authority:

Safe Drinking Water Act, §§ 1431-1435; Clean Water Act; Public Health Security and Bioterrorism Emergency and Response Act of 2002; Emergency Planning and Community Right-to-Know Act, §§ 301-305.

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Science & Technology	***$21,877***	***$24,852***	***$25,890***	***$1,038***
Hazardous Substance Superfund	$31,897	$33,020	$43,796	$10,776
Total Budget Authority	$53,774	$57,872	$69,686	$11,814
Total Workyears	127.2	124.1	125.8	1.7

Program Project Description:

Exposure to hazardous chemical agents, microbial pathogens, and radiological materials released into the environment could pose catastrophic consequences to the health of first responders and American citizens. EPA has responsibility, under legislation and Presidential Directives, to remediate contaminated environments created by incidents such as terrorist attacks, industrial accidents, or natural disasters.

EPA's disaster-related research responsibilities under the Homeland Security Research Program (HSRP) are: 1) contaminant characterization and consequence assessment; 2) environmental cleanup and infrastructure remediation; and 3) systems approaches to preparedness and response.

The research conducted supports EPA to carry out its primary mission essential function to help communities prepare for, endure, and recover from disasters – safeguarding their economic, environmental, and social well-being. Researchers within the HSRP collaborate with state, local, tribes, private sector organizations, and key federal agencies[14] to prioritize research needs and prevent the duplication of scientific and technical work. The HSRP delivers effective tools, methods, information, and guidance to local, tribal, state, and federal decision-makers that address both critical terrorism-related issues and natural or manmade disasters.

EPA also is responsible for operating and maintaining the network of near real-time radiation monitors, known as *RadNet,* under the Nuclear/Radiological Incident Annex to the National Response Framework. This network is critical in responding to large-scale incidents such as the accident at the Fukushima nuclear facility and is an EPA Critical Infrastructure/Key Resource asset. This monitoring network is supported by the IT system known as ARaDS, the Analytical Radiation Data System.

[14] Partners include: Department of Homeland Security (DHS), Department of Defense (DOD), Centers for Disease Control and Prevention (CDC), Federal Bureau of Investigation (FBI), National Institute of Health (NIH), National Science Foundation (NSF), Department of Energy (DOE), and Department of Agriculture (USDA).

Recent Accomplishments Include:[15]

Supporting COVID-19 Response. EPA researchers worked with program and regional office partners and with other federal, state, and local stakeholders (including CDC, DHS, the New York City Metro Transit Authority, the Los Angeles Metro, and many others) to provide timely and reliable information to address Agency and stakeholder research needs related to COVID-19. The research and technical support provided was used by EPA and other stakeholders to make informed decisions, develop federal guidance, and support strategies and investments. The research focused on determining the effectiveness of:

- Available products and methods for cleaning and disinfecting real-world surfaces
- UV-C systems and ozone generation devices for surface disinfection
- Technologies to reduce airborne transmission
- New analytical approaches for environmental samples that reduce time for analyses results
- Ways to routinely disinfect common personal protective equipment such as masks, face shields, and clothing

EPA regularly updated and communicated research findings to a wide audience via webinars (with attendance in the thousands) with interim results posted on the EPA COVID-19 research website.[16] The Agency also held regular meetings with federal, tribal, state, and local governments.

Improving Preparedness for Bio-incident Response. EPA researchers significantly advanced capabilities to respond to a biological incident. Environmental sampling is critical for effective response to bio-incidents, specifically to address persistent biological agents like *Bacillus anthracis* spores or other pathogens that can survive or propagate in the environment (e.g., in biofilm or other host vectors). Various sampling methods were developed and evaluated to characterize potentially contaminated indoor sites and support cleaning.[17,18,19] EPA researchers developed methods to effectively sample complex, outdoor environmental surfaces for the presence of biological threats (specifically, *B. anthracis* spores) and developed tools to generate incident specific characterization strategies (Trade-Off Tool for Sampling, TOTS).[20] These methods, tools, and information will help responders determine which sampling methods to consider for their specific situation and develop the most effective sampling strategies to protect human health.

Improving Wastewater Infrastructure Preparedness. Wide area outdoor contamination incidents, whether they be chemical, biological, or radiological, can be intensified by rain events. Rainfall can wash contamination over outdoor areas, or into stormwater, or combined wastewater systems, which increases the contaminated area. Management of contaminated water is often an after-thought when first responding to a natural or human caused disaster. To help stormwater managers fulfill their emergency response responsibilities within the United States' National Incident

[15] For a more complete view of accomplishments, please see: https://www.epa.gov/research/national-research-programs.
[16] For more information, please see: https://www.epa.gov/covid19-research.
[17] For more information, please see: https://cfpub.epa.gov/si/si_public_record_Report.cfm?dirEntryId=352037&Lab=CESER.
[18] For more information, please see: https://cfpub.epa.gov/si/si_public_record_Report.cfm?dirEntryId=352038&Lab=CESER.
[19] For more information, please see: https://cfpub.epa.gov/si/si_public_record_Report.cfm?dirEntryId=352040&Lab=CESER.
[20] For more information, please see: https://cfpub.epa.gov/si/si_public_record_Report.cfm?dirEntryId=350224&Lab=CESER.

Management System,[21] EPA researchers developed a method to help them make decisions about the allocation of containment and treatment resources within an impacted area.

Additionally, it is unknown how radionuclides, which are radioactive forms of elements, interact with stormwater or combined sewage collection system infrastructure, but long-term persistence and release could have significant impacts on wastewater operations. Data generated during a study by EPA researchers on the persistence and fate and transport of radionuclides will help wastewater utilities make decisions about treating, storing, or diverting contamination after a radionuclide contamination incident that affects their systems.[22]

FY 2023 Activities and Performance Plan:

Work in this program directly supports Goal 6/Objective 6.3, Prepare for and Respond to Environmental Emergencies in the *FY 2022-2026 EPA Strategic Plan*.

Research is planned and prioritized based on the needs of end-users of this science, including Regional On-Scene Coordinators, water utility companies, states, and EPA program and regional offices.

Contaminant Characterization and Risk Assessment. Contaminant characterization provides essential information that helps determine the extent and nature of an environmental contamination and plan effective response actions. Information on contaminant characterization, coupled with an understanding of exposure potential, can be used to inform the potential consequences of a contamination on public health. Furthermore, understanding the fate and transport of contaminants in the environment will ensure proper contaminant characterization. Following chemical, biological, and radiological incidents, EPA may support or lead site characterization, remediation, and management of waste in the contaminated environment. Additional characterization of the site may be required during cleanup operations to assess progress and determine waste streams and to inform site re-occupancy and reuse decisions (sometimes referred to as clearance decisions).

In FY 2023, HSRP will:

- Conduct research to understand the transport of communicable disease agents, including consideration of impacts as a function of social, economic, and environmental vulnerabilities.
- Develop rapid and widely available sample collection methods for indoor and outdoor environmental matrices for target biological and chemical agents.
- Develop sampling strategy and data management tools for wide-area chemical and biological incidents for urban wide-area environments. These tools will incorporate data

[21] For more information, please see: https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=350959&Lab=CESER&subject=Homeland%20Security%20Research&view=desc&sortby=pubDateYear&showcriteria=1&count=25&searchall=%27homeland%20security%27%20AND%20%27water%20security%27%20NOT%20(presentation%20OR%20poster)&datebeginpublishedpresented=01/01/2003.

[22] For more information, please see: https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=351297&Lab=CESER&subject=Homeland%20Security%20Research&view=desc&sortby=pubDateYear&showcriteria=1&count=25&searchall=%27homeland%20security%27%20AND%20%27water%20security%27%20NOT%20(presentation%20OR%20poster)&datebeginpublishedpresented=01/01/2003.

layers enabling assessment of environmental justice factors to inform response decision making.

Environmental Cleanup and Infrastructure Remediation. Remediating chemical, biological, and radiological contamination released over wide areas including indoor and outdoor areas, critical infrastructures, or impacted water systems, is a responsibility for which EPA needs to accumulate operational experience. Such a release can pose a continual challenge with long-standing consequences. Chemical, biological, and radiological environmental contamination that can impact human health and welfare can result from intentional acts or from the increasing severity and occurrence of natural disasters due to climate change. HSRP research aims to fill the most critical scientific gaps in the capabilities of EPA's response community so that the Agency can make the most informed mitigation and remediation decisions. As the lead federal agency overseeing the water sector, EPA addresses water sector research needs identified by the Water Sector Coordinating Council and the Water Government Coordinating Council's Critical Infrastructure Partnership Advisory Council.[23]

In FY 2023, HSRP will:

- Develop decontamination methods for biological agents that can effectively minimize the risk of transmission from environmental matrices, including research useful to support reducing environmental transmission in pandemic or other naturally occurring outbreaks;
- Develop decontamination methods for chemical agent contaminated areas, including methods for non-traditional agents and opioids;
- Conduct cybersecurity research to assess the impact a cyberattack will have on the drinking water infrastructure;
- Evaluate water system security and assess resilience for wastewater, stormwater, and home plumbing;
- Assess the impact of high consequence pathogens on wastewater treatment plant operations; and
- Develop integrated waste management tools for all hazards with enhancements to estimate waste volumes and social implications of disaster waste and materials management. These tools will incorporate environmental justice data to inform decision making. These tools are developed to be applicable to debris from intentional incidents as well as natural disasters.

Community Engagement and Systems-Based Tools Supporting Resilience Equity. Transitioning research into reliable and field usable capabilities involves ensuring that decision makers and responders have knowledge of and access to the latest information. Effective technical support and decision-support tools will be developed to ensure that information is readily and easily accessible to decision makers and stakeholders throughout response and recovery efforts. In FY 2023, HSRP will:

[23] The Water Sector Coordinating Council is a "self-organized, self-run, and self-governed council" composed of water utilities. The Water Government Coordinating Council is responsible for interagency coordination of efforts related to the water sector.

- Develop decision-support tools and resources to improve environmental justice, community resilience, risk communication, risk perception, and human behavior during disaster preparedness, response, and recovery; and
- Develop a data management tool to enhance data usability and availability for wide area response and recovery from natural and man-made disasters.

Radiation Monitoring. The *RadNet* fixed monitoring network provides near real-time radiation monitoring coverage near each of the 100 most populous U.S. cities, as well as expanded geographic coverage for a total of 140 monitoring sites. The *RadNet* air monitoring network provides the Agency, first responders, and the public with greater access to data. Should there be a radiological emergency, *RadNet* improves officials' ability to make decisions about protecting public health and the environment during and after the incident. Additionally, *RadNet* data is used by scientists to better characterize the effect of a radiological incident.

In FY 2023, the Agency will continue to operate the *RadNet* air monitoring network, continue to add exposure rate meter capability to the network, and provide essential maintenance to the network. To best maximize resources, exposure rate meter capability will be added to monitors when needed repairs are called for. This expansion will enhance the federal government's ability to effectively communicate radiation measurement information to the public and to non-technical decision makers after a radiological release. In addition to aiding in explaining data to the public and decision makers, the addition of exposure rate meters aligns EPA's monitoring system with that of the international community.

Research Planning. EPA research is built around six integrated and transdisciplinary research programs. Each of the six programs is guided by a Strategic Research Action Plan (StRAP) that reflects the research needs of Agency program and regional offices, states, and tribes, and is planned with their active involvement. Each research program is in the process of developing the fourth generation of the StRAPs, which will continue the practice of conducting innovative scientific research aimed at solving the problems encountered by the Agency and its stakeholders.

EPA's Research and Development Program, ORD, ensures the integrity and value of its research through a variety of mechanisms that include:

- EPA's Board of Scientific Counselors (BOSC)
    - ORD meets regularly with this committee, which provides advice and recommendations to ORD on technical and management issues of its research programs.
- State Engagement
    - EPA's state engagement[24] is designed to inform states about their role within EPA and EPA's research programs and to better understand the science needs of state environmental and health agencies.

- Tribal Partnerships

[24] For more information, please see: https://www.epa.gov/research/epa-research-solutions-states.

- Key Tribal partnerships are established through the Tribal Science Program which provides a forum for the interaction between Tribal and Agency representatives. These interactions identify research of mutual benefit and lead to collaborations on important tribal environmental science issues.

Performance Measure Targets:

Work under this program supports performance results in the Research: Chemical Safety and Sustainability Program under the S&T appropriation.

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- (+$964.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to annual payroll increases, adjustments to provide essential workforce support, and changes to benefits costs.

- (-$228.0) This change to fixed and other costs is a decrease due to the recalculation of lab fixed costs.

- (+$306.0 / + 1.7 FTE) This program change is an increase in resources and FTE to support research efforts to identify and address emerging threats to the water sector. This includes $300.0 thousand in payroll.

- (-$4.0) This program change is a decrease in resources for radiological emergency preparedness.

Statutory Authority:

Atomic Energy Act of 1954; Clean Air Act, §§ 102, 103; Safe Drinking Water Act, §§ 1431-1435, 1442; Robert T. Stafford Disaster Relief and Emergency Assistance Act; National Defense Authorization Act for Fiscal Year 1997, §§ 1411-1412; Public Health Security and Bioterrorism Preparedness and Response Act of 2002; Toxic Substances Control Act, § 10; Oil Pollution Act; Pollution Prevention Act; Resource Conservation and Recovery Act; Emergency Planning and Community Right-to-Know Act; Clean Water Act; Federal Insecticide, Fungicide, and Rodenticide Act; Federal Food, Drug, and Cosmetic Act; Food Quality Protection Act; Food Safety Modernization Act, §§ 203, 208.

Homeland Security: Protection of EPA Personnel and Infrastructure

Program Area: Homeland Security
Goal: Safeguard and Revitalize Communities
Objective(s): Prepare for and Respond to Environmental Emergencies

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Environmental Programs & Management	$4,915	$4,959	$5,139	$180
Science & Technology	***$500***	***$501***	***$501***	***$0***
Building and Facilities	$7,006	$6,676	$6,676	$0
Hazardous Substance Superfund	$845	$1,030	$1,530	$500
Total Budget Authority	$13,266	$13,166	$13,846	$680
Total Workyears	9.2	9.2	9.2	0.0

Total workyears in FY 2023 include 9.2 FTE to support Homeland Security Working Capital Fund (WCF) services.

Program Project Description:

This program supports activities to ensure that EPA's physical structures and assets are secure and operational and that physical security measures are in place to help safeguard staff in the event of an emergency. These efforts also protect EPA's vital laboratory infrastructure and testing assets. Specifically, funds within this appropriation support security needs for the National Vehicle and Fuel Emissions Laboratory (NVFEL).

FY 2023 Activities and Performance Plan:

Work in this program directly supports Goal 6/Objective 6.3, Prepare for and Respond to Environmental Emergencies in the *FY 2022 - 2026 EPA Strategic Plan.*

In FY 2023, the Agency will continue to provide enhanced physical security for the NVFEL, its employees, visitors, and test articles, which include prototype vehicles and engines. This funding supports the cost of security enhancements required as part of an Agency security assessment review.

Performance Measure Targets:

EPA's FY 2023 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- There is no change in program funding.

Statutory Authority:

Intelligence Reform and Terrorism Prevention Act of 2004; Homeland Security Act of 2002; Reorganization Plan No. 3 of 1970, 84 Stat. 2086, as amended by Pub. L. 98–80, 97 Stat. 485 (codified at Title 5, App.) (EPA's organic statute).

Indoor Air and Radiation

Indoor Air: Radon Program
Program Area: Indoor Air and Radiation
Goal: Ensure Clean and Healthy Air for All Communities
Objective(s): Reduce Exposure to Radiation and Improve Indoor Air

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Environmental Programs & Management	$2,224	$3,136	$5,004	$1,868
Science & Technology	***$112***	***$157***	***$157***	***$0***
Total Budget Authority	$2,336	$3,293	$5,161	$1,868
Total Workyears	8.8	9.0	12.4	3.4

Program Project Description:

Title III of the Toxic Substances Control Act (TSCA) authorizes EPA to take a variety of actions to address the public health risks posed by exposures to indoor radon. Under the statute, EPA studies the health effects of radon, assesses exposure levels, sets an action level, provides technical assistance to States, industry and the public, advises the public on steps they can take to reduce exposure and promotes the availability of reliable radon services and service providers to the public.

Radon is the second leading cause of lung cancer in the United States – and the leading cause of lung cancer mortality among non-smokers – accounting for about 21,000 deaths per year.[25] The EPA's non-regulatory Indoor Air: Radon Program promotes actions to reduce the public's health risk from indoor radon. EPA and the Surgeon General recommend that people conduct a simple home radon test and, if levels above the EPA's guidelines are confirmed, reduce elevated levels by home mitigation using inexpensive and proven techniques. EPA also recommends that new homes be built using radon-resistant features in areas where there is elevated radon. Nationally, risks from radon have been reduced in many homes over the years, but many are still in need of mitigation. This voluntary program promotes partnerships between national organizations, the private sector, and more than 50 state, local, and tribal governmental programs to reduce radon risk.

This program, combined with the Indoor Air: Radon EPM Program, supports the EPA Radon Reference and Intercomparison Program (ERRIP) of the National Air and Radiation Environmental Laboratory (NAREL) in Montgomery, Alabama. The ERRIP is the only federal National Institute of Standards and Technology (NIST) traceable primary radon reference and calibration program accessible to the U.S. radon industry and is a critical element of the framework for promoting the availability of reliable, quality radon services for the public.

[25] For more information, please see: https://www.epa.gov/radon.

FY 2023 Activities and Performance Plan:

Work in this program directly supports Goal 4/Objective 4.2, Reduce Exposure to Radiation and Improve Indoor Air in the *FY 2022 - 2026 EPA Strategic Plan*.

EPA will provide radon reference intercomparison samples to secondary radon chambers (known as ERRIP participants) operating in the United States to analyze. EPA then submits the radon reference data to the Radon Accrediting Board(s) to evaluate and assess the performance of the ERRIP participant. EPA will update and modernize program equipment and perform required QA/QC on program analytical process and procedures.

Performance Targets:

EPA's FY 2023 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- There is no change in program funding.

Statutory Authority:

Title III of the Toxic Substances Control Act (TSCA).

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Environmental Programs & Management	$8,283	$7,661	$10,588	$2,927
Science & Technology	***$1,645***	***$1,735***	***$2,224***	***$489***
Hazardous Substance Superfund	$1,973	$1,985	$2,872	$887
Total Budget Authority	$11,901	$11,381	$15,684	$4,303
Total Workyears	60.0	53.8	66.7	12.9

Program Project Description:

EPA supports waste site characterization and cleanup by providing field and fixed laboratory environmental radiological and radioanalytical data and technical support, providing radioanalytical training to state and federal partners, and developing new and improved radioanalytical methods and field measurement technologies. In the event of a radiological accident or incident, the National Analytical Radiation Environmental Laboratory in Montgomery, Alabama, and the National Center for Radiation Field Operations in Las Vegas, Nevada, provide analytical and field operation support for radioanalytical testing, quality assurance, analysis of environmental samples, and field measurement systems and equipment to support site assessment, cleanup, and response activities. Support to these sites, including those disproportionately impacted by environmental justice issues, is based on requests from EPA and the Regions. Together, these organizations provide technical support for conducting site-specific radiological characterizations and cleanups.

FY 2023 Activities and Performance Plan:

Work in this program directly supports Goal 4/Objective 4.2, Reduce Exposure to Radiation and Improve Indoor Air in the *FY 2022 - 2026 EPA Strategic Plan*.

In FY 2023, EPA, in cooperation with states, tribes, and other federal agencies, will provide ongoing site characterization and analytical support for site assessment activities, remediation technologies, and measurement and information systems. EPA also will provide essential training and direct site assistance, including field surveys and monitoring, laboratory analyses, health and safety, and risk assessment support at sites with actual or suspected radioactive contamination.

Performance Measure Targets:

EPA's FY 2023 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- (+$85.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to annual payroll increases, adjustments to provide essential workforce support, and changes to benefits costs.

- (-$180.0) This change to fixed and other costs is a decrease due to the recalculation of lab utilities.

- (+$584.0 / +2.2 FTE) This program change is an increase that supports addressing critical gaps in EPA's radiological protection capacity including the ability to provide ongoing site characterization and analytical support for site assessment activities, remediation technologies, and measurement and information systems. This investment includes $384.0 thousand in payroll.

Statutory Authority:

Atomic Energy Act of 1954; Clean Air Act; Energy Policy Act of 1992; Nuclear Waste Policy Act of 1982; Public Health Service Act; Safe Drinking Water Act; Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978; Waste Isolation Pilot Plant Land Withdrawal Act of 1992; Marine Protection, Research, and Sanctuaries Act; Clean Water Act.

Radiation: Response Preparedness
Program Area: Indoor Air and Radiation
Goal: Ensure Clean and Healthy Air for All Communities
Objective(s): Reduce Exposure to Radiation and Improve Indoor Air

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Environmental Programs & Management	$2,703	$2,404	$3,004	$600
Science & Technology	***$3,063***	***$3,096***	***$4,383***	***$1,287***
Total Budget Authority	$5,766	$5,500	$7,387	$1,887
Total Workyears	32.1	33.3	41.4	8.1

Program Project Description:

The National Analytical Radiation Environmental Laboratory (NAREL) in Montgomery, Alabama, and the National Center for Radiation Field Operations (NCRFO) in Las Vegas, Nevada, provide laboratory analyses and field sampling and analyses to respond to radiological and nuclear incidents. This work includes measuring and monitoring radioactive materials and assessing radioactive contamination in the environment. This program comprises direct scientific field and laboratory activities to support preparedness, planning, training, and procedure development. In addition, program personnel are members of EPA's Radiological Emergency Response Team (RERT), a component of the Agency's emergency response program, and are trained to provide direct expert scientific and technical assistance. EPA's RERT is part of the Nuclear Incident Response Team under the Department of Homeland Security.

FY 2023 Activities and Performance Plan:

Work in this program directly supports Goal 4/Objective 4.2, Reduce Exposure to Radiation and Improve Indoor Air in the *FY 2022 - 2026 EPA Strategic Plan*.

In FY 2023, EPA's RERT will provide critical support for federal radiological emergency response and recovery operations under the National Response Framework and the National Oil and Hazardous Substances Pollution Contingency Plan. When necessary, EPA's RERT will complement routine operations (e.g., on-site technical support/consultation, fixed laboratory, and mobile laboratory analyses) and provide for the rapid collection of field measurements/samples and accurate radionuclide analyses of environmental samples.[26]

In FY 2023, NAREL and NCRFO will build capacity in core levels of readiness for radiological emergency responses; participate in critical emergency exercises; and respond, as required, to radiological incidents. NAREL and NCRFO will prioritize rapid deployment capabilities to ensure that field teams and laboratory personnel are ready to provide scientific data, field measurement

[26] For additional information, please visit: https://www.epa.gov/radiation/radiological-emergency-response.

capabilities, analyses, and updated analytical techniques for radiation emergency response programs across the Agency.

Performance Measure Targets:

EPA's FY 2023 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- (+$170.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to annual payroll increases, adjustments to provide essential workforce support, and changes to benefits costs.

- (+$110.0) This change to fixed and other costs is an increase due to the recalculation of lab utilities.

- (+$1,007.0 / +5.0 FTE) This program change is an increase to support activities for preparedness work, including basic laboratory analytic functions and field operations. This investment includes $769.0 thousand in payroll.

Statutory Authority:

Homeland Security Act of 2002; Atomic Energy Act of 1954; Clean Air Act; Post-Katrina Emergency Management Reform Act of 2006 (PKEMRA); Public Health Service Act (PHSA); Robert T. Stafford Disaster Relief and Emergency Assistance Act; Safe Drinking Water Act (SDWA).

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Environmental Programs & Management	$10,968	$11,750	$23,542	$11,792
Science & Technology	***$296***	***$161***	***$173***	***$12***
Total Budget Authority	$11,264	$11,911	$23,715	$11,804
Total Workyears	40.8	37.2	68.1	30.9

Program Project Description:

Title IV of the Superfund Amendments and Reauthorization Act of 1986 (SARA) authorizes EPA to conduct and coordinate research on indoor air quality, develop and disseminate information, and coordinate risk reduction efforts at the federal, state, and local levels. Poor indoor air quality represents one of the largest risks in EPA's portfolio.[27] EPA uses a range of strategies to reduce health risks from poor indoor air quality in homes, schools, and other buildings through partnerships with non-governmental, professional, federal, state and local organizations. Through these partnerships EPA provides information, guidance and technical assistance to equip industry, the health care community, the residential, school and commercial building sectors, and the general public to take action. As technical experts working at the intersection of the built environment and health, EPA is focused on policy and guidance to improve building conditions, including for disproportionately impacted communities, to reduce indoor air risk and achieve improvements in environmental and health outcomes.

Tribes have identified indoor air quality as a high priority and often bear disproportionately high impacts from poor indoor air quality. For example, Native Americans and Alaska Natives disproportionately suffer from asthma, in part due to poor housing conditions and the associated increase in exposure to indoor air pollutants.

FY 2023 Activities and Performance Plan:

Work in this program directly supports Goal 4/Objective 4.2, Reduce Exposure to Radiation and Improve Indoor Air in the *FY 2022 - 2026 EPA Strategic Plan*.

Under this program, EPA will maintain indoor air monitoring and assessment equipment, conduct field measurements and assessments, and provide technical support and guidance for indoor air quality remediations, with a primary focus on assistance to tribal communities. In addition, EPA

[27] For more information, please see: https://www.epa.gov/iaq.

will conduct training and capacity building for tribal air quality professionals on indoor air assessments and field measurement technology and practices, including radon.

Performance Targets:

EPA's FY 2023 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- (+$11.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to annual payroll increases, adjustments to provide essential workforce support, and changes to benefits costs.

- (+$1.0) This program change is an increase in support to restore capacity in the program including field measurements and assessments, technical support, capacity building, and training for tribal communities.

Statutory Authority:

Title IV SARA; Title III Toxic Substances Control Act; Clean Air Act.

IT / Data Management / Security

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Environmental Programs & Management	$74,013	$82,715	$98,452	$15,737
Science & Technology	***$2,782***	***$3,072***	***$3,195***	***$123***
Hazardous Substance Superfund	$20,984	$13,826	$16,904	$3,078
Total Budget Authority	$97,779	$99,613	$118,551	$18,938
Total Workyears	467.8	482.4	486.4	4.0

Total workyears in FY 2023 include 172.0 FTE to IT/Data Management working capital fund (WCF) services.

Program Project Description:

The work performed under the Information Technology/Data Management (IT/DM) Program supports human health and the environment by providing critical IT infrastructure and data management. Science and Technology (S&T) resources for EPA's IT/DM Program fund the following activities: Quality Program,[28] EPA National Library Network, and One EPA Web.

The Quality Program provides quality policy, procedures, standards, and guidance for environmental information collection, production, evaluation, or use activities. These activities are performed by or for the Agency to ensure sound decisions are based on quality to support their intended use as we strive to protect human health and the environment. The Quality Program provides Quality Assurance (QA) directives, training, oversight, and technical support to assist EPA organizations in implementing their Quality Program for environmental information operations. It also oversees the implementation of EPA's Information Quality Guidelines (IQGs).

EPA's National Library Network provides information resources and services to EPA staff and the public in support of EPA's mission. One EPA Web provides accessible, relevant, timely, accurate, and complete environmental information to the public through EPA's internet pages, primarily https://www.epa.gov/.

FY 2023 Activities and Performance Plan:

Work in this program provides Cross-Agency Mission and Science Support and is allocated across strategic goals and objectives in the *FY 2022 - 2026 EPA Strategic Plan*.

[28] For more information about EPA's Quality Program, please see: http://www.epa.gov/quality.

EPA's Quality Program provides support to all EPA organizations that have environmental information operations described in an approved Quality Management Plan (QMP) in implementing EPA's Quality Program. In FY 2023, the Quality Program will:

- Assess organizations that have an approved QMP and identify findings requiring corrective action, areas needing improvement, and leveraging best practices.

- Focus on promoting sound science and ensure scientific integrity by promoting better planning to produce improved environmental information. Evaluate environmental information through use of the QA Annual Report and Work Plan and annual certification by Assistant and Regional Administrators.

- Manage and provide oversight for the IQGs to ensure that information disseminated by or for EPA conforms with the *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility and Integrity of Information Disseminated by the Environmental Protection Agency*[29] criteria. The Quality Program will facilitate the development of the Agency's responses to public requests for correction and reconsideration of information disseminated by EPA and report this information to the Office of Management and Budget (OMB). The Quality Program also will continue to focus on implementing recommendations from the Office of Inspector General (OIG) Audit Report, *EPA Needs to Address Internal Control Deficiencies in the Agencywide Quality System*.[30] The Program will give priority to implementation of revised Quality Directives for QMPs and Quality Assurance Project Plans, and the IQGs.

- Engage as a resource with EPA's state and tribal partners and environmental justice communities and support the Climate Change Program to ensure QA processes and procedures are in place to protect human health and the environment.

The Agency's S&T resources for IT/DM also will help provide library services through the EPA National Library Network to all EPA employees and environmental information access to the public, as well as support the hosting of EPA's websites and web pages. One EPA Web will continue to manage content and support internal and external users with information on EPA business, support employees with internal information, and provide a clearinghouse for the Agency to communicate initiatives and successes.

In FY 2023, EPA will work to transform the Agency's libraries to meet the needs of the 21st Century. This involves operating in an increasingly online and mobile environment; providing services and resources at the customer's point of need; prioritizing the thorough assessment of print materials to support strategic space usage; utilizing detailed data to ensure print collections are highly relevant to the Agency's needs and centralizing core services; and relying on technology and a team of professional librarians to disseminate information and connect people to resources they need to support the demands of both internal and external requests.

[29] For more information, please see: https://www.epa.gov/quality/guidelines-ensuring-and-maximizing-quality-objectivity-utility-and-integrity-information.
[30] For more information, please see: https://www.epa.gov/office-inspector-general/report-epa-needs-address-internal-control-deficiencies-agencywide-quality.

Performance Measure Targets:

EPA's FY 2023 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- (+$123.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to annual payroll increases, adjustments to provide essential workforce support, and changes to benefits costs. This change also includes program increases for critical IT infrastructure and data management programs.

Statutory Authority:

Reorganization Plan No. 3 of 1970, 84 Stat. 2086, as amended by Pub. L. 98–80, 97 Stat. 485 (codified at Title 5, App.) (EPA's organic statute); Federal Information Technology Acquisition Reform Act; Federal Information Security Modernization Act (FISMA); Government Performance and Results Act (GPRA); Government Management Reform Act (GMRA); Clinger-Cohen Act (CCA); Rehabilitation Act of 1973 § 508.

Operations and Administration

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Environmental Programs & Management	$257,524	$285,441	$288,293	$2,852
Science & Technology	***$65,093***	***$67,500***	***$68,912***	***$1,412***
Building and Facilities	$36,071	$27,076	$73,894	$46,818
Leaking Underground Storage Tanks	$932	$836	$724	-$112
Inland Oil Spill Programs	$628	$682	$641	-$41
Hazardous Substance Superfund	$81,976	$68,727	$71,219	$2,492
Total Budget Authority	$442,223	$450,262	$503,683	$53,421
Total Workyears	334.2	315.4	325.4	10.0

Total workyears in FY 2023 include 5.4 FTE to support Facilities Infrastructure and Operations working capital fund (WCF) services.

Program Project Description:

Science and Technology (S&T) resources in the Facilities Infrastructure and Operations Program fund the Agency's rent, utilities, and security. The Program also supports centralized administrative activities and support services, including health and safety, environmental compliance and management, facilities maintenance and operations, space planning, sustainable facilities and energy conservation planning and support, property management, mail, and transportation services. Funding for such services is allocated among the major appropriations for the Agency.

FY 2023 Activities and Performance Plan:

Work in this program provides Cross-Agency Mission and Science Support and is allocated across strategic goals and objectives in the *FY 2022 - 2026 EPA Strategic Plan*.

In FY 2023, the Agency requests an investment of approximately $1.4 million to support agencywide climate sustainability and resiliency initiatives and EPA facilities projects. EPA will continue to invest in the reconfiguration of EPA's workspaces, enabling the Agency to release office space and avoid long-term rent costs, consistent with HR 4465,[31] the *Federal Assets Sale and Transfer Act of 2016*. EPA is implementing a long-term space consolidation plan that aims to reduce the number of occupied facilities, consolidate and optimize space within remaining facilities, and reduce square footage wherever practical. EPA also will continue working to enhance its federal infrastructure and operations in a manner that increases efficiency. For FY

[31] For additional information, please refer to: https://www.congress.gov/bill/114th-congress/house-bill/4465, *Federal Assets Sale and Transfer Act of 2016*.

2023, the Agency is requesting $29.45 million for rent, $17.23 million for utilities, and $11.58 million for security in the S&T appropriation. EPA uses a standard methodology to ensure that rent charging appropriately reflects planned and enacted resources at the appropriation level.

EPA also will work to secure physical and operational resiliency for agency facilities. As part of this work, EPA will continue conducting climate resiliency assessments at all EPA-owned facilities to identify critical upgrades that are necessary to improve facility resiliency against the impacts of climate change, such as roofing stability or seawall construction projects. In FY 2023, EPA will conduct climate assessments at the following facilities: Cincinnati Test and Evaluation Facility, Duluth Environmental Center, Ada Gaar Corner, Ada Environmental Research Center, Region 10 Laboratory – Manchester. EPA will initiate all high-priority projects within 24 months of the completion of a climate assessment.

Further, EPA will continue reconfiguring EPA's workplaces with the goal of reducing long-term rent costs while increasing EPA facility sustainability to combat the effects of climate change and ensuring a space footprint that accommodates a growing workforce. Space reconfiguration enables EPA to reduce its footprint to create a more efficient, collaborative, and technologically sophisticated workplace. However, even if modifications are kept to a minimum, each move requires initial funding to achieve long-term cost avoidance and sustainability goals. These investments support sustainable federal infrastructure, a clean energy future, and goals to achieve net-zero emissions by 2050.

In FY 2023, EPA will pursue aggressive energy, water, and building infrastructure requirements with emphasis on environmental programs (e.g., Environmental Management Systems, Environmental Compliance Programs, Leadership in Energy and Environmental Design Certification, alternative fuel use, fleet reductions, telematics, sustainability assessments). This investment in infrastructure (e.g., architectural and design) and mechanical systems (e.g., electrical, water/steam, HVAC) is necessary to meet the Administration's climate sustainability goals. Additionally, in 2023, EPA will continue to transition to electric vehicles through direct purchase (mobile lab vehicles) or lease through General Services Administration (GSA) for all future fleet procurements where economically feasible. EPA also will identify opportunities to build out necessary charging infrastructure at EPA facility locations. EPA's goal is to use 100 percent carbon pollution-free electricity on a net annual basis by 2030.

EPA also will meet regulatory Occupational Safety and Health Administration (OSHA) obligations and provide health and safety training to field staff (e.g., inspections, monitoring, on-scene Coordinators), and track capital equipment of $25 thousand or more. The Agency will continue its partnership with GSA to utilize shared services solutions, *USAccess*, and Enterprise Physical Access Control System (ePACS) programs. *USAccess* provides standardized HSPD-12 approved Personal Identity Verification (PIV) card enrollment and issuance and ePACS provides centralized access control of EPA space, including restricted and secure areas.

Performance Measure Targets:

Work under this program supports performance results in the Facilities Infrastructure and Operations Program under the EPM appropriation.

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- (+$1,412.0) This net program change is an increase to support EPA facilities projects that will ensure EPA has optimal footprint to support the proposed FTE increase in the FY 2023 Budget request, continue ongoing EPA laboratory consolidation projects, and support agencywide climate sustainability and resiliency initiatives. This increase is partially offset by a decrease in rent, utilities, security, and transit subsidy needs.

Statutory Authority:

Federal Property and Administration Services Act; Reorganization Plan No. 3 of 1970, 84 Stat. 2086, as amended by Pub. L. 98-80, 97 Stat. 485 (codified at Title 5, App.) (EPA's organic statute).

Pesticides Licensing

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Environmental Programs & Management	$58,124	$60,181	$62,726	$2,545
Science & Technology	***$2,431***	***$2,803***	***$2,917***	***$114***
Total Budget Authority	$60,555	$62,984	$65,643	$2,659
Total Workyears	434.3	385.6	385.6	0.0

Total program work years in FY 2023 include 82.1 FTE funded by the Reregistration and Expedited Processing Revolving Fund.

Program Project Description:

EPA's Pesticide Program screens new pesticides before they reach the market and ensures that pesticides already in commerce are safe. As directed by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), the Federal Food, Drug, and Cosmetic Act (FFDCA), as amended by the Food Quality Protection Act of 1996 (FQPA), and the Pesticide Registration Improvement Extension Act of 2018 (PRIA 4),[32] EPA is responsible for registering and re-evaluating pesticides to protect consumers, pesticide users, workers who may be exposed to pesticides, children, and other sensitive populations. To make regulatory decisions and establish tolerances (*e.g.*, maximum allowable pesticide residues on food and feed) for food use pesticides and for residential or non-occupational use, EPA must find the pesticide safe. This involves considering cumulative and aggregate risks and ensuring extra protection for children as required by the FQPA. Aggregate assessments ensure that there is reasonable certainty that no harm will result from aggregate exposure to the pesticide chemical residue, including all anticipated dietary exposure and all other exposure for which there is reliable information. For cumulative assessments, the Agency is required to consider available information concerning the cumulative effects of such residues and other substances that have a common mechanism of toxicity. The Agency must balance the risks and benefits of other uses. For antimicrobial pesticides with public health claims, EPA requires that manufacturers perform tests to ensure the efficacy (*i.e.*, performance) of products per the labelling. In response to the ongoing COVID-19 pandemic and in anticipation of future public health emergencies, the Pesticide Program evaluates public health claims for antimicrobial products, including the accelerated availability of disinfectants determined to be effective against SARS-CoV-2 and development of study designs to support the generation of innovative products, including those that can reduce airborne transmission of the virus.

[32] On Friday, March 8, 2019, the Pesticide Registration Improvement Extension Act of 2018 (PRIA 4), which reauthorizes PRIA for 5 years through fiscal year 2023 and updates the fee collection provisions of the FIFRA, was signed into law.

Under the Science and Technology appropriation, this program operates two laboratories, the Microbiology Laboratory[33] and the Analytical Chemistry Laboratory,[34] that support the goal of protecting human health and the environment through diverse analytical testing, and analytical method development and validation efforts. These laboratories provide a variety of technical services to EPA, other federal and state agencies, tribal nations, and other organizations to protect human health from pesticide risk.

FY 2023 Activities and Performance Plan:

Work in this program directly supports Goal 7/Objective 7.1, Ensure Chemical and Pesticide Safety in the *FY 2022 – 2026 EPA Strategic Plan*.

The Microbiology Laboratory will continue to protect human health by ensuring the availability of scientifically sound efficacy test methods for antimicrobial pesticides (*e.g.*, hospital disinfectants used to treat surfaces). By developing new methods for new uses and emerging pathogens, the regulated community can register new products as well as new claims for existing products. These efforts will have an impact on the public because of the critical support the Laboratory provides to inform regulatory actions for public health pesticides, identify pathways for approval of pathogen-specific claims, and allow for marketplace penetration of these products.

Specifically, in FY 2023, the Microbiology Laboratory will:

- Complete the data collection, analysis, and development of regulatory guidance materials on a quantitative method that follows the Organization for Economic Cooperation and Development (OECD) quantitative method for bactericidal claims to support adoption of the method for regulatory purposes.
- Complete analysis of FY 2021-2022 multi-laboratory data and develop guidance materials and final method (through American Society for Testing and Materials [ASTM] review) for *Legionella* in recirculating water for cooling tower remediation.
- Issue prototype method and guidance for evaluating porous materials found in clinical and agricultural environments (e.g., room separation curtains, vinyl surfaces, wood, etc.)
- Provide efficacy testing and technical support for workplans for the Antimicrobial Product Evaluation Program (APEP) pursuant to EPA's response to the Office of the Inspector General (Report No. 16-P-0316).[35]
- Develop residual self-sanitizing disinfectant protocol (SARS-CoV-2) and collect multi-laboratory data to support regulatory use.
- Complete data analysis and development of final ASTM method (ASTM work item WK73519) and regulatory guidance document for evaluating the efficacy of antimicrobial towelettes.
- Continue to develop laboratory capacity for conducting efficacy testing with Biosafety Level 3 (BSL-3) microorganisms at the Environmental Science Center in Ft. Meade, Maryland. SARS-CoV-2 is a BSL-3 microorganism; EPA's Office of Pesticide Programs

[33] For additional information, please visit: https://www.epa.gov/aboutepa/about-microbiology-laboratory.
[34] For additional information, please visit: https://www.epa.gov/aboutepa/about-analytical-chemistry-laboratory-acl.
[35] *See*, Report No. 16-P-0316, "Report: EPA Needs a Risk-Based Strategy to Assure Continued Effectiveness of Hospital-Level Disinfectants," found at: https://www.epa.gov/office-inspector-general/report-epa-needs-risk-based-strategy-assure-continued-effectiveness.

has the only EPA laboratory with physical containment laboratories to manage BSL-3 microbes.

In FY 2023, the Analytical Chemistry Laboratory will continue to protect human health by ensuring the availability of appropriate analytical methods for analyzing pesticide residues in food and feed and ensuring their suitability for monitoring pesticide residues and enforcing tolerances. In addition, the Laboratory will:

- Develop improved analytical methods using state of the art instruments to replace outdated methods, thus increasing laboratory efficiency and accuracy of the data.
- Provide analytical support to fill in data gaps for the Pesticide Programs' risk assessments and for Section 18 emergency exemptions, and to perform studies for use in risk mitigation.
- Provide analytical assistance and technical advice to all regional offices in support of their enforcement cases, including cases against imported disinfectant products with false claims against SARS-CoV-2. This could disproportionately impact members of communities with environmental justice (EJ) concerns who might not speak English, who may be being targeted by illegal foreign imports, and who may not know to look for approved products (*i.e.*, List N products).
- Verify that pesticides are properly formulated (as requested).
- Operate EPA's National Pesticide Standard Repository.[36]

Preventing Disease through Public Health Pesticides: Antimicrobial Testing

EPA's Antimicrobial Testing Program (ATP) has been testing hospital sterilants, disinfectants, and tuberculocides since 1991 to help ensure that products in the marketplace meet stringent efficacy standards. EPA is in the process of developing a new risk-based testing strategy in response to OIG recommendations made in FY 2016.[37] Consistent with the OIG recommendations, EPA suspended the ATP in November 2017. EPA released a draft risk-based strategy, renamed the Antimicrobial Performance Evaluation Program (APEP), in October 2019 for public comment and will continue to seek public input prior to implementation as early as FY 2023. Implementation of the APEP will benefit public health by ensuring approved antimicrobials meet contemporary efficacy standards.

The Microbiology Laboratory will continue to develop efficacy methods to support EPA's antimicrobial pesticide regulatory programs. The results of these efforts will help ensure products are available to control various bacteria (*e.g.*, *Clostridioides difficile)*, viruses (*e.g.*, SARS-CoV-2), and biofilms and to inform EPA's method development activities in FY 2023 and beyond.

Performance Measure Targets:

Work under this program supports performance results in the Pesticides: Protect the Environment from Pesticide Risk Program under the EPM appropriation.

[36] For additional information, please visit: https://www.epa.gov/pesticide-analytical-methods/national-pesticide-standard-repository.
[37] For additional information, please visit: https://www.epa.gov/pesticide-registration/antimicrobial-performance-evaluation-program-apep.

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- (+$90.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to annual payroll increases, adjustments to provide essential workforce support, and changes to benefits costs.

- (-$90.0) This change to fixed and other costs is a decrease due to the recalculation of laboratory fixed costs.

- (+$114.0) This program change is an increase in laboratory Operations and Maintenance costs.

Statutory Authority:

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA); Federal Food, Drug, and Cosmetic Act (FFDCA), §408.

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Environmental Programs & Management	$36,714	$39,543	$45,876	$6,333
Science & Technology	***$1,805***	***$2,207***	***$2,252***	***$45***
Total Budget Authority	$38,519	$41,750	$48,128	$6,378
Total Workyears	322.1	249.6	259.6	10.0

Total program work years in FY 2023 include 53.2 FTE funded by the Reregistration and Expedited Processing Revolving Fund.

Program Project Description:

EPA's Pesticide Program screens new pesticides before they reach the market and ensures that pesticides already in commerce are safe. As directed by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), the Federal Food, Drug, and Cosmetic Act (FFDCA), as amended by the Food Quality Protection Act of 1996 (FQPA), and the Pesticide Registration Improvement Extension Act of 2018 (PRIA 4),[38] EPA is responsible for registering and re-evaluating pesticides to protect humans and plants, animals, and ecosystems that are not targets of the pesticide. Under FIFRA, the Agency must balance the risks and benefits of other uses. For antimicrobial pesticides with public health claims, EPA requires that manufacturers perform tests to ensure the efficacy (*i.e.*, performance) of products per the labelling.

In addition to FIFRA responsibilities, the Agency has responsibilities under the Endangered Species Act (ESA).[39] Under ESA, EPA must ensure that pesticide regulatory decisions will not destroy or adversely modify designated critical habitat or result in jeopardy to the continued existence of species listed by the U.S. Fish and Wildlife Service (FWS) or the National Marine Fisheries Service (NMFS). Where risks are identified, EPA must work with FWS and NMFS in a consultation process to ensure these pesticide registrations also will meet the ESA standard.

Under the Science and Technology appropriation, EPA's Pesticide Program operates two laboratories, the Microbiology Laboratory[40] and the Analytical Chemistry Laboratory,[41] that support the goal of protecting human health and the environment through diverse analytical testing, and analytical method development and validation efforts. These laboratories provide a variety of technical services to EPA, other federal and state agencies, tribal nations, and other organizations

[38] On Friday, March 8, 2019, the Pesticide Registration Improvement Extension Act of 2018 (PRIA 4), which reauthorizes PRIA for 5 years through fiscal year 2023 and updates the fee collection provisions of the FIFRA was signed into law.
[39] *See*, ESA sections 7(a)(1) and 7(a)(2); Federal Agency Actions and Consultations (16 U.S.C. § 1536(a)), available at the U.S. Fish and Wildlife Service ESA internet site: https://www.fws.gov/service/section-7-consultations.
[40] For additional information, please visit: https://www.epa.gov/aboutepa/about-microbiology-laboratory.
[41] For additional information, please visit: https://www.epa.gov/aboutepa/about-analytical-chemistry-laboratory-acl.

to ensure the protection of the environment from pesticide risk. Laboratory activities in FY 2023 will include; continuing to lead collaborative studies with other laboratories to validate testing methods for antimicrobial products to determine their efficacy against pathogens such as *Legionella*; working with the Antimicrobials Division on the implementation of an appropriate performance standard for a revised method for measuring the efficacy of disinfectants quantitatively; working with state laboratories to share method development and analyze samples, as requested; and working with investigations to evaluate the composition of potentially illegal pesticides.

EPA's Pesticide Program laboratories provide a diverse range of environmental data that the Agency uses to make informed regulatory decisions. The Analytical Chemistry Laboratory and the Microbiology Laboratory each provide critical laboratory testing and support activities to assist the decision-making processes of the Agency. The laboratories develop standard methods to evaluate the performance of antimicrobial products such as disinfectants used in hospital settings, and validate analytical chemistry methods to ensure that EPA, the Food and Drug Administration (FDA), the United States Department of Agriculture (USDA), and the states have reliable methods to measure and monitor pesticide residues in food and the environment.

FY 2023 Activities and Performance Plan:

Work in this program directly supports Goal 7/Objective 7.1, Ensure Chemical and Pesticide Safety in the *FY 2022 – 2026 EPA Strategic Plan*.

In FY 2023, the Microbiology Laboratory will continue to work with the U.S. Department of Homeland Security and USDA to evaluate various environmentally relevant materials such as porous materials (*e.g*., wood, concrete, fabric, tile, etc.) which simulate use sites in livestock, poultry, and other food animal rearing operations. Outbreaks of avian influenza, African swine fever, Newcastle Disease virus, and other pathogens can devastate American agriculture, and the persistence of these viruses on surfaces is not well understood. Currently, due to the unavailability of standardized quantitative test methods to simulate real-world conditions, the response to an animal pathogen outbreak and submission of requests under FIFRA Section 18 to address these outbreaks rely on published, and often antiquated, data. Thus, the use of commonly available chemicals for remediation (e.g., citric acid, sodium hypochlorite, chlorine dioxide, etc.) of contaminated sites without extensive knowledge of their environmental impact from such widespread use is deemed problematic. The goal of the Laboratory is to develop a quantitative approach for assessing the effectiveness of antimicrobial products against high consequence animal viruses and other pathogens to provide a tool for the development of high-quality efficacy data on relevant surface materials. The availability of the method to the regulated community will support more effective, targeted chemistries and refined antimicrobial application techniques for porous materials and support the development of new antimicrobial products following contemporary regulatory requirements.

In FY 2023, the Analytical Chemistry Laboratory will continue to focus on analytical method development and validations as well as special studies to address specific, short-term, rapid-turnaround priority issues. The Laboratory also will continue to provide technical and analytical assistance to EPA's Enforcement and Compliance Assurance Program and regional offices in

support of their enforcement/complaint cases, including analysis of dicamba and its metabolites in soil and vegetation samples and analysis of products sold in online commerce. The Analytical Chemistry Laboratory also will continue to provide national technical analytical support for the development of data needed for the Pesticides Program's risk assessments and for Section 18 emergency exemptions, and to perform studies for use in risk mitigation.

Performance Measure Targets:

Work under this program supports performance results in the Pesticides: Protect the Environment from Pesticide Risk Program under the EPM appropriation.

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- (+$57.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs due to annual payroll increases, adjustments to provide essential workforce support, and changes to benefits costs.

- (-$32.0) This change to fixed and other costs is a decrease due to the recalculation of laboratory fixed costs.

- (+$20.0) This program change is a slight increase in laboratory Operations and Maintenance costs.

Statutory Authority:

Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); Endangered Species Act (ESA).

Pesticides: Realize the Value of Pesticide Availability

Program Area: Pesticides Licensing
Goal: Ensure Safety of Chemicals for People and the Environment
Objective(s): Ensure Chemical and Pesticide Safety

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Environmental Programs & Management	$6,034	$7,730	$7,979	$249
Science & Technology	***$645***	***$876***	***$984***	***$108***
Total Budget Authority	$6,680	$8,606	$8,963	$357
Total Workyears	35.3	35.8	35.8	0.0

Program Project Description:

EPA's Pesticide Program laboratories provide significant contributions to help the Agency realize the value of pesticides. They consist of the Microbiology Laboratory[42] and the Analytical Chemistry Laboratory,[43] that support the goal of protecting human health and the environment through diverse analytical testing and analytical method development, and validation efforts. These laboratories provide a variety of technical services to EPA, other federal and state agencies, tribal nations, and other organizations to ensure the value of pesticide availability is realized.

The primary focus of the Microbiology Laboratory is standardization of existing test methods and the development and validation of methods for new uses and emerging pathogens for antimicrobial products with public health claims – products used to kill or suppress the growth of pathogenic microorganisms on inanimate objects and surfaces. The Laboratory is instrumental in advancing the science of antimicrobial product testing and provides technical expertise to standard-setting organizations and various agency stakeholder groups.

The Analytical Chemistry Laboratory provides scientific, laboratory, and technical support through chemical analyses of pesticides and related chemicals to protect human health and the environment. The Analytical Chemistry Laboratory responsibilities include providing technical support and chemical analyses of pesticides and related chemicals; developing new multi-residue analytical methods; and operating EPA's National Pesticide Standard Repository,[44] which collects and maintains pesticide standards (*i.e.*, samples of pure active ingredients or technical grade active ingredients, regulated metabolites, degradates, and related compounds).

[42] For additional information, please visit: https://www.epa.gov/aboutepa/about-microbiology-laboratory.
[43] For additional information, please visit: https://www.epa.gov/aboutepa/about-analytical-chemistry-laboratory-acl.
[44] For additional information, please visit: https://www.epa.gov/pesticide-analytical-methods/national-pesticide-standard-repository.

FY 2023 Activities and Performance Plan:

Work in this program directly supports Goal 7/Objective 7.1, Ensure Chemical and Pesticide Safety in the *FY 2022 – 2026 EPA Strategic Plan*.

In FY 2023, EPA will realize the benefits of pesticides by ensuring the continued operation of the National Pesticide Standard Repository. The Microbiology Laboratory and the Analytical Chemistry Laboratory will continue to conduct chemistry and efficacy evaluations for antimicrobials. As the recognized source for expertise in pesticide analytical method development, EPA's Pesticide Program laboratories will continue to provide quality assurance review, technical support, and training to EPA's regional offices, state laboratories, and other federal agencies that implement the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

The Analytical Chemistry Laboratory will continue to maintain the National Pesticide Standard Repository and collect and maintain an inventory of analytical standards of registered pesticides in the U.S. EPA provides these pesticide standards (approximately 4,000 to 5,000 annually) to qualified federal, state, territorial, and tribal laboratories for food and product testing and environmental monitoring. In FY 2018, efficiency reviews showed that the typical turnaround time for a standard request was approximately 15 working days. Using the results of the efficiency review, the Analytical Chemistry Laboratory is implementing procedural changes, such as requiring requests be grouped for pesticide standards, instituting an inventory control system focusing on high demand standards, and installing a chemist as the lead staff person in the Repository to reduce the turnaround time to 12 days.[45] These initial changes will help federal agencies, states, and tribal laboratories expedite enforcement efforts, and further process enhancements will continue in FY 2023 and beyond. The Analytical Chemistry Laboratory also will continue its work in:developing and validating multiresidue methods using state-of-the-art methodology and instrumentation; providing chemical analysis for assessing risk to human health and to the environment from agricultural use of pesticides; and providing technical support to EPA regional offices to ensure that pesticide products are formulated according to approved labels.

In FY 2023, the Microbiology Laboratory will continue to evaluate FIFRA Section 18 emergency exemptions and novel protocol requests for new uses and novel pathogens. The Laboratory also will continue the development of data and methods to support Section 18 for high consequence animal pathogens (e.g., African swine fever, Newcastle disease virus, etc.). In addition, the continued work to develop new methods for emerging pathogens (e.g., *Legionella*, *Candida auris,* etc.) and clinical porous materials provides a pathway for registrants to add new claims to existing antimicrobial pesticides. In some cases, the methods will lead to the development of new products when currently registered formulations are not effective against emerging pathogens. The Laboratory anticipates supporting up to 25 requests for these activities during FY 2023. The Microbiology Laboratory also will continue to refine and develop methods to support EPA's Section 3 and Section 18 regulatory programs, continuing to develop testing methods for evaluating effectiveness of disinfectant products against airborne SARS-CoV-2 virus. In addition, the Laboratory will collaborate with EPA's Homeland Security Research Program to develop guidance for registrants seeking to make long-term disinfectant efficacy claims and explore novel control and application options for disinfectant products. The Laboratory also will continue to

[45] For those pesticide standard requests that are not complicated and/or standards that are not expiring.

develop a quantitative efficacy test method which may provide a pathway for evaluating disinfectant claims for porous material (vinyl, room divider curtains, etc.)

Performance Measure Targets:

Work under this program supports performance results in the Pesticides: Protect the Environment from Pesticide Risk Program under the EPM appropriation.

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- (+$45.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs due to annual payroll increases, adjustments to provide essential workforce support, and changes to benefits costs.

- (-$73.0) This change to fixed and other costs is a decrease due to the recalculation of rent, utilities, and security.

- (+$136.0) This program change is an increase in laboratory Operations and Maintenance costs.

Statutory Authority:

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA); Federal Food, Drug, and Cosmetic Act (FFDCA) § 408.

Research: Air, Climate and Energy

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Science & Technology	***$76,733***	***$95,250***	***$132,924***	***$37,674***
Total Budget Authority	$76,733	$95,250	$132,924	$37,674
Total Workyears	265.6	258.0	297.7	39.7

Program Project Description:

Air pollution adversely affects human health and the environment, yet millions of Americans still live in or near geographic areas that do not meet national standards for air pollutants. Climate change is impacting public health, air, and water quality today and will exacerbate other environmental challenges in the future. Many air pollution sources are located communities with environmental justice concerns that also are more vulnerable to the impacts of climate change. To address these and other air pollution issues, EPA's Air, Climate, and Energy (ACE) Research Program provides scientific information to EPA program and regional offices, tribes, states, and other partners. ACE advances the science needed to achieve clean air, attain the National Ambient Air Quality Standards (NAAQS),[46] reduce emissions of hazardous air pollutants (HAPs), address the causes and consequences of climate change and environmental inequities, and develop more resilient communities to protect human health and ecosystems. ACE also contributes to understanding the impacts of interventions that reduce exposures and protect public health; strategies to prepare, adapt, and build resilience; and responses to the transformation of our energy systems.

The ACE Research Program is centered around two inter-related research topic areas: 1) understanding air pollution and climate change and their impacts on human health and ecosystems; and 2) responding to risks and impacts and preparing for the future. The ACE Research Program relies on successful partnerships, including with academic and industry researchers, tribes, states, local and private sector organizations, as well as key federal agencies.

Recent Accomplishments of the ACE Research Program include:[47]

- **Informing Ozone Attainment Strategies:** In FY 2021, EPA researchers produced scientific data from measurements and modeling of ozone formation and transport in two

[46] Section 109 of the Clean Air Act identifies two types of national ambient air quality standards – primary standards provide public health protection, including protecting the health of "sensitive" populations such as children, older adults, and persons with pre-existing disease such as asthma or cardiovascular disease and secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, wildlife, soils, water, crops, vegetation, and buildings. Unless otherwise stated, in this document the term NAAQS will refer to both primary and secondary standards.
[47] For more information, please see https://www.epa.gov/research/national-research-programs.

difficult non-attainment areas, Connecticut and Denver.[48] The research demonstrated how the combination of local emissions controls and a better understanding of ozone transport from outside a non-attainment area are needed to effectively reduce ozone concentrations within a non-attainment area. EPA researchers also used a detailed hemispheric air quality model to improve estimates of the contributions of long-range transport of ozone from outside North America to ozone concentrations in the U.S., demonstrating an increase in this contribution over the period from 1990-2010.

- **Climate Change Impacts and Adaptation Planning Tools**: Climate change continues to impact U.S. communities through extreme heat and precipitation, flooding, and drought. With heat waves and droughts increasing the size and severity of wildfires, EPA researchers improved emissions factors for different types of fire conditions, including those occurring during prescribed fires.[49] EPA researchers collaborated with scientists from the U.S. Forest Service and the Department of Interior to publish the *Comparative Assessment of the Impacts of Prescribed Fire Versus Wildfire*, which used integrated modeling of smoke emissions, air quality, and health impacts to demonstrate that in two case studies, well-designed prescribed fires can potentially reduce the overall size of a subsequent wildfire and reduce smoke emissions and public health impacts.[50] In FY 2021, EPA researchers also published a methodology for quantifying potential changes in future extreme precipitation from climate projections and applied it to estimate significant increases in the highest rainfall frequencies, up to 168 percent for 1,000-year rainfall events, and widespread regional increases in total rainfall up to 44 percent from a single tropical storm.[51]

- **PFAS:** States and communities continue to be concerned with the production and disposal of materials containing perfluoroalkyl and polyfluoroalkyl substances (PFAS) and the associated air emissions of PFAS. EPA is committed to conducting research to better understand PFAS exposure pathways and understand the effects of PFAS treatment and destruction technologies, including air emissions from incomplete combustion of PFAS during incineration as a means of destroying PFAS waste.[52] In FY 2021, EPA researchers published a review of air sources and pathways for PFAS exposures[53] and produced a draft method (Other Test Method 45) that is suitable for 50 targeted PFAS compounds.[54] This method provided guidance to states and communities for establishing in-stack emissions method detection limits and quantitative reporting limits and can be expanded to new target PFAS compounds as new standards become available.

[48] For more information, please see: https://www.cmascenter.org/conference/2020/slides/Matichuketal_19thAnnual_CMAS_Presentation_Oct28th_2pmSession.pdf
[49] For more information, please see: https://www.sciencedirect.com/science/article/pii/S135223102100011X?via%3Dihub
[50] For more information, please see: https://ofmpub.epa.gov/eims/eimscomm.getfile?p_download_id=543347
[51] For more information, please see: https://www.nature.com/articles/s41612-021-00176-9
[52] For more information, please see: https://www.epa.gov/system/files/documents/2021-10/pfas-roadmap_final-508.pdf
[53] For more information, please see: https://intranet.ord.epa.gov/sites/default/files/2021-08/JEH1-2.21-Special-Report-Review-Source-Transportation-Pathways.pdf
[54] For more information, please see: https://www.epa.gov/sites/default/files/2021-01/documents/otm_45_semivolatile_pfas_1-13-21.pdf

FY 2023 Activities and Performance Plan:

Work in this Program provides Cross-Agency Mission and Science Support and is allocated across strategic goals and objectives in the *FY 2022-2026 EPA Strategic Plan*.

The ACE Research Program prioritizes key activities to support attainment of the NAAQS and implementation of stationary and mobile source regulations, as well as foundational science to inform decision making with consideration of increasing climate change impacts. The ACE Research Program includes work to develop, evaluate, and apply measurement methods and models incorporating the latest physical science and understanding of behaviors that impact the system. The research performed addresses program and regional science information needs across multiple disciplines. The research conducted also advances EPA's capabilities to understand sources of air pollution, the fate and transport of air contaminants, and their effects in the midst of changing energy infrastructure and climate. The planned research responds to identified needs in areas of emerging concern to the Administration, EPA, tribes, and state policymakers, including climate change, environmental justice and equity, PFAS, ethylene oxide, and wildland fires.

In FY 2023, the ACE Research Program will continue to:

- Assess human and ecosystem exposures and effects associated with air pollutants on individual, community, regional, national, and global scales, both today and in the future, under a changing climate.[55]

- Assess the consequences of climate change and the vulnerability of communities and ecosystems to climate change impacts, including wildfires and other extreme events, and identify and evaluate strategies to adapt to and build resilience to these impacts.

- Characterize disproportionate impacts of climate change and air pollution on communities with environmental justice concerns and identify and evaluate strategies to reduce impacts in those communities.

- Develop and evaluate innovative multi-pollutant and sector-based approaches to preventing pollution, particularly in environmental justice communities.

- Characterize the positive and negative environmental effects of energy efficiency and renewable energy and evaluate strategies to expand the benefits of transformations in transportation and energy systems, especially for communities with environmental justice concerns.

- Provide human exposure and environmental modeling, monitoring, metrics, and information needed to inform air quality and climate change decision making at the federal, tribal, state, and local level.

[55] Beyond effects associated with ambient air exposures, consideration of potential human and ecosystem exposures and effects associated with deposition of air pollutants to water and land also are evaluated.

- Deliver state-of-the-art tools that tribes and states can use to identify effective emission reduction strategies to meet the NAAQS and enhance air quality measurement and modeling methods to ascertain current and future compliance with the NAAQS, including potential impacts from the changing climate.

- Develop and apply approaches to evaluate the positive and negative environmental impacts of the transition to a low-carbon energy system, including development of a report to Congress on the environmental and resource conservation impacts of the Renewable Fuel Standard.[56]

In FY 2023, EPA will invest additional funds to expand the Administration's science-based approach to improving wildfire readiness by enhancing wildfire data and communications related to air quality and helping communities become "smoke ready". Smoke ready communities benefit community health by coordinating community-level action related to monitoring outdoor air quality, creating clean indoor air, and communicating actionable public health messaging. Smoke ready communities have evidence-based strategies in place to guide responses to wildfire smoke events, which include actions that people can take to reduce exposures to harmful smoke, preventing health impacts such as asthma attacks, emergency room visits, heart attacks, and premature death.

EPA also will invest additional funds to increase PFAS research efforts with specific emphasis on implementing the *PFAS Strategic Roadmap*.[57]

Research Planning:

EPA research is built around six integrated and transdisciplinary research programs. Each of the six programs is guided by a Strategic Research Action Plan (StRAP) that is developed with and reflects the research needs of Agency programs and regional offices, states, and tribes. Each research program is in the process of developing the fourth generation of the StRAPs, which will continue the practice of conducting innovative scientific research aimed at solving the problems encountered by the Agency and its partners.

The Office of Research and Development (ORD) works with various groups, including communities, to ensure the integrity and value of its research through a variety of mechanisms that include:

- EPA's Board of Scientific Counselors (BOSC)
    - ORD meets regularly with this committee, which provides advice and recommendations to ORD on technical and management issues of its research programs.

[56] Required by the Energy Independence and Security Act of 2007, PL110-140. For more information, please see: https://www.epa.gov/laws-regulations/summary-energy-independence-and-security-act. More information about the report is available at: https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=IO&dirEntryId=341491.

[57] See EPA's PFAS Strategic Roadmap at: https://www.epa.gov/system/files/documents/2021-10/pfas-roadmap_final-508.pdf

- State Engagement
  - EPA's state engagement[58] is designed to inform states about their role within EPA and EPA's research programs and to better understand the science needs of state environmental and health agencies.

- Tribal Partnerships
  - Key tribal partnerships are established through the Tribal Science Program, which provides a forum for the interaction between tribal and Agency representatives. These interactions identify research of mutual benefit and lead to collaborations on important tribal environmental science issues.

Performance Measure Targets:

(PM RD2) Number of ORD activities related to environmental justice that involve or are designed to be applicable to tribes, states, territories, local governments, and communities.	**FY 2022 Target**	**FY 2023 Target**
	No Target Established	TBD

(PM RD3) Percentage of ORD climate-related research products meeting partner needs.	**FY 2022 Target**	**FY 2023 Target**
	93	94

(PM RD4) Percentage of ORD environmental justice-related research products meeting partner needs.	**FY 2022 Target**	**FY 2023 Target**
	93	94

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- (+$2,346.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to annual payroll increases, adjustments to provide essential workforce support, and changes to benefits costs.

- (+$37.0) This change to fixed and other costs is an increase due to the recalculation of laboratory fixed costs.

- (-$30,030.0) This program change is a decrease due to the reduction in resources towards the Air, Climate, and Energy Research Program's collaborative research on climate adaptation and resilience with the new Advanced Research Projects Agency for Climate (ARPA-C) that will be located within DOE. The ARPA model of high-risk, accelerated research is uniquely meant to conduct R&D that, if successful, results in transformational technology advancements.

- (+$60,446.0 / +30.0 FTE) This net program change increases resources and FTE for the Air, Climate, and Energy Research Program. This increase is targeted to EPA's commitment to enhance its efforts to combat climate change. This increase will more than double its research to assess the impacts of climate change on human health and ecosystems. This investment includes $5.411 million in payroll.

[58] For more information, please see: https://www.epa.gov/research/epa-research-solutions-states.

- (+$4,625.0 / +9.7 FTE) This program change increases resources and FTE for wildfires research. This increase is targeted to improve wildfire readiness by enhancing wildfire data and communications related to air quality and helping communities become "smoke ready." This investment also includes $1.75 million in payroll.

- (+$250.0) This program change increases funding for EPA's PFAS research efforts, with specific emphasis on implementing the *PFAS Strategic Roadmap.*

Statutory Authority:

Clean Air Act; Title II of Energy Independence and Security Act of 2007; Environmental Research, Development, and Demonstration Authorization Act (ERDDAA); National Environmental Policy Act (NEPA) § 102; Pollution Prevention Act (PPA); Global Change Research Act of 1990.

Research: Chemical Safety and Sustainability

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Environmental Programs & Management	$115	$0	$0	$0
Science & Technology	***$75,966***	***$89,518***	***$98,093***	***$8,575***
Hazardous Substance Superfund	$6,065	$0	$8,060	$8,060
Total Budget Authority	$82,146	$89,518	$106,153	$16,635
Total Workyears	278.1	273.9	300.9	27.0

Program Project Description:

EPA's Chemical Safety for Sustainability (CSS) Research Program provides scientific and technical approaches, information, tools, and methods to support the Agency and others to make better-informed, more-timely decisions about chemicals and their potential risks to human health and the environment.[59] CSS products strengthen the Agency's ability to use the best available science to evaluate and predict human health and ecological impacts from the use, reuse, recycling, and disposal of manufactured and naturally occurring chemicals and their by-products.

CSS research informs Agency decisions about chemicals, accelerates the pace of chemical assessment and decision-making, and helps to replace, reduce, and refine the use of mammals to evaluate chemical risks to ecological systems and human health. CSS products inform Agency programs established to implement environmental regulations that govern agency actions to evaluate existing and new chemicals (Toxic Substances Control Act [TSCA]); develop and use alternative testing protocols (TSCA, Federal Insecticide Fungicide and Rodenticide Act [FIFRA]); protect the Nation's food supply (Food Quality Protection Act [FQPA]), address product safety (Federal Food Drug Cosmetics Act [FFDCA]), support chemical prioritization (TSCA, Safe Drinking Water Act [SDWA]), support the development of safer and more sustainable chemicals and alternatives (Pollution Prevention [P2] Act [PPA]), evaluate pesticide registrations (FIFRA, Endangered Species Act), and mitigate active (Resource Conservation and Recovery Act [RCRA]) and inactive (Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA]) Superfund remediation sites.

CSS research activities are coordinated with the activities of other national research programs and the results produced inform other high priority research topics. For example, planned research will address per- and polyfluoroalkyl substances (PFAS), climate change, and risks in communities with environmental justice (EJ) concerns. Coordination with the Health and Environmental Risk Assessment (HERA) Research Program ensures that the approaches, tools, and information

[59] For the current CSS StRAP, please see: https://www.epa.gov/research/chemical-safety-sustainability-strategic-research-action-plan-2019-2022.

produced by CSS can be used to improve chemical risk assessments, reduce uncertainties associated with those assessments, and increase the speed of delivering chemical information to the Agency.

The CSS Research Program is organized into eight, integrated research areas that include research on toxicity, exposure, human health, ecological health, chemical modeling and prediction, and chemical integration and informatics. These research areas fulfill requirements for chemical evaluation under TSCA as amended by the Frank R. Lautenberg Chemical Safety for the 21st Century Act and as part of SDWA; pesticide evaluation under FIFRA; chemical testing for endocrine system impacts under FQPA; Agency implementation of TSCA Section 5 (New Chemicals) and Section 6 (Existing Chemicals); the development of safer and more sustainable chemicals and alternatives under PPA and TSCA, and identification of contaminants of emerging concern. The CSS Research Program provides ongoing support to the Agency's Chemical Safety and Pollution Prevention Program for the successful implementation of these TSCA activities, as well as their evaluation of pesticides under FIFRA.[60]

Recent Accomplishments of the CSS Research Program include:

- **Development and Advancement of New Approach Methods (NAMs):** CSS objectives and research activities are strongly supporting the development of NAMs that will improve the Agency's understanding of chemical toxicity. NAMs are focused on using faster, less expensive approaches that reduce the use of mammals for toxicity testing. CSS continues to collaborate closely with the Chemical Safety and Pollution Prevention Program to implement the June 2018 TSCA Strategic Plan[61] that emphasizes the development and implementation of alternative test methods. Additionally, CSS research is a key component of the December 2021 NAMs workplan.[62] Critical to this effort is implementation of a tiered hazard evaluation strategy. CSS investigators are currently advancing methods in high-throughput phenotypic profiling (HTPP) and high-throughput transcriptomics (HTTr). These approaches can be applied to prioritize and group chemicals. Additionally, investigators are exploring approaches and models for species extrapolation in the ecotoxicology domain, and development of high-throughput exposure and toxicokinetic models. In May of 2021, in an EPA report,[63] CSS research enabled development of a method, to integrate publicly available hazard, exposure, persistence, and bioaccumulation information for more than 33,000 chemical substances, including both traditional and NAM data. The method allows for discriminating between chemicals that have the potential to present hazard or exposure concerns and those that do not.

- **Continued Release, Evolution, and Updating of Multiple Digital Information Products to Inform Decision Making:** The *CompTox Chemicals Dashboard*[64] is the Agency's 'first-stop-shop' for information on chemical properties, characteristics, structure, toxicity, exposure, and persistence. The *Dashboard* is used by the Agency and

[60] For more information, please see: https://www.epa.gov/chemical-research.
[61] For more information, please see: https://www.epa.gov/sites/production/files/2018-06/documents/epa_alt_strat_plan_6-20-18_clean_final.pdf.
[62] For more information, please see: https://www.epa.gov/chemical-research/new-approach-methods-work-plan.
[63] For more information, please see: https://cfpub.epa.gov/si/si_public_pra_view.cfm?dirEntryID=349776&Lab=CCTE
[64] For more information, please see: https://comptox.epa.gov/dashboard.

its external partners to generate real-time quantitative structure-activity relationship (QSAR) predictions for chemical property and toxicity endpoints. It allows for flexible searches including chemical and functional use and has batch search functionality. As of the June 2021 release, the *Dashboard* contains curated data on 900,000 chemicals. The *ECOTOX Knowledgebase*[65] serves as the comprehensive, publicly available source of environmental toxicity data on aquatic life, terrestrial plants, and wildlife. The March 2021 release of the ECOTOX Knowledgebase contains over 1 million records and provides information on over 12,000 chemicals and over 13,000 species from over 50,000 references. The *Chemical Transformation Simulator* continues to develop as a web-based tool for predicting environmental and biological transformation pathways for organic chemicals. Recently, the *Simulator* was expanded to include environmental transformation information for PFAS chemicals. *SeqAPASS*[66] – Sequence Alignment to Predict Across Species Susceptibility – is a tool enabling extrapolation of toxicity information across species. Version 5.0, released in December 2020, features improved functionalities and visualization of results. Research and development for all these systems continues in order to meet the information needs of decision makers.

FY 2023 Activities and Performance Plan:

Work in this Program provides Cross-Agency Mission and Science Support and is allocated across strategic goals and objectives in the *FY 2022-2026 EPA Strategic Plan*.

The objective of CSS research activities is to inform risk-based decisions made by EPA programs, states, tribes, and others. Of particular importance are 'chemicals of immediate and emerging concern,' such as PFAS, which heighten the need for rapid scientific approaches to evaluate potential chemical safety. In FY 2023, CSS will invest additional funds in PFAS research efforts, with specific emphasis on implementing the *PFAS Strategic Roadmap*.[67] CSS also will increase its efforts to conduct research and reviews on scientifically sound EPA-initiated existing chemical risk evaluations in support of TSCA.

In FY 2023, research efforts also will focus on replacing, reducing, and refining the use of mammals in testing, while accelerating the pace of chemical assessment and decision-making. CSS research products will continue to use innovative *in vitro* and *in silico* (computer modeling) approaches to provide more timely and comprehensive information about chemical hazard and exposure while still providing information of equal or greater biological predictivity than current *in vivo* animal models.

Selected research areas are highlighted below for work in FY 2023.

- **High-Throughput Toxicity (HTT) Testing:** This research is focused on developing, testing, and applying NAMs to evaluate chemical hazards, with an emphasis on developmental neurotoxicology, inhalation toxicology, thyroid disruption, and

[65] For more information, please see: https://cfpub.epa.gov/ecotox/.
[66] For more information, please see: https://www.epa.gov/chemical-research/sequence-alignment-predict-across-species-susceptibility.
[67] See EPA's PFAS Strategic Roadmap at: https://www.epa.gov/system/files/documents/2021-10/pfas-roadmap_final-508.pdf

methodologically challenging chemicals. These will enable EPA to make better, more timely decisions about chemicals by increasing toxicological information for more chemicals.

- **Rapid Exposure and Dosimetry (RED) and Ecotoxicological Assessment and Modeling (ETAM):** This research parallels work in the HTT research area to provide information to inform Agency chemical risk assessment activities. Chemical exposure research also includes the continued development of advanced analytical and computational tools, such as non-targeted analysis, to detect and identify unknown chemicals in complex environmental media, biological media, and consumer products. Non-targeted analysis has been critical for the identification of previously unknown PFAS chemicals in the environment. Ecotoxicological Assessment and Modeling efforts support the Agency's work considering the impacts to pollinators. Specifically, research includes assessing the impacts of pesticides on honeybees and pollen bees to support pesticide assessments.

- **PFAS Research:**[68] PFAS are a class of substances of concern and EPA is committed to helping states, tribes, and local communities understand and manage risks associated with these chemicals.[69] For most of the over 6,000 PFAS chemicals, there are little or no published toxicity data available. CSS is addressing this gap by conducting high-throughput toxicological screening assays on hundreds of PFAS chemicals. In FY 2023, CSS will build upon the research foundation formed from completed work outlined in the *PFAS Strategic Roadmap*.[70] For more information on CSS' PFAS work, please see the CSS narrative for the Superfund appropriation.

- **Improved Understanding of Biological Impacts:** This research helps decision-makers understand the significance of chemical impacts on biological systems. This is especially important to understanding chemical impacts on developmental and reproductive biology. This program will employ data generated from its chemical evaluation research to develop interpretive frameworks and models to place complex information into biological, chemical, and toxicological context. Data developed in the HTT and Virtual Tissue Modeling research areas will contribute to the study of adverse outcome pathways (AOPs), which link molecular initiating events at the cellular level to apical outcomes expressed at the whole animal level.

- **Delivery of Chemical Information:** The Chemical Safety Analytics research area will continue to provide computational, predictive tools to estimate physicochemical, toxicological, and exposure information for data poor chemicals. CSS is working with the Agency to build program-specific applications, such as RapidTox that facilitate access and use of relevant information to support different decision contexts. These applications will give risk assessors and decision-makers confidence that the new approaches, data, and tools

[68] For more information, please see: https://www.epa.gov/sites/production/files/2019-02/documents/pfas_action_plan_021319_508compliant_1.pdf.
[69] For more information, please see: https://www.epa.gov/pfas/pfas-community-engagement.
[70] For more information, please see: https://www.epa.gov/pfas/pfas-strategic-roadmap-epas-commitments-action-2021-2024

developed in CSS are both scientifically robust and relevant to environmental decision making.

Research Planning:

EPA research is built around six integrated and transdisciplinary research programs. Each of the six programs is guided by a Strategic Research Action Plan (StRAP) that reflects the research needs of Agency program and regional offices, states, and tribes, and is planned with their active involvement. Each research program is in the process of developing the fourth generation of the StRAPs, which will continue the practice of conducting innovative scientific research aimed at comprehensively assessing and solving the problems encountered by the Agency and its stakeholders.

EPA works with various groups, including communities, to ensure the integrity and value of its research and research planning efforts through a variety of mechanisms that include:

- EPA's Board of Scientific Counselors (BOSC)
  - The Office of Research and Development (ORD) meets regularly with this committee, which provides advice and recommendations to ORD on technical and management issues of its research programs.

- State Engagement
  - EPA's state engagement[71] is designed to inform states about their role within EPA and EPA's research programs, and to better understand the science needs of state environmental and health agencies.

- Tribal Partnerships
  - Key tribal partnerships are established through the Tribal Science Program which provides a forum for the interaction between tribal and Agency representatives. These interactions identify research of mutual benefit and lead to collaborations on important tribal environmental science issues.

Performance Measure Targets:

(PM RD1) Percentage of ORD research products meeting partner needs.	**FY 2022 Target**	**FY 2023 Target**
	93	94

(PM RD5) Number of actions implemented for EPA scientific integrity objectives.	**FY 2022 Target**	**FY 2023 Target**
	No Target Established	21

[71] For more information, please see: https://www.epa.gov/research/epa-research-solutions-states.

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- (+$2,270.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to annual payroll increases, adjustments to provide essential workforce support, and changes to benefits costs.

- (+$22.0) This change to fixed and other costs is an increase due to the recalculation of laboratory fixed costs.

- (+$3,772.0 / +22.0 FTE) This net program change increases funding and FTE for the Chemical Safety for Sustainability Research Program. These FTE will assist in providing scientific and technical approaches, information tools, and methods to better inform decision-making. This investment includes $3.961 million in payroll and also reflects a slight adjustment in non-payroll resources.

- (+$500.0) This program change increases funding for EPA's PFAS research efforts, with specific emphasis on implementing the *PFAS Strategic Roadmap.*

- (+$2,011.0 / +5.0 FTE) This program change increases resources and FTE for EPA's efforts to conduct research and reviews on existing EPA-initiated chemical risk evaluations in support of TSCA. This investment includes $901.0 thousand in payroll.

Statutory Authority:

Clean Air Act §§ 103, 104; Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); Children's Health Act; 21st Century Nanotechnology Research and Development Act; Clean Water Act; Federal Food, Drug, and Cosmetic Act (FFDCA); Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); Pollution Prevention Act (PPA); Resource Conservation and Recovery Act (RCRA); Safe Drinking Water Act (SDWA); Toxic Substances Control Act (TSCA).

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Science & Technology	***$35,251***	***$37,482***	***$42,355***	***$4,873***
Hazardous Substance Superfund	$3,654	$12,824	$4,896	-$7,928
Total Budget Authority	$38,905	$50,306	$47,251	-$3,055
Total Workyears	163.3	154.9	174.9	20.0

Program Project Description:

EPA's Health and Environmental Risk Assessment (HERA) Program is focused on the science of assessments that inform decisions made by EPA and others, including states and tribes. These assessments provide the scientific basis for decisions under an array of environmental laws, including the: Clean Air Act (CAA), Clean Water Act (CWA), Safe Drinking Water Act (SDWA), Toxic Substances Control Act (TSCA), and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The HERA Program is multidisciplinary and aimed at incorporating scientific innovations to advance analytic approaches and applications needed to address the wide-ranging risk assessment requirements to support implementation of these various statutes.

The current portfolio of HERA products encompasses these two topic areas:

- **Science Assessments and Translation:** HERA produces a portfolio of assessment products that optimizes the application of the best available science and technology and is responsive to Agency priorities and timelines. The portfolio includes assessments from among the traditional product lines – Integrated Risk Information System (IRIS), Integrated Science Assessment (ISAs), and Provisional Peer-Reviewed Toxicity Values (PPRTVs) – in addition to a wide range of innovative 'fit-for-purpose' products. Additionally, significant emphasis is placed on providing scientific and technical support throughout the lifecycle of decisions, from development to application of the assessment products.

- **Advancing the Science and Practice of Risk Assessment:** Research under this topic is targeted to enhance hazard characterization, expand the repertoire of dose-response methods and models, and characterize the utility of emerging data and new computational tools as applied to risk assessment. It also enhances and maintains critical assessment infrastructure, including databases, models, and software support, to ensure transparency and facilitate understanding and translation to Agency partners, external partners, and other users. Refinements to current approaches are expected to improve the accuracy, efficiency, flexibility, and utility of applications across a large landscape of assessment activities.

Recent Accomplishments of the HERA Program include:

The HERA Research Program has been developing assessment products to inform science-based decision making, enhance timely responses, improve screening capabilities, and augment toxicity value derivations for use in risk assessments.

- **Portfolio of Assessment Products:** In October 2020, the *ISA for Oxides of Nitrogen, Oxides of Sulfur, and Particulate Matter - Ecological Criteria* was released[72] following a peer review by the Clean Air Scientific Advisory Committee. HERA will provide the scientific foundation for the reconsiderations of the particulate matter and ozone National Ambient Air Quality Standards; a *Supplement to the 2019 ISA for Particulate Matter*[73] will be finalized in spring 2022. HERA continues to deliver on EPA's commitment to address Per- and polyfluoroalkyl substances (PFAS) in the environment and released the final *Human Health Toxicity Values for Perfluorobutane Sulfonic Acid (CASRN 375-73-5) and Related Compound Potassium Perfluorobutane Sulfonate (CASRN 29420-49-3)*[74] in April 2021, the draft *IRIS Assessment for Perfluorobutanoic Acid and Related Salts*[75] in August 2021, and the draft *IRIS Assessment for Perfluorohexanoic Acid and Related Salts*[76] in April 2022. In FY 2021, nine PPRTV assessments were finalized, and HERA anticipates delivering at least nine additional high-priority PPRTV assessments in FY 2022 to support Superfund priorities.[77] In FY 2021, HERA also posted final IRIS assessments for ethyl tertiary butyl ether and tert-butyl alcohol, as well as publicly released assessment materials for inorganic mercury salts, vanadium and compounds (oral exposure), and vanadium and compounds (inhalation exposure).[78] In FY 2022, HERA anticipates publicly releasing a final IRIS assessment for Perfluorobutanoic acid and Related Salts.[79] HERA also anticipates publicly releasing assessment materials for ethylbenzene, uranium, vanadium and compounds (inhalation exposure), and naphthalene, and draft assessments for chloroform (inhalation), hexavalent chromium, and formaldehyde. HERA also will finalize the Office of Research and Development (ORD) Staff Handbook for Developing IRIS Assessments in FY 2022.

- **Innovations in Risk Assessment:** HERA continues to advance assessment science and modernize its assessment infrastructure through tool and model advancements. In FY 2021, HERA released updates to the Integrated Exposure Uptake Biokinetic (IEUBK) model to support lead biokinetic modeling in children. HERA anticipates finalizing 1) updates to the All-Ages Lead Model (AALM) in the fall of 2022 which will include improved lead biokinetic modeling in adults and children; and 2) EPA's version of the multi-path particle dosimetry (MPPD) model and software for improved mechanistic modeling of inhalation dosimetry for particles in the spring of 2022. Continued advancements are being made to HERA's dose-response analysis tool, Benchmark Dose

[72] For more information, please see: https://www.epa.gov/isa/integrated-science-assessment-isa-oxides-nitrogen-oxides-sulfur-and-particulate-matter.
[73] For more information, please see: https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=352823.
[74] For more information, please see: https://www.epa.gov/pfas/learn-about-human-health-toxicity-assessment-pfbs.
[75] For more information, please see: https://cfpub.epa.gov/ncea/iris_drafts/recordisplay.cfm?deid=350051.
[76] For more information, please see: https://cfpub.epa.gov/ncea/iris_drafts/recordisplay.cfm?deid=352767.
[77] For more information, please see: https://www.epa.gov/pprtv.
[78] For more information, please see: https://www.epa.gov/iris/iris-recent-additions.
[79] For more information, please see: https://www.epa.gov/iris/iris-recent-additions.

Software (BMDS),[80] as well as critical information management databases including HERA's *Health and Environmental Research Online*[81] and the *Health Assessment and Workplace Collaborative*,[82] contributing to the improvement in the science, structure, and interoperability of these critical assessment infrastructure tools. Accompanying innovations in assessment science in FY2021 and FY2022, HERA has emphasized and coordinated training in risk assessment practice, methods, and tools for EPA staff and stakeholders to enhance communication, understanding, and engagement.

FY 2023 Activities and Performance Plan:

Work in this Program provides Cross-Agency Mission and Science Support and is allocated across strategic goals and objectives in the *FY 2022-2026 EPA Strategic Plan*.

In FY 2023, the HERA Program's work will focus on efforts integral to achieving EPA priorities and informing the Agency's implementation of key environmental decisions. Specifically, the program will:

- Continue developing additional assessments through IRIS of perfluorinated compounds, as well as other priority chemicals identified by EPA's Water Program, Air and Radiation Program, and Land and Emergency Management Program. These HERA assessments include ethylbenzene, hexavalent chromium, chloroform, methylmercury, mercury salts, inorganic arsenic, and formaldehyde.

- Provide assessment, methodology, and modeling support to the Chemical Safety and Pollution Prevention Program on TSCA implementation for an array of chemicals, as well as support to the Air and Radiation Program, including the development of the ISA for Lead to support review of the National Ambient Air Quality Standards (NAAQS).

- Provide high-priority PPRTV human health assessments to support the Land and Emergency Management Program on CERCLA and Resource Conservation and Recovery Act (RCRA) implementation

- HERA will focus on support for specific decision contexts through a modernized assessment infrastructure, applying state of the science tools, databases, and models in assessment development and program management. Continue to develop and apply evidence mapping to provide a better understanding of the extent and nature of evidence available to address priority needs of the Agency and its partners.

- Provide the resources and workflow to two of the five Research and Development Program's Superfund technical support centers (TSCs)[83] to provide localized and tailored technical assistance and scientific expertise on human and ecological risk assessments to

[80] For more information, please see: https://www.epa.gov/bmds.
[81] For more information, please see: https://hero.epa.gov/hero/.
[82] For more information, please see: https://hawcprd.epa.gov/.
[83] HERA supports the Superfund Health Risk Technical Support Center (STSC) and the Ecological Risk Assessment Support Center (ERASC). For more information on EPA's five TSCs, please see: https://www.epa.gov/land-research/epas-technical-support-centers.

states, tribes, and EPA's program and regional offices. This includes direct support in cases of emergencies and other rapid response situations.

- Apply new and alternative approaches, methods, and data to risk assessment products, and technical support to better respond to the needs of the states, tribes, and EPA's program and regional offices, in cooperation with the Chemical Safety for Sustainability (CSS) Research Program.

- Provide training to staff, partners, and stakeholders on risk assessment practice, assessment tool literacy, and standard operating procedures for assessment development via easy-to-access modules.

In addition to the activities listed above, EPA also conducts research across programs in the following areas:

- **PFAS Research:** Per- and polyfluoroalkyl substances (PFAS) are a class of chemicals of concern in the environment, and EPA is committed to pursuing all options to address PFAS pollution and protect human health and the environment. There are still large numbers of PFAS of high interest to stakeholders which currently have no federal published, peer-reviewed toxicity values. As described in the *PFAS Strategic Roadmap*,[84] within the HERA Research Program, EPA is prioritizing additional PFAS for development of peer-reviewed toxicity values. This will result in an expanded set of high-quality peer-reviewed toxicity values for use by federal, state, and tribal decision makers in making risk assessment and management decisions. In addition, EPA is identifying, reviewing, organizing, and presenting relevant health information on PFAS through systematic evidence mapping to identify data gaps, inform prioritization and hazard characterization, and facilitate human health assessments for PFAS.

- **Lead:** Childhood lead exposure continues to be one of the highest priorities for EPA. To advance the application of lead exposure and biokinetic models in EPA regulatory decisions and site assessments, HERA research will enhance, evaluate, and apply lead biokinetic models used to estimate potential blood lead levels for regulatory determinations.[85] Additionally, the Exposure Factors Handbook[86] provides up-to-date data on various human factors, including soil and dust ingestion rates, used by risk assessors.

Research Planning:

EPA is built around six integrated and transdisciplinary research programs. Each of the six programs is guided by a Strategic Research Action Plan (StRAP) that reflects the research needs of Agency program and regional offices, states, and tribes, and is planned with their active involvement. Each research program is in the process of developing the fourth generation of the

[84] For more information, please see EPA's PFAS Strategic Roadmap at: https://www.epa.gov/system/files/documents/2021-10/pfas-roadmap_final-508.pdf
[85] For more information, please see: https://www.epa.gov/superfund/lead-superfund-sites-software-and-users-manuals.
[86] For more information, please see: https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=236252.

StRAPs, which will continue the practice of conducting innovative scientific research aimed at solving the problems encountered by the Agency and its stakeholders.

ORD works with various groups, including communities, to ensure the integrity and value of its research through a variety of mechanisms that include:

- EPA's Board of Scientific Counselors (BOSC)
  - ORD meets regularly with this committee, which provides advice and recommendations to ORD on technical and management issues of its research programs.

- State Engagement
  - EPA's state engagement[87] is designed to inform states about their role within EPA and EPA's research programs, and to better understand the science needs of state environmental and health agencies.

- Tribal Partnerships
  - Key tribal partnerships are established through the Tribal Science Program which provides a forum for the interaction between tribal and Agency representatives. These interactions identify research of mutual benefit and lead to collaborations on important tribal environmental science issues.

Performance Measure Targets:

Work under this program supports performance results in the Research: Chemical Safety for Sustainability Program under the S&T appropriation.

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- (+$1,233.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to annual payroll increases, adjustments to provide essential workforce support, and changes to benefits costs.

- (+$3,640.0 / +20.0 FTE) This program change increases funding and FTE for the Health and Environmental Risk Assessment program. These FTE will assist in advancing science assessments, such as IRIS, as well as analytical approaches for the application of risk assessments. This investment includes $3.618 million in payroll.

Statutory Authority:

Clean Air Act §§ 103, 108, 109, and 112; Clean Water Act §§ 101(a)(6), 104, 105; Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) § 3(c)(2)(A); Safe Drinking Water Act (SDWA) § 1458; Toxic Substances Control Act (TSCA).

[87] For more information, please see: https://www.epa.gov/research/epa-research-solutions-states.

Research: Safe and Sustainable Water Resources

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Science & Technology	***$92,719***	***$112,250***	***$119,286***	***$7,036***
Total Budget Authority	$92,719	$112,250	$119,286	$7,036
Total Workyears	367.3	358.1	378.1	20.0

Program Project Description:

The quality and availability of water, upon which human and ecosystem health and a robust economy depend, face myriad challenges. These challenges include aging water infrastructure, contaminants of existing and emerging concern, waterborne pathogens, antimicrobial resistance, harmful algal blooms and hypoxia, stormwater runoff, and water shortages. Many of these concerns are more prevalent in disadvantaged and rural communities, and can be exacerbated by changing climate patterns, for example, higher temperatures and greater frequency, duration and intensity of precipitation, extreme heat, wildland fire, and drought.

To address these current, emerging, and long-term water resource challenges, EPA's Safe and Sustainable Water Resources (SSWR) Research Program produces robust research and scientific analyses for decision-making and the development of innovative, practical solutions for the Agency and its partners to protect and restore America's watersheds and water infrastructure.

SSWR research is integrated with other Office of Research and Development (ORD) national research programs to address water quality concerns related to wildland fire; revitalize land and prevent contamination through work on biosolids and green infrastructure; and ensure the safety of chemicals through research on lead and other chemical contaminants.

Recent Accomplishments of the SSWR Research Program[88]

Contaminants of Emerging Concern:

- **SARS-CoV-2.** EPA collaborated with the Center for Disease Control and the State of Ohio to establish a wastewater monitoring network to detect and quantify SARS-CoV-2. EPA researchers rapidly developed and applied a method to detect SARS-CoV-2 in 12 sewersheds in Ohio. EPA also evaluated analytical approaches to detect variants of concern within wastewater. EPA helped to successfully establish Ohio's SARS-CoV-2 monitoring program and continues to provide analyses from wastewater treatment plants in southwest Ohio.

[88] For a more complete view of accomplishments, please see: https://www.epa.gov/research/national-research-programs.

- **Per- and Polyfluoroalkyl Substances (PFAS).**
    - **PFAS Treatment in Drinking Water**. In 2021, EPA's Drinking Water Treatability Database was updated to include 37 PFAS chemicals. The database provides information on best practices and technologies for PFAS treatment in drinking water. Information on cost models for PFAS treatment in drinking water also was generated. EPA actively provides support to the Office of Water on PFAS treatment modeling for the development of the PFAS drinking water regulation.
    - **PFAS Analytical Methods**.
        - EPA created and continues to update the PFAS Analytical Website,[89] which consolidates PFAS analytical and sampling methods for drinking water, groundwater, surface water, wastewater, air, and solids (soils, sediments, biota, and biosolids). The website includes analytical method resources from EPA and other federal agencies and non-governmental organizations, and sampling, data analysis, and laboratory certification resources.
        - EPA finalized and published the SW846 Method 8327 for 24 PFAS in non-drinking water aqueous samples[90] and drinking water method 533 in support of the upcoming fifth Unregulated Contaminant Monitoring Rule. ORD completed a draft method for total absorbable PFAS in wastewater which is under review by the Office of Water (OW). EPA developed a draft isotope dilution method (Method 1633) for aqueous and solid samples for 40 PFAS in collaboration with the Department of Defense. ORD continues to provide technical support for the multi-laboratory validation of Method 1633 which will be complete by the end of calendar year 2022. Additionally, ORD continues to work with OW for development of a total organic fluorine method in drinking water for future validation.

Science to Support Recreational Water Quality Criteria:
Over the past five years, ORD scientists have published more than 40 peer-reviewed scientific publications providing science to support Recreational Water Quality Criteria recommendations. Notable efforts include the development of Standard Reference Material 2917 in collaboration with the National Institute of Standards and Technology, the public release of EPA Methods 1696 and 1697 for characterization of human fecal pollution in recreational waters, and performance assessment of virus-based fecal indicator methodologies, respectively. ORD research will play an important role in the anticipated EPA Office of Water 2022 Five-Year Review of the 2012 Recreational Water Quality Criteria.

Harmful Algal Blooms (HABs): In August 2021, ORD research enabled the release of a new tool – CyANWeb – expanding digital platforms beyond its CyAN Android app. The new web tool helps federal, state, tribal, and local partners identify when a harmful algal bloom may be forming in waters where people swim, fish, and boat. The tool uses satellite data for initial detection of a harmful algal bloom in more than 2,000 of the largest U.S. lakes and reservoirs. ORD also

[89] For more information, please see the following: https://www.epa.gov/water-research/pfas-analytical-methods-development-and-sampling-research.
[90] For more information, please see the following: https://www.epa.gov/water-research/pfas-analytical-methods-development-and-sampling-research.

developed a proof of concept for Decision Support System expansion to identify sub-watersheds within a larger basin for targeted nutrient control across New England.

FY 2023 Activities and Performance Plan:

Work in this Program provides Cross-Agency Mission and Science Support and is allocate across strategic goals and objectives in the *FY 2022-2026 EPA Strategic Plan*.

In FY 2023, the SSWR Research Program will continue to focus on:

- **Water Infrastructure:**
  - Conduct research and provide technical support to assess the distribution, composition, and potential health risks of known and emerging chemical and biological contaminants. Protocols for sampling lead and identification of lead service lines will support the availability of safe drinking water, especially in disadvantaged communities.
  - Continue work to evaluate SARS-CoV-2 variants with the Ohio Network and determine the viability of live virus in wastewater; and assist states, communities, and utilities to address stormwater and wastewater infrastructure needs through applied models and technical assistance.

- **Climate Change Impacts/Resiliency:**
  - Integrate the impacts of climate change with research on water bodies and water infrastructure, including wildland fire, extreme drought and precipitation events, harmful algal blooms, and other impacts on water quality and availability.
  - Develop risk assessments on stormwater capture for enhanced aquifer recharge.
  - Compare cost and carbon footprint of alternative water sources, develop risk assessments to support safe, fit-for-purpose non-potable use by tribes and states, and expand research to potable use.

- **Harmful Algal Blooms/Nutrients:**
  - Investigate toxicity and health effects from exposure to anatoxin-a, a potent cyanotoxin with neurological effects.
  - Launch a joint EPA and USDA Challenge to better understand the potential role for enhanced efficiency fertilizers (EEFs) by assessing the efficacy of 16 EEFs in greenhouse trials.
  - Complete approaches to prioritize watersheds for restoration and recovery efforts, including a visual tool to illustrate national nutrient inventories and watershed responsiveness to management actions.

- **Recreational Waters and Public Health Protection:** Improve methods for rapid and cost-effective monitoring of waterborne pathogens in recreational waters. For example, improving rapid low-cost methods for real time notifications on the presence of pathogens will inform community decisions to close and reopen beaches more quickly to prevent human illness and unnecessary lost revenue.

- **Microplastics:** Continue refinement of methods to collect, extract, characterize, quantify, and evaluate microplastics in surface water and sediment. Characterizing the smaller micro- and nanoplastic particles will be the emphasis. These standard methods will allow comparability across studies and aid in comprehensive exposure assessment and risk characterization of microplastics. The research also will include activities to assess new methods to rapidly identify microplastics in sediment with a citizen science project.

In addition to the activities listed above, EPA also will conduct research across programs in the following areas:

- **PFAS Research:** PFAS are a class of chemicals of growing concern in the environment, and EPA has committed to taking action to support states, tribes, and local communities understand and manage risks associated with these chemicals. A significant challenge for risk managers at the tribal, state, and local level is how to identify and remove or treat PFAS chemicals that are impacting drinking water supplies. Additional knowledge is needed regarding how to measure and quantify different PFAS chemicals in water, how to remove or treat PFAS chemicals when detected, and how to estimate the cost of different treatment alternatives so that utilities can make informed investment decisions. In FY 2023, EPA will increase its PFAS research efforts, with specific emphasis on implementing the *PFAS Strategic Roadmap*.[91]

  Within the SSWR Research Program, EPA is:
  - Developing and validating standard methods for measuring different PFAS chemicals in water and water treatment residuals (e.g., biosolids);
  - Reviewing available literature on effectiveness and cost data for different water treatment technologies applied to different PFAS chemicals; and
  - Conducting pilot- and bench-scale testing of the most promising technologies to further evaluate effectiveness.

  This work is being done in collaboration with water utilities and water treatment technology suppliers. The results of this work will be posted to EPA's public Drinking Water Treatability Database so the information will be widely available to stakeholders.[92]

- **Lead:** EPA, the Centers for Disease Control and Prevention, and the American Academy of Pediatrics unanimously agree that there is no safe level of lead in a child's blood and that even low levels can result in behavior and learning problems, lower IQ, and other health effects.[93] In response to overwhelming scientific consensus and continued public health concern, reducing childhood lead exposure is one of the highest priorities for EPA.[94]

[91] See EPA's PFAS Strategic Roadmap at: https://www.epa.gov/system/files/documents/2021-10/pfas-roadmap_final-508.pdf
[92] For more information, please see: https://iaspub.epa.gov/tdb/pages/general/home.do#content.
[93] For more information, please see: https://www.cdc.gov/nceh/lead/prevention/blood-lead-levels.htm.
[94] For more information, please see: https://www.epa.gov/lead.

SSWR research focuses on:

- Establishing reliable models for estimating lead exposure from drinking water;
- Developing improved sampling techniques and strategies for identifying and characterizing lead in plumbing materials, including lead service lines;
- Developing guidance on optimizing lead mitigation strategies; and
- Testing and evaluating treatment processes for removing lead from drinking water. The overall impact of this research will provide information and tools that EPA, states, tribes, utilities, and communities can use to minimize or eliminate lead exposure in drinking water.

Research Planning:

EPA is built around six integrated and transdisciplinary research programs. Each of the six programs is guided by a Strategic Research Action Plan (StRAP) that reflects the research needs of Agency program and regional offices, states, and tribes, and is planned with their active involvement. Each research program is in the process of developing the fourth generation of the StRAPs, which will continue the practice of conducting innovative scientific research aimed at solving the problems encountered by the Agency and its stakeholders.

ORD works with various groups, including communities, to ensure the integrity and value of its research through a variety of mechanisms that include:

- EPA's Board of Scientific Counselors (BOSC)
  - ORD meets regularly with this committee, which provides advice and recommendations to ORD on technical and management issues of its research programs.

- State Engagement
  - EPA's state engagement[95] is designed to inform states about their role within EPA and EPA's research programs, and to better understand the science needs of state environmental and health agencies.

- Tribal Partnerships
  - Key tribal partnerships are established through the Tribal Science Program which provides a forum for the interaction between tribal and Agency representatives. These interactions identify research of mutual benefit and lead to collaborations on important tribal environmental science issues.

Performance Measure Targets:

(PM RD1) Percentage of ORD research products meeting partner needs.	**FY 2022 Target**	**FY 2023 Target**
	93	94

[95] For more information, please see: https://www.epa.gov/research/epa-research-solutions-states.

(PM RD2) Number of ORD activities related to environmental justice that involve or are designed to be applicable to tribes, states, territories, local governments, and communities.	FY 2022 Target	FY 2023 Target
	No Target Established	TBD

(PM RD4) Percentage of ORD environmental justice-related research products meeting partner needs.	FY 2022 Target	FY 2023 Target
	93	94

(PM RD5) Number of actions implemented for EPA scientific integrity objectives.	FY 2022 Target	FY 2023 Target
	No Target Established	21

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- (+$2,993.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to annual payroll increases, adjustments to provide essential workforce support, and changes to benefits costs.

- (+$116.0) This change to fixed and other costs is an increase due to the recalculation of laboratory fixed costs.

- (+$250.0) This program change increases funding for EPA's PFAS research efforts, with specific emphasis on implementing the *PFAS Strategic Roadmap.*

- (+$3,677.0 / +20.0 FTE) This net program change increases funding and FTE for the Safe and Sustainable Water Resources Program. These FTE will help to address the challenges of aging water infrastructure, contaminants of concern, harmful algal blooms, and diminished water availability. This investment includes $3.567 million in payroll.

Statutory Authority:

Safe Drinking Water Act (SDWA) § 1442(a)(1); Clean Water Act §§ 101(a)(6), 104, 105; Environmental Research, Development, and Demonstration Authorization Act (ERDDAA); Marine Protection, Research, and Sanctuaries Act (MPRSA) § 203; Title II of Ocean Dumping Ban Act of 1988 (ODBA); Water Resources Development Act (WRDA); Wet Weather Water Quality Act of 2000; Marine Plastic Pollution Research and Control Act of 1987 (MPPRCA); National Invasive Species Act; Coastal Zone Amendments Reauthorization Act (CZARA); Coastal Wetlands Planning, Protection and Restoration Act; Endangered Species Act (ESA); North American Wetlands Conservation Act; Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); Toxic Substances Control Act (TSCA).

Research: Sustainable Communities

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Science & Technology	***$112,717***	***$133,000***	***$141,477***	***$8,477***
Leaking Underground Storage Tanks	$303	$320	$337	$17
Inland Oil Spill Programs	$1,149	$664	$674	$10
Hazardous Substance Superfund	$13,458	$16,463	$16,927	$464
Total Budget Authority	$127,626	$150,447	$159,415	$8,968
Total Workyears	442.3	421.8	441.8	20.0

Program Project Description:

EPA's Sustainable and Healthy Communities (SHC) Research Program supports the following broad community-based goals: 1) accelerate the pace of contaminated site cleanups; 2) return contaminated sites to beneficial use in their communities; 3) protect vulnerable groups, such as communities with environmental justice concerns and children; 4) revitalize the most vulnerable communities; and 5) understand the connections between healthy ecosystems, healthy people, and healthy communities. SHC research provides decision-makers with the latest scientific information on how the interrelationships between socio-economic, human health, and environmental factors impact the environmental health of communities. The research and tools generated, including those related to health disparities and social determinants of health, aim to minimize negative, unintended consequences to human health and the environment and promote resilience to the impacts of climate change across communities.

The SHC Research Program has made a commitment to foster environmental, public health, and economic benefits for overburdened communities. Remedial technologies will directly support communities with environmental justice concerns and accelerate solutions for the risks that contaminated sites pose to underserved communities. The SHC program will focus on systems approaches that consider how remediation and other technologies can reduce risk to sensitive populations and improve climate adaptation and climate resilience. SHC will apply an integrated systems approach to incorporate diverse data streams for increased understanding of linkages between the total environment (built, natural and social) and public health to support communities and will highlight climate change and environmental justice related research throughout the program.

Recent Accomplishments of the SHC Research Program include:

- **Beneficial Use of Dredged Materials: Opportunities, Community Benefits, and Applied Guidance (Published in December 2020):**[96] Federal navigation channels throughout the US are maintained through operations and maintenance dredging of rivers and harbors. Much of this material is disposed through open water or contained disposal facility placement. While dredged materials may contain contaminants, there is a significant amount of material that is clean and may have beneficial uses in society. Thus, there is increased pressure to identify beneficial uses for dredged material, such as contaminated site remediation and aquatic habitat restoration. This project identified barriers and opportunities related to using clean dredged materials to remediate contaminated sites along with providing a tool for municipalities and other agencies to better understand the social and ecological benefits of utilizing dredged materials in cleanups or habitat restoration. The research team utilized and augmented the EPA EcoService Models Library; developed a representative case study database; and produced a report to support decision-making for dredged materials. This project created a foundation of information, a use-refined tool, and a concept map to guide application for different stakeholders in future projects.

- **Supply Chain Emission Factors for US Commodities and Industries (Published in July 2020):**[97] Researchers developed a comprehensive set of supply chain emission factors covering all categories of goods and services in the US economy. Purchased goods and services and capital goods represent a significant source of emission for many organizations. The final emission factors are available in the Supply Chain Emission Factors for US Industries and Commodities dataset. Organizations can use these supply chain factors to calculate the life cycle greenhouse gas (GHG) emissions/carbon footprints of their purchases, or for reporting Scope 3 GHG emissions under the global Greenhouse Gas Protocol.

FY 2023 Activities and Performance Plan:

Work in this Program provides Cross-Agency Mission and Science Support and is allocated across strategic goals and objectives in the *FY 2022-2026 EPA Strategic Plan*.

SHC's FY 2023 research will focus on three topic areas: 1) Advancing Remediation and Restoration of Contaminated Sites; 2) Materials Management and Beneficial Reuse of Waste; and 3) Integrated Systems Approach to Building Healthy and Resilient Communities. This research will integrate and translate public health, environmental engineering, and ecosystem science to provide:

- Remediation solutions through permanent remedies, accounting for climate change, and innovative treatment technologies for returning contaminated sites to safe and productive use;

[96] For more information, please see: https://intranet.ord.epa.gov/sites/default/files/2021-01/DMMT%20RESES%20Final%20Report_508.pdf.
[97] For more information, please see: https://cfpub.epa.gov/si/si_public_record_Report.cfm?dirEntryId=349324&Lab=CESER.

- Tools for sustainable materials management and beneficial reuse of materials; and
- Approaches for revitalizing communities, particularly those that are underserved and overburdened, including but not limited to those impacted by climate change.

The SHC Research Program provides state-of-the-science methods, models, tools, and technologies to the Land and Emergency Management Program for use in programmatic guidance and to support EPA decision makers with in-site cleanup. These approaches will address contaminated sediments and groundwater, as well as health risks posed by vapor intrusion and chemicals of immediate concern, such as per- and polyfluoroalkyl substances (PFAS) and lead. To support prevention of future land contamination problems, SHC develops life cycle analysis tools and explores opportunities for beneficial reuse of materials to reduce environmental impact. Finally, SHC research and development also will provide programs, regional partners, and local communities with research and tools they can apply to assess how they can become more resilient to and adapt to climate change. This community-oriented research is designed to revitalize communities, support the protection of children's health, and address critical health impacts on vulnerable populations. These efforts support community sustainability and increase community resilience to natural disasters including those impacted by climate change.

Specifically, in FY 2023, SHC Research will conduct research in the following areas:

- **Advancing Remediation and Restoration of Contaminated Sites:** EPA research under this topic will primarily focus on developing and testing remedial alternatives for treating contaminated soils, sediments, groundwater sites, vapor intrusion sites, and sites with PFAS and lead contamination, along with providing technical support to the Office of Land and Emergency Management (OLEM), regions, tribes, and states to translate the research into usable approaches.

- **PFAS Research:** PFAS will continue to be an important research topic for SHC. SHC is specifically researching analytical methods, human exposure, contaminated sites source zones, hard to treat streams such as landfill leachate, fate and transport of PFAS in groundwater, remediation performance (treatability and cost models), immobilization/stabilization of PFAS, and novel remedial technologies. This work provides technical support and assistance to tribes, states, and local communities on issues pertaining to ecological and human health risk assessment and site engineering challenges related to PFAS. In FY 2023, EPA is investing additional funds in PFAS research, with specific emphasis on implementing the *PFAS Strategic Roadmap*.[98]

- **Lead Research:** The SHC Research Program is working to identify locations of high exposures and blood lead levels to target lead sources for mitigation. The research program also will develop innovative methods to clean up lead at Superfund and other contaminated sites and strengthen the scientific basis of the Agency's lead-related regulatory and clean-up decisions. The SHC Research Program also will enhance models and methods that determine key drivers of blood lead levels to inform regulatory decisions, develop tools to identify and prioritize communities with higher incidence of increased blood lead levels in

[98] See EPA's PFAS Strategic Roadmap at: https://www.epa.gov/system/files/documents/2021-10/pfas-roadmap_final-508.pdf

children, and provide the data needed to reduce uncertainty in lead exposure and risk analysis. EPA's research in this area is essential to support ongoing Agency efforts, as well as filling in the data gaps for federal partners, tribes, states, and local communities.

- **Materials Management and Beneficial Reuse of Waste:** EPA research under SHC's Materials Management and Beneficial Reuse of Waste aims to strengthen the scientific basis for the Nation's materials management decisions and guidance at the tribal, state, and community levels. The overall goal of this research is to increase sustainability through reducing waste and supporting more circular economies, including supporting the implementation of the 2021 National Recycling Strategy. Primary research efforts will focus on developing lifecycle-based assessment tools for sustainable materials management, evaluating the design, application, and use of landfills as well as the degradation of liner material and improved monitoring strategies and their long-term impact on human health and the environment, and developing waste-management methodologies that can minimize adverse impacts to human health and the environment through proposed beneficial use and reuse. This work will include research that increases the effectiveness of food waste campaigns and examines food waste collection and pretreatment technologies from a lifecycle perspective. These efforts support an agencywide goal to reduce domestic food loss and waste by half by the year 2030.[99]

- **Integrated Systems Approach to Building Healthy and Resilient Communities:** The SHC Research Program will evaluate and communicate the benefits from remediation, restoration, and revitalization of contaminated sites and provide community-driven solutions with measurable outcomes. These efforts will help communities meet their needs for building resilience to the impacts of climate change, including the health and well-being of those most vulnerable. Research under the Healthy and Resilient Communities topic will provide the scientific basis for guidance, best practices, and tools to support decisions by the Agency, its stakeholders, tribes, and states to optimize health and well-being outcomes while minimizing unintended consequences. In addition, EPA is investing funds to increase protection of communities located near the fence line of industrial facilities.

Research Planning:

EPA research is built around six integrated and transdisciplinary research programs. Each of the six programs is guided by a Strategic Research Action Plan (StRAP) that reflects the research needs of Agency program and regional offices, states, and tribes, and is planned with their active involvement. Each research program is in the process of developing the fourth generation of the StRAPs, which will continue the practice of conducting innovative scientific research aimed at solving the problems encountered by the Agency and its stakeholders.

The Office of Research and Development (ORD) works with various groups, including communities, to ensure the integrity and value of its research through a variety of mechanisms that include:

[99] For more information, please visit: https://www.epa.gov/sustainable-management-food.

- EPA's Board of Scientific Counselors (BOSC)
    - ORD meets regularly with this committee, which provides advice and recommendations to ORD on technical and management issues of its research programs.

- State Engagement
    - EPA's state engagement[100] is designed to inform states about their role within EPA and EPA's research programs, and to better understand the science needs of state environmental and health agencies.

- Tribal Partnerships
    - Key tribal partnerships are established through the Tribal Science Program which provides a forum for the interaction between tribal and Agency representatives. These interactions identify research of mutual benefit and lead to collaborations on important tribal environmental science issues.

Performance Measure Targets:

(PM RD1) Percentage of ORD research products meeting partner needs.	**FY 2022 Target**	**FY 2023 Target**
	93	94

(PM RD2) Number of ORD activities related to environmental justice that involve or are designed to be applicable to tribes, states, territories, local governments, and communities.	**FY 2022 Target**	**FY 2023 Target**
	No Target Established	TBD

(PM RD4) Percentage of ORD environmental justice-related research products meeting partner needs.	**FY 2022 Target**	**FY 2023 Target**
	93	94

(PM RD5) Number of actions implemented for EPA scientific integrity objectives.	**FY 2022 Target**	**FY 2023 Target**
	No Target Established	21

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- (+$3,094.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to annual payroll increases, adjustments to provide essential workforce support, and changes to benefits costs.

- (+$106.0) This change to fixed and other costs is an increase due to the recalculation of laboratory fixed costs.

[100] For more information, please see: https://www.epa.gov/research/epa-research-solutions-states.

- (+$1,356.0) This program change increases funding for EPA's PFAS research efforts, with specific emphasis on implementing the *PFAS Strategic Roadmap.*

- (+$200.0) This program change increases resources to fund protection of communities located near the fence line of industrial facilities.

- (+$3,721.0 / +20.0 FTE) This net program change increases funding and FTE for the Sustainable and Healthy Communities Research Program. These FTE will help to address the acceleration of cleanup and return of contaminated sites to beneficial use, protection of vulnerable populations, and the revitalization of vulnerable communities. This investment includes $3.576 million in payroll.

Statutory Authority:

Reorganization Plan No. 3 of 1970, 84 Stat. 2086, as amended by Pub. L. 98-80, 97 Stat. 485 (codified as Title 5 App.) (EPA's organic statute).

Water: Human Health Protection

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Environmental Programs & Management	$97,190	$106,903	$133,258	$26,355
Science & Technology	***$4,088***	***$4,364***	***$6,776***	***$2,412***
Total Budget Authority	$101,278	$111,267	$140,034	$28,767
Total Workyears	480.3	475.2	547.2	72.0

Program Project Description:

The Drinking Water Technical Support Center is responsible for a range of activities to address drinking water contamination. The Center:

- leads the collection of national occurrence data for unregulated contaminants in drinking water;
- develops, evaluates, and approves analytical methods that are used to accurately and reliably monitor drinking water contaminants;
- leads the national program under which laboratories are certified to conduct the analyses of drinking water contaminants with approved analytical methods; and,
- collaborates with states and public water systems to implement tools that optimize treatment and improve water quality by helping systems achieve compliance and maximize technical capacity while reducing operational costs.

FY 2023 Activities and Performance Plan:

Work in this program directly supports Goal 5/Objective 5.1, Ensure Safe Drinking Water and Reliable Water Infrastructure in the *FY 2022 - 2026 EPA Strategic Plan*. The program also will support the Agency's Infrastructure Investment and Jobs Act implementation priorities.

In FY 2023, EPA is requesting funding for the Drinking Water Technical Support Center to carry out the activities listed below:

- Lead rule development and implementation activities for the Unregulated Contaminant Monitoring Rule (UCMR), a federal direct implementation program coordinated by EPA, as directed by the Safe Drinking Water Act (SDWA).
  - The data collected pursuant to this rule support the Agency's determination of whether to establish health-based standards to protect public health. Data reporting under the UCMR's fourth cycle (UCMR 4) concluded at the end of calendar year (CY) 2021. EPA compiled and published the final data set for the fourth cycle in FY 2022.

- In December 2021, the Agency published the final rule for the UCMR's fifth cycle (UCMR 5). EPA is conducting pre-monitoring implementation activities throughout CY 2022 to prepare for the upcoming UCMR 5 sampling period from January 2023 through December 2025.
- UCMR 5 is the first cycle to implement the monitoring provisions of America's Water Infrastructure Act of 2018 (AWIA), which requires, subject to the availability of appropriations and adequate laboratory capacity, sampling at all small public water systems (PWSs) serving between 3,300 and 10,000 persons. AWIA also requires monitoring at a representative sample of small PWSs serving fewer than 3,300 persons. EPA implementation efforts need to significantly expand to address a 7.5-fold increase in the number of small-system samples as a result of AWIA.
- EPA is responsible for managing and funding the small-system monitoring. Key activities for EPA include ensuring laboratories are available to perform the required analyses, managing the field sample collection and sample analysis for small systems, and managing data reporting by large systems. In addition, EPA makes the UCMR data available to state and tribal partners and to the public.

- Lead the development, revision, evaluation, and approval of analytical methods for unregulated and regulated contaminants in drinking water to assess and ensure protection of public health (e.g., polyfluoroalkyl substances [PFAS]). This work supports the activities underway for the Agency's PFAS Roadmap and is expected to support priorities identified by the EPA Council on PFAS.

- Implement EPA's Drinking Water Laboratory Certification Program,[101] which sets direction for oversight of state, municipal, and commercial laboratories that analyze drinking water samples. EPA will conduct regional laboratory certification program reviews and deliver laboratory certification officer training courses (chemistry and microbiology) for state and regional representatives. The certification program and trainings will help to ensure the quality of drinking water analyses conducted in FY 2023.

- Partner with states and water systems to optimize their treatment technology and distribution systems under the drinking water Area Wide Optimization Program (AWOP).[102] AWOP is a highly successful technical/compliance assistance and training program that enhances the ability of public water systems to comply with existing microbial, disinfectant, and disinfection byproduct standards, and to address distribution system integrity and water quality issues. During FY 2023, EPA expects to work with states and tribes to expand efforts to train and assist systems, including those in disadvantaged and tribal communities. This effort includes identifying performance limiting factors at public water systems and developing and applying tailored tools to help them overcome operational challenges, achieve performance and optimization levels, and address health-based compliance challenges. The technical assistance provided by AWOP can be instrumental in supporting public water systems with limited financial capacity to effectively address drinking water quality issues.

[101] For more information, please see: https://www.epa.gov/dwlabcert.
[102] For more information, please see: https://www.epa.gov/sdwa/optimization-program-drinking-water-systems.

Performance Measure Targets:

Work under this program supports Safe Drinking Water Act (SDWA) implementation and compliance and requirements in the Drinking Water State Revolving Fund and Categorical Grant: Public Water System Supervision Programs under the STAG appropriation to support safe drinking water for the nation.

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- (+$187.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to annual payroll increases, adjustments to provide essential workforce support, and changes to benefits costs.

- (+$187.0 / +1.0 FTE) This program change is an increase in resources and FTE to support the activities associated with the Evidence Act. This investment includes $182.0 thousand in payroll.

- (+$2,038.0 / +4.0 FTE) This program change is an increase in resources and FTE to support regulatory analysis, development and training, and technical assistance for state, tribal, and local communities to address drinking water contaminants (including Lead and PFAS) in their efforts to ensure safe and affordable drinking water. The increase also supports development of the Lead and Copper Rule Revisions and the Unregulated Contaminant Monitoring Rule. This investment includes $729.0 thousand in payroll.

Statutory Authority:

SDWA.

Congressional Priorities

Water Quality Research and Support Grants

Program Area: Clean and Safe Water Technical Assistance Grants
Goal: Ensure Clean and Safe Water for All Communities
Objective(s): Ensure Safe Drinking Water and Reliable Water Infrastructure

(Dollars in Thousands)

	FY 2021 Final Actuals	FY 2022 Annualized CR	FY 2023 President's Budget	FY 2023 President's Budget v. FY 2022 Annualized CR
Environmental Programs & Management	$0	$21,700	$0	-$21,700
Science & Technology	***$0***	***$7,500***	***$0***	***-$7,500***
Total Budget Authority	$0	$29,200	$0	-$29,200

Program Project Description:

In FY 2021 and in the FY 2022 Annualized Continuing Resolution, Congress appropriated $7.5 million in the Science and Technology appropriation to fund high priority water quality and water availability research. EPA was instructed by Congress to award grants on a competitive basis, independent of the Science to Achieve Results (STAR) Program, and to give priority to not-for-profit organizations that: 1) conduct activities that are national in scope; 2) can provide a 25 percent match, including in-kind contributions; and 3) often partner with the Agency.

FY 2023 Activities and Performance Plan:

Resources are proposed for elimination for this Program in FY 2023.

Performance Measure Targets:

EPA's FY 2023 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2023 Change from FY 2022 Annualized Continuing Resolution (Dollars in Thousands):

- (-$7,500.0) Resources are proposed for elimination for this program in FY 2023. The goals of this program can be accomplished through core statutory programs.

Statutory Authority:

CAA 42 U.S.C. 7401 et seq. Title 1, Part A – Sec. 103 (a) and (d) and Sec. 104 (c); CAA 42 U.S.C. 7402(b) Section 102; CAA 42 U.S.C. 7403(b)(2) Section 103(b)(2); Clinger Cohen Act, 40 U.S.C. 11318; CERCLA (Superfund, 1980) Section 209(a) of Public Law 99-499; Children's Health Act; CWA, Sec. 101 - 121; CWPPRA; CZARA; CZMA 16 U.S.C. 1451 - Section 302; Economy Act, 31 U.S.C. 1535; EISA, Title II Subtitle B; ERDDA, 33 U.S.C. 1251 – Section 2(a); ESA, 16 U.S.C. 1531 - Section 2; FFDCA, 21 U.S.C. Sec. 346; FIFRA (7 U.S.C. s/s 136 et seq. (1996), as amended), Sec. 3(c)(2)(A); FQPA PL 104-170; Intergovernmental Cooperation Act, 31 U.S.C.

6502; MPRSA Sec. 203, 33 U.S.C. 1443; NAWCA; NCPA; National Environmental Education Act, 20 U.S.C. 5503(b)(3) and (b)(11); NEPA of 1969, Section 102; NISA; ODBA Title II; PPA, 42 U.S.C. 13103; RCRA; SDWA (1996) 42 U.S.C. Section 300j-18; SDWA Part E, Sec. 1442 (a)(1); TSCA, Section 10, 15, 26, U.S.C. 2609; USGCRA 15 U.S.C. 2921; WRDA; WRRA; and WWWQA.