



**United States
Environmental Protection Agency**

FISCAL YEAR 2021

**Justification of Appropriation
Estimates for the Committee
on Appropriations**

Tab 03: Science and Technology

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**Environmental Protection Agency
FY 2021 Annual Performance Plan and Congressional Justification**

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**Environmental Protection Agency
FY 2021 Annual Performance Plan and Congressional Justification**

**APPROPRIATION: Science & Technology
Resource Summary Table
(Dollars in Thousands)**

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
Science & Technology				
Budget Authority	\$695,063.1	\$716,449.0	\$484,733.0	-\$231,716.0
Total Workyears	1,892.9	1,983.7	1,501.0	-482.7

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

Bill Language: Science and 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 and travel expenses; procurement of laboratory equipment and supplies; and other operating expenses in support of research and development, \$484,733,000, to remain available until September 30, 2022, of which \$19,000,000 shall be derived from the Special Treasury fund established under section 217(b) of the Clean Air Act (42 U.S.C. 7552(b)).

**Program Projects in S&T
(Dollars in Thousands)**

Program Project	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
Clean Air				
Clean Air Allowance Trading Programs	\$7,834.8	\$7,463.0	\$5,739.0	-\$1,724.0
Atmospheric Protection Program	\$8,044.4	\$7,772.0	\$0.0	-\$7,772.0
Federal Support for Air Quality Management	\$10,878.2	\$6,039.0	\$3,712.0	-\$2,327.0
Federal Vehicle and Fuels Standards and Certification	\$92,789.2	\$94,790.0	\$80,932.0	-\$13,858.0
Subtotal, Clean Air	\$119,546.6	\$116,064.0	\$90,383.0	-\$25,681.0
Indoor Air and Radiation				
Indoor Air: Radon Program	\$16.7	\$143.0	\$0.0	-\$143.0
Radiation: Protection	\$2,794.7	\$1,781.0	\$1,047.0	-\$734.0
Radiation: Response Preparedness	\$2,545.0	\$3,089.0	\$4,167.0	\$1,078.0
Reduce Risks from Indoor Air	\$216.7	\$136.0	\$0.0	-\$136.0

Program Project	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
Subtotal, Indoor Air and Radiation	\$5,573.1	\$5,149.0	\$5,214.0	\$65.0
Enforcement				
Forensics Support	\$11,534.7	\$13,592.0	\$11,723.0	-\$1,869.0
Homeland Security				
Homeland Security: Critical Infrastructure Protection	\$7,957.5	\$9,053.0	\$7,732.0	-\$1,321.0
Homeland Security: Preparedness, Response, and Recovery	\$20,492.7	\$23,593.0	\$25,542.0	\$1,949.0
Homeland Security: Protection of EPA Personnel and Infrastructure	\$410.0	\$443.0	\$500.0	\$57.0
Subtotal, Homeland Security	\$28,860.2	\$33,089.0	\$33,774.0	\$685.0
IT / Data Management / Security				
IT / Data Management	\$3,092.6	\$3,072.0	\$2,890.0	-\$182.0
Operations and Administration				
Facilities Infrastructure and Operations	\$67,856.9	\$65,372.0	\$67,908.0	\$2,536.0
Pesticides Licensing				
Pesticides: Protect Human Health from Pesticide Risk	\$3,098.5	\$3,154.0	\$2,443.0	-\$711.0
Pesticides: Protect the Environment from Pesticide Risk	\$2,415.8	\$2,327.0	\$2,616.0	\$289.0
Pesticides: Realize the Value of Pesticide Availability	\$354.6	\$405.0	\$684.0	\$279.0
Subtotal, Pesticides Licensing	\$5,868.9	\$5,886.0	\$5,743.0	-\$143.0
Research: Air and Energy				
Research: Air and Energy	\$85,895.8	\$94,496.0	\$33,543.0	-\$60,953.0
Research: Safe and Sustainable Water Resources				
Research: Safe and Sustainable Water Resources	\$100,123.7	\$110,890.0	\$78,948.0	-\$31,942.0
Research: Sustainable Communities				
Research: Sustainable and Healthy Communities	\$135,083.1	\$132,477.0	\$58,597.0	-\$73,880.0
Research: Chemical Safety for Sustainability				
Health and Environmental Risk Assessment	\$37,003.7	\$37,351.0	\$24,694.0	-\$12,657.0
Research: Chemical Safety for Sustainability				
<i>Endocrine Disruptors</i>	\$15,230.0	\$16,021.0	\$10,775.0	-\$5,246.0
<i>Computational Toxicology</i>	\$22,262.3	\$21,089.0	\$18,181.0	-\$2,908.0
<i>Research: Chemical Safety for Sustainability (other activities)</i>	\$49,811.9	\$51,807.0	\$37,996.0	-\$13,811.0

Program Project	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
Subtotal, Research: Chemical Safety for Sustainability	\$87,304.2	\$88,917.0	\$66,952.0	-\$21,965.0
Subtotal, Research: Chemical Safety for Sustainability	\$124,307.9	\$126,268.0	\$91,646.0	-\$34,622.0
Water: Human Health Protection				
Drinking Water Programs	\$3,227.6	\$4,094.0	\$4,364.0	\$270.0
Congressional Priorities				
Water Quality Research and Support Grants	\$4,092.0	\$6,000.0	\$0.0	-\$6,000.0
TOTAL S&T	\$695,063.1	\$716,449.0	\$484,733.0	-\$231,716.0

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

Clean Air

Clean Air Allowance Trading Programs

Program Area: Clean Air

Goal: A Cleaner, Healthier Environment

Objective(s): Improve Air Quality

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
Environmental Programs & Management	\$15,302.4	\$13,619.0	\$13,231.0	-\$388.0
<i>Science & Technology</i>	<i>\$7,834.8</i>	<i>\$7,463.0</i>	<i>\$5,739.0</i>	<i>-\$1,724.0</i>
Total Budget Authority	\$23,137.2	\$21,082.0	\$18,970.0	-\$2,112.0
Total Workyears	64.5	63.7	61.7	-2.0

Program Project Description:

This program is responsible for managing the Clean Air Status and Trends Network (CASTNET), a long-term ambient monitoring network, which serves as the Nation’s primary source for assessing atmospheric data trends in sulfur and nitrogen deposition, regional ground-level ozone, and other forms of particulate and gaseous air pollution. Used in conjunction with the National Atmospheric Deposition Program’s wet deposition networks and other ambient air quality networks, CASTNET’s long-term data products are used to determine the effectiveness of national and regional emission control programs. The CASTNET program provides spatial and temporal trends in ambient air quality and atmospheric deposition in non-urban areas and sensitive ecosystems (e.g., National Parks). CASTNET ozone data allow EPA to assess National Ambient Air Quality Standards compliance in areas not monitored by the State, Local and Tribal Ambient Monitoring Networks. 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).

EPA’s Long-Term Monitoring (LTM) program was created to assess the health of water bodies 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 changing pollutant emissions. The LTM program is one of the longest running programs at EPA, providing a longitudinal dataset based on sampling and measurements that go back to 1983.

The Clean Air Allowance Trading Programs are nationwide and multi-state programs that address air pollutants that are transported across state, regional, and international boundaries. The

programs designed to control SO₂ and NO_x include Title IV (the Acid Rain Program) of the Clean Air Act, the Cross-State Air Pollution Rule (CSAPR), and the Texas SO₂ Trading Program.

Both the CSAPR and the CSAPR Update Rule require 27 states in the eastern U.S. to limit their statewide emissions of SO₂ 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. The set emissions limitations that are defined in terms of maximum statewide "budgets" for emissions of annual SO₂, annual NO_x, and/or ozone-season NO_x from each state's large electric generating units. The Texas SO₂ Trading Program addresses Texas' obligations to implement best available retrofit technology, reasonable progress, and interstate visibility transport, as those obligations relate to SO₂ emissions from electricity generating units.¹

FY 2021 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.1, Improve Air Quality in the *FY 2018 – 2022 EPA Strategic Plan*. In FY 2021, EPA will:

- Continue to maintain long-term CASTNET monitoring sites that provide atmospheric deposition and rural ozone concentrations. Provide support to assure high-quality analysis and reporting of environmental data from CASTNET and LTM surface water monitoring networks.
- Analyze and assess trends in sulfur and nitrogen deposition, rural ozone concentrations, surface water quality, and other indicators of ecosystem health and ambient air quality in non-urban areas of the U.S.
- Assure the continuation of ongoing SO₂ 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.³

Performance Measure Targets:

EPA's FY 2021 Annual Performance Plan does not include annual performance goals specific to this program.

¹ Clean Air Act § 110 and § 169A; see 40 CFR 52.2312.

² Clean Air Act §§ 110(a)(2)(D) and 401.

³ For more information on program performance, please see: <https://www.epa.gov/airmarkets/clean-air-markets-progress>.

FY 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (-\$1,724.0) This program change reduces support for activities such as technical analysis, modeling, and emissions monitoring support to states as they develop, implement, and assess their state and regional programs to address regional and national air issues from large stationary sources.

Statutory Authority:

Clean Air Act.

Atmospheric Protection Program

Program Area: Clean Air

Goal: A Cleaner, Healthier Environment

Objective(s): Improve Air Quality

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
Environmental Programs & Management	\$90,985.1	\$95,436.0	\$14,512.0	-\$80,924.0
<i>Science & Technology</i>	<i>\$8,044.4</i>	<i>\$7,772.0</i>	<i>\$0.0</i>	<i>-\$7,772.0</i>
Total Budget Authority	\$99,029.5	\$103,208.0	\$14,512.0	-\$88,696.0
Total Workyears	201.3	200.6	120.0	-80.6

Program Project Description:

The Atmospheric 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 2021 Activities and Performance Plan:

Resources are proposed for elimination for this program in FY 2021.

Performance Measure Targets:

EPA’s FY 2021 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (-\$7,772.0 / -28.7 FTE) This funding change proposes to eliminate the Atmospheric Protection Program from the S&T appropriation.

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

Goal: A Cleaner, Healthier Environment

Objective(s): Improve Air Quality

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
Environmental Programs & Management	\$132,513.9	\$130,588.0	\$114,095.0	-\$16,493.0
<i>Science & Technology</i>	<i>\$10,878.2</i>	<i>\$6,039.0</i>	<i>\$3,712.0</i>	<i>-\$2,327.0</i>
Total Budget Authority	\$143,392.1	\$136,627.0	\$117,807.0	-\$18,820.0
Total Workyears	824.8	842.0	638.8	-203.2

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 risk 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 2021 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.1, Improve Air Quality in the *FY 2018 – 2022 EPA Strategic Plan*. During FY 2021, 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 2021, EPA will continue to conduct the periodically required "technology reviews" of NESHAP and conduct required risk assessments for MACT-based NESHAP. The Program will prioritize conducting reviews of NESHAP for 14 source categories for which the statutory deadlines passed and 13 of which are now subject to court-ordered dates. EPA expects to similarly prioritize reviews for the five source categories currently subject to litigation.

EPA works with other internal and external stakeholders on improving ambient air monitoring networks and measurement techniques to fill data gaps and to better estimate population exposure to criteria and toxic air pollutants. EPA will provide quality assurance proficiency testing for federal and commercial laboratories that produce data from PM_{2.5} air monitoring systems to ensure quality data for use in determining air quality.

In FY 2021, EPA will work with partners to continue improving 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 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (+\$1,217.0) This change is an increase due to the recalculation of base payroll costs.
- (-\$3,544.0 / -3.1 FTE) This program change is a decrease in EPA's assistance to state, tribal, and local agencies' Clean Air Act implementation activities, such as SIP/TIP development as well as activities to reduce air toxic emissions and risks for communities.

Statutory Authority:

Clean Air Act.

Federal Vehicle and Fuels Standards and Certification

Program Area: Clean Air

Goal: A Cleaner, Healthier Environment

Objective(s): Improve Air Quality

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
<i>Science & Technology</i>	<i>\$92,789.2</i>	<i>\$94,790.0</i>	<i>\$80,932.0</i>	<i>-\$13,858.0</i>
Total Budget Authority	\$92,789.2	\$94,790.0	\$80,932.0	-\$13,858.0
Total Workyears	287.9	308.5	296.7	-11.8

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 vehicles; 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 access to information on transportation programs and incentive-based programs.

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.

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, greenhouse gas, and fuel economy standards. The NVFEL conducts vehicle emission tests as part of pre-production tests, certification audits, in-use assessments, and recall programs to ensure compliance with mobile source programs.

Renewable Fuel Standard Program (RFS): EPA administers the Renewable Fuel Standard (RFS) Program. The RFS 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.

The four renewable fuel categories under the RFS are biomass-based diesel, cellulosic biofuel, advanced biofuel, and total renewable fuel. Obligated parties under the RFS Program are refiners or importers of gasoline or diesel fuel. Compliance is achieved by blending renewable fuels into

transportation fuel, or by obtaining credits (called “Renewable Identification Numbers” or RINs) to meet an EPA-specified Renewable Volume Obligation (RVO).

Work with State and Local Governments: EPA works with state and local governments to ensure the technical integrity of the mobile source control emission benefits included in State Implementation Plans (SIPs) and transportation conformity determinations. EPA develops and provides information and tools to assist state, local, and tribal agencies, as well as communities, to reduce air toxics emissions and risks specific to their local areas. Reductions in emissions of mobile source air toxics, such as components of diesel exhaust, are achieved through establishing national emissions standards and partnership approaches working with state, local, and tribal governments, as well as a variety of non-governmental stakeholder groups.

FY 2021 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.1, Improve Air Quality in the *FY 2018 – 2022 EPA Strategic Plan*. The Federal Vehicle and Fuels Standards and Certification program supports the Agency’s integrated criteria pollutant and greenhouse gas (GHG) compliance programs by operating test cells that simultaneously measure criteria pollutants and GHG emissions, reviewing certification applications for light-duty vehicles and heavy-duty engines to approve applications for both the criteria pollutant and GHG programs, and examining potential violations.

In FY 2021, the Federal Vehicle and Fuels Standards and Certification Program will continue to focus its efforts on certification decisions. 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. EPA anticipates reviewing and approving about 5,000 vehicle and engine emissions certification requests, including light-duty vehicles, heavy-duty diesel engines, nonroad engines, marine engines, locomotives, and others. There has been a significant increase in demand for EPA’s certification services over the last two decades, due in part to the addition of certification requirements for marine, other nonroad, and small spark-ignited engines.

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 calendar year 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, which receives over 2,100 test results annually. EPA reviews the data and determines if there are any specific vehicles, models, or manufacturers that are failing emissions in-use. The Agency will use this information submitted by light-duty manufacturers to determine if there are vehicle models 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.

In August 2018, EPA and the Department of Transportation’s National Highway Traffic Safety Administration (NHTSA) released a notice of proposed rulemaking, the Safer Affordable Fuel Efficient (SAFE) Vehicles Rule, which proposed to amend the federal fuel economy and

greenhouse gas emissions standards for model years 2021-2026 passenger cars and light trucks. In addition, SAFE clarified that federal law (Energy Policy and Conservation Act (EPCA)) preempts state and local tailpipe GHG emissions standards and zero emission vehicle (ZEV) mandates. In the SAFE rule, EPA also proposed to withdraw portions of the Clean Air Act waiver it had previously granted to California in January 2013, as it relates to California's light-duty vehicle GHG and ZEV programs.⁴

In September 2019, EPA and NHTSA finalized Part 1 of the SAFE Rule, in which EPA withdrew the Clean Air Act preemption waiver for California's GHG and ZEV programs. In the SAFE Part 1 final rule, NHTSA also promulgated regulations to preempt state and local standards related to fuel economy under EPCA. The SAFE Part 2 final rule, which will establish federal fuel economy standards and revised GHG emissions tailpipe standards for Model Year (MY) 2021-2026 light-duty vehicles, is expected to be finalized by April 2020.

The *Cleaner Trucks Initiative* is a rulemaking effort to address NO_x emissions from heavy-duty trucks. As a part of this rulemaking effort, EPA plans to evaluate the technologies which can ensure real-world compliance with emissions standards and also will seek opportunities to modernize and streamline the regulatory framework for the heavy-duty highway sector.

In FY 2021, EPA plans to release the final Fuels Regulatory Streamlining Rule based on the notice of proposed rulemaking in FY 2020. In addition, EPA will begin implementation of the rule to streamline and update EPA's existing gasoline, diesel, and other fuels regulations to improve overall compliance assurance and maintain environmental performance, while reducing compliance costs for industry as well as EPA. This rule streamlines the existing fuels regulations by deleting expired provisions, eliminating redundant compliance provisions, removing unnecessary and out-of-date requirements, and replacing them with a single set of provisions that will apply across all gasoline, diesel, and other fuels programs under the current regulations.

In FY 2021, 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, inaccurate fuel economy labels on more than a million vehicles from several well-known manufacturers.

In FY 2021, EPA will continue implementing the Tier 3 standards for light-duty vehicles and certifying manufacturers' fleets for vehicle MY 2022. 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 deploy its laboratory testing resources to ensure that new cars and trucks are in compliance with the Tier 3 emissions standards.

EPA will continue working with the International Maritime Organization and the International Civil Aviation Organization (ICAO) on programs to control conventional pollutant emissions from marine and aircraft engines, respectively. In FY 2021, the Agency will work with ICAO on

⁴ Information on the proposal may be found at the following website: <https://www.epa.gov/regulations-emissions-vehicles-and-engines/safer-affordable-fuel-efficient-safe-vehicles-proposed>.

its program to develop international action plans to reduce particulate matter (PM) emissions from international civil aviation.

The Motor Vehicle Emissions Simulator (MOVES) is the Agency's emission modeling system that estimates emissions for mobile sources at the national, county, and project levels for criteria air pollutants, greenhouse gases, and air toxics. In FY 2021, MOVES will support the Agency's emission control programs, as well as provide critical support to states in their determination of program needs to meet air quality standards. The Agency also will support users on any release of a new model version based on the best available data and science.

In FY 2021, EPA will continue to provide state and local governments with assistance in developing SIPs and providing assistance with transportation conformity determinations. EPA will continue to work with states and local governments to ensure the technical integrity of the mobile source emission estimates in their SIPs. EPA will assist in identifying control options available and provide guidance, as needed. In addition, EPA will ensure national consistency in how conformity determinations are conducted across the U.S. and in the development of motor vehicle emissions budgets in air quality plans, for use in conformity determinations.

EPA will continue to provide assistance to state and local transportation and air quality agencies working on PM_{2.5} hot-spot analyses. This will help ensure that analyses use the latest available information and that a measure of consistency exists across the Nation. Additionally, EPA will continue partnering with states to support inspection and maintenance (I/M) programs that focus on in-use vehicles and engines. Basic and/or enhanced I/M testing is currently being conducted in over 30 states with technical and programmatic guidance from EPA.

In FY 2021, EPA will continue to work with a broad range of stakeholders to develop targeted, sector-based, and place-based incentives for diesel fleets (including school buses, ports, and freight) to limit emissions from older, pre-2007 diesel engines not subject to stringent emissions standards. Tens of 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.⁵ Because large numbers of people live near ports and are vulnerable to mobile source diesel emissions, EPA will focus its efforts on reducing mobile source emissions in and around ports. 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.

EPA will continue to implement the RFS Program and to carry out actions required by the EPAct of 2005 and the EISA of 2007, including operating and maintaining the credit trading systems. EISA expanded the renewable fuels provisions of EPAct and requires additional studies in various areas of renewable fuel use. EISA requires that EPA set an annual volume standard for renewable fuels, and the 2021 RFS volume requirements are statutorily required to be promulgated in FY 2020. In 2021, EPA will promulgate the annual volume standard for 2022.

⁵ 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>.

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 apply its lifecycle analysis to such fuels to evaluate and determine eligibility for the Program.

In FY 2021, 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 Renewable Identification Numbers (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 2021, EPA will continue to implement its Fuel and Fuel Additive Registration program. The Agency will prioritize its review and decisions for Part 79 registrations.

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 of the applicable emission requirements and may be entered into commerce.

	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	Units
Target					5,200	5,000	5,000	5,000	Certificates
Actual	4,225	4,360	4,453	5,109	4,869	4,711			

FY 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (+\$4,633.0) This change is an increase due to the recalculation of base payroll costs.
- (+\$480.0) This change to fixed and other costs is an increase due to the recalculation of lab utilities.
- (-\$18,971.0 / -11.8 FTE) This program change streamlines technical assistance to industry, stakeholders, state and local governments, and other partners and focuses the program on efficiently and effectively implementing core statutory requirements, including ensuring compliance with national standards to reduce air pollution from vehicles, engines, and fuels and assessing the capabilities of new and current vehicle technologies.

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.

Indoor Air and Radiation

Indoor Air: Radon Program

Program Area: Indoor Air and Radiation

Goal: A Cleaner, Healthier Environment

Objective(s): Improve Air Quality

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
Environmental Programs & Management	\$2,642.6	\$3,136.0	\$0.0	-\$3,136.0
<i>Science & Technology</i>	<i>\$16.7</i>	<i>\$143.0</i>	<i>\$0.0</i>	<i>-\$143.0</i>
Total Budget Authority	\$2,659.3	\$3,279.0	\$0.0	-\$3,279.0
Total Workyears	9.1	9.0	0.0	-9.0

Program Project Description:

Title III of the Toxic Substances Control Act (TSCA) authorizes EPA to undertake a variety of activities 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, and advises the public of steps they can take to reduce exposure. EPA’s radon program has provided important guidance, technical assistance, and funding to help states establish their own programs.

FY 2021 Activities and Performance Plan:

Resources and FTE are proposed for elimination for this program in FY 2021.

Performance Measure Targets:

EPA’s FY 2021 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (-\$143.0) This funding change proposes to eliminate the Indoor Air: Radon Program in the S&T appropriation.

Statutory Authority:

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

Radiation: Protection

Program Area: Indoor Air and Radiation

Goal: A Cleaner, Healthier Environment

Objective(s): Improve Air Quality

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
Environmental Programs & Management	\$10,880.5	\$7,992.0	\$2,470.0	-\$5,522.0
<i>Science & Technology</i>	\$2,794.7	\$1,781.0	\$1,047.0	-\$734.0
Hazardous Substance Superfund	\$1,768.6	\$1,985.0	\$2,122.0	\$137.0
Total Budget Authority	\$15,443.8	\$11,758.0	\$5,639.0	-\$6,119.0
Total Workyears	57.4	53.8	25.0	-28.8

Program Project Description:

EPA supports waste site characterization and cleanup by providing field and fixed laboratory environmental radiological and radioanalytical data and technical support, radioanalytical training to state and federal partners, and developing new and improved radioanalytical methods and field measurement technologies. 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 in the event of a radiological accident or incident. Together, these organizations provide technical support for conducting site-specific radiological characterizations and cleanups.

FY 2021 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.1, Improve Air Quality in the *FY 2018 – 2022 EPA Strategic Plan*. In FY 2021, EPA, in cooperation with states, tribes, and other federal agencies, will provide limited 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 2021 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (+\$39.0) This change is an increase due to the recalculation of base payroll costs.
- (-\$41.0) This change to fixed and other costs is a reduction due to the recalculation of lab utilities.
- (-\$732.0 / -4.2 FTE) This program change decreases support activities at the National Analytical Radiation Environmental Laboratory (NAREL) in Montgomery, Alabama and the National Center for Radiation Field Operations (NCRFO) in Las Vegas, Nevada.

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: A Cleaner, Healthier Environment
 Objective(s): Improve Air Quality

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
Environmental Programs & Management	\$2,078.1	\$2,196.0	\$2,350.0	\$154.0
Science & Technology	\$2,545.0	\$3,089.0	\$4,167.0	\$1,078.0
Total Budget Authority	\$4,623.1	\$5,285.0	\$6,517.0	\$1,232.0
Total Workyears	26.3	33.3	31.5	-1.8

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 Office of Radiation and Indoor Air program’s RERT asset is part of the Nuclear Incident Response Team under the Department of Homeland Security.

FY 2021 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.1, Improve Air Quality in the *FY 2018 – 2022 EPA Strategic Plan*. In FY 2021, EPA’s RERT will provide limited support for federal radiological emergency response and recovery operations under the National Response Framework and the National Oil and Hazardous Substances Pollution Contingency Plan. They will support basic operations (e.g., on-site technical support/consultation, fixed laboratory, and mobile laboratory analyses) to provide for the rapid collection of field measurements/samples and accurate radionuclide analyses of environmental samples.⁶

In FY 2021, NAREL and NCRFO will: maintain core levels of readiness for radiological emergency responses; participate in the most 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,

⁶ For additional information, please visit: <https://www.epa.gov/radiation/radiological-emergency-response>.

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

Performance Measure Targets:

EPA's FY 2021 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (+\$416.0) This change is an increase due to the recalculation of base payroll costs.
- (+\$392.0) This change to fixed and other costs is an increase due to the recalculation of lab utilities.
- (+\$270.0 / -0.7 FTE) This net program change reflects an adjustment in support activities for preparedness work, including basic laboratory analytic functions.

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).

Reduce Risks from Indoor Air
 Program Area: Indoor Air and Radiation
 Goal: A Cleaner, Healthier Environment
 Objective(s): Improve Air Quality

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
Environmental Programs & Management	\$10,931.6	\$11,627.0	\$0.0	-\$11,627.0
<i>Science & Technology</i>	<i>\$216.7</i>	<i>\$136.0</i>	<i>\$0.0</i>	<i>-\$136.0</i>
Total Budget Authority	\$11,148.3	\$11,763.0	\$0.0	-\$11,763.0
Total Workyears	34.7	37.2	0.0	-37.2

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. EPA supports field measurements and assessments and provides technical support for indoor air quality remediation, when requested.

FY 2021 Activities and Performance Plan:

Resources and FTE are proposed for elimination for this program in FY 2021.

Performance Measure Targets:

EPA's FY 2021 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (-\$136.0 / -1.4 FTE) This funding change proposes to eliminate the Reduce Risks from Indoor Air program in the S&T account.

Statutory Authority:

Title III of the Toxic Substances Control Act (TSCA); Title IV of the Superfund Amendments and Reauthorization Act of 1986 (SARA); Clean Air Act.

Enforcement

Forensics Support

Program Area: Enforcement

Goal: Greater Certainty, Compliance, and Effectiveness

Objective(s): Compliance with the Law

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
<i>Science & Technology</i>	<i>\$11,534.7</i>	<i>\$13,592.0</i>	<i>\$11,723.0</i>	<i>-\$1,869.0</i>
Hazardous Substance Superfund	\$1,402.3	\$1,145.0	\$1,312.0	\$167.0
Total Budget Authority	\$12,937.0	\$14,737.0	\$13,035.0	-\$1,702.0
Total Workyears	57.4	68.9	52.1	-16.8

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 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.⁷ The NEIC maintains a sophisticated chemistry and physical science laboratory and a corps of highly trained inspectors and scientists with expertise across media. The NEIC works closely with EPA's Criminal Investigation Division to provide technical support (e.g., sampling, analysis, consultation, and testimony) to criminal investigations. The NEIC also works closely with EPA's programs to provide technical support, consultation, on-site inspection, investigation, and case resolution services in support of the Agency's Civil Enforcement Program.

FY 2021 Activities and Performance Plan:

Work in this program directly supports Goal 3/Objective 3.1, Compliance with the Law in the *FY 2018 - 2022 EPA Strategic Plan*. The Forensics Support Program provides expert scientific and technical support for EPA's criminal and civil enforcement efforts. In FY 2021, NEIC will continue to streamline its forensics work, and identify enhancements to our sampling and analytical methods, using existing technology. The Program will build on its progress using the EPA Lean Management System to maximize the efficiency and effectiveness of its operations, reduce the time for completion of civil inspection reports, improve procurement processes, and continue to identify and implement further efficiencies in laboratory operations. The results of these efforts will inform EPA's work in FY 2021 and beyond.

⁷ 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.

Performance Measure Targets:

EPA's FY 2021 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (+\$1,825.0) This change is an increase due to the recalculation of base payroll costs.
- (-\$3,768.0 / -16.3 FTE) This net decrease reflects a focus on analyzing material to attribute it to individual sources or facilities and a reduction in other analytical support.
- (+\$74.0) This net change to fixed and other costs is an increase due to the recalculation of rent, utilities, and security or lab fixed costs.

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.

Homeland Security

Homeland Security: Critical Infrastructure Protection

Program Area: Homeland Security
Goal: A Cleaner, Healthier Environment
Objective(s): Provide for Clean and Safe Water

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
Environmental Programs & Management	\$444.4	\$840.0	\$1,361.0	\$521.0
<i>Science & Technology</i>	<i>\$7,957.5</i>	<i>\$9,053.0</i>	<i>\$7,732.0</i>	<i>-\$1,321.0</i>
Total Budget Authority	\$8,401.9	\$9,893.0	\$9,093.0	-\$800.0
Total Workyears	19.4	22.6	21.0	-1.6

Program Project Description:

Under the federal homeland security system, EPA is the Sector-Specific 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 U.S. 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 2021 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.2, Provide for Clean and Safe Water in the *FY 2018 – 2022 EPA Strategic Plan*. 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 2021, under this homeland security program, EPA will train about 1,500 water utilities, state officials, and federal emergency responders to become more resilient to any natural or manmade incident that could endanger water and wastewater services. In FY 2021, EPA will provide tools, training, and technical assistance which will address the highest risks confronting the water sector.

Natural Disasters and General Preparedness

Drought, floods, hurricanes, earthquakes, and other natural disasters represent a high risk to the water sector owing to their historical frequency of occurrence and their enormous potential for destruction. As evident from several recent natural disasters, the level of preparedness within the water sector varies significantly— with many utilities lacking an adequate preparedness capability. In FY 2021, EPA will improve the preparedness of the water sector by providing nationwide training sessions to address natural disasters and general preparedness with the objective to train water and wastewater systems, state officials, and emergency response partners. Specifically, EPA will:

- Provide in-person trainings and workshops which will include: Incident Command System/National Incident Management System training; drought response training; flood response training; state functional exercises (e.g., scenarios of hurricanes, floods, and earthquakes); resource typing and site access workshops; a regional interstate emergency response exercise (e.g., hurricane), etc.
- Conduct tabletop and functional exercises to improve the operation of intra-state and interstate mutual aid agreements among water utilities.
- Implement lessons learned, of relevance to the water sector, from the most recent hurricane seasons, as identified by reports from the 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*,⁸ with an emphasis on projects addressing the following four priorities: (1) establishing the critical lifeline status of the 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 water and wastewater sector for area-wide loss of water and power; and (4) advancing recognition of vulnerabilities and needed responses related to cyber risk management.
- Conduct nationwide training sessions with three critical, inter-dependent sectors: health care, emergency services, and energy. Most incidents, particularly natural disasters, have underscored the mutual reliance on the water sector with other lifeline sectors. Through training sessions 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/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, to describe existing water security efforts and progress in achieving the sector's key metrics.

Water Security Initiative and Water Lab Alliance

Water Security Initiative. The Water Security Initiative (WSI) designs and demonstrates 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 2021 request includes \$3.45 million for necessary WSI

⁸For more information, please see:

https://www.waterisac.org/sites/default/files/public/2017_CIPAC_Water_Sector_Roadmap_FINAL_051217.pdf.

Surveillance and Response System (SRS) activities to: 1) continue refining technical assistance products based on the five full-scale SRS pilots, 2) implement a monitoring and response program for water utilities focused on source water chemical spills, and 3) provide direct technical assistance to the dozens of water utilities that seek to leverage EPA's expertise in deploying their own warning system.

In FY 2021, EPA will train about 50 drinking water utilities in the design, operation, and response components of early contaminant warning systems. In particular, EPA will:

- Continue efforts to promote the water sector's adoption of Water Quality Surveillance and Response Systems. This will help to rapidly detect and respond to water quality problems, such as contamination in the distribution system, in order to reduce public health and economic consequences through the development of several online training modules and webinars, as well as the provision of in-person direct technical assistance.
- 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. EPA will compile and disseminate chemical storage data from state and local sources 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 implementing effective source water contamination detection and response systems.
- Conduct nationwide training sessions for its SRS Capabilities Assessment Tool,¹⁰ a web-based, easy-to-use, decision support tool that presents the user with a series of questions by which 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 program¹¹ within the water sector - the purpose of which is to: demonstrate the application of SRS tools in designing and operating an early warning system for contamination events; illustrate additional applications of SRS tools, such as extending the SRS approach to source water monitoring; and identify champions, within the industry, for implementing surveillance and response systems.

Water Laboratory Alliance. In a contamination event, the sheer volume or unconventional type of samples could quickly overwhelm the capacity or capability of a single laboratory. To address this potential deficiency, EPA has established a national Water Laboratory Alliance (WLA) comprised of laboratories harnessed from the range of existing lab resources from the local (e.g., water utility) to the federal levels (e.g., the Centers for Disease Control and Prevention's (CDC) Laboratory Response Network). In FY 2021, EPA will continue to promote, through exercises, expert

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/sites/production/files/2015-06/documents/srs_fact_sheet.pdf.

¹¹ For more information, please see: <https://www.epa.gov/waterqualitysurveillance>.

workshops, and association partnerships, the Water Laboratory Alliance Plan,¹² which provides a protocol for coordinated laboratory response to a surge of analytical needs. In FY 2021, under WLA, EPA will train approximately 50 laboratories in improving their ability to handle potential problems associated with surge capacity and analytical method capabilities during an emergency.

In particular, EPA will:

- Continue 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.¹³ For the WLA to become a robust infrastructure that can cover major population centers and address a diverse array of high priority contaminants, membership must continue to increase.
- Continue to target laboratories located in areas where the WLA has both inadequate membership levels and gaps in laboratory analytical capabilities.
- Coordinate with other federal agencies, primarily DHS, CDC, Food and Drug Administration, and Department of Defense, on chemical, biological, and radiological contaminants of high concern and how to detect and respond to their presence in drinking water and wastewater systems.
- 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).

Cybersecurity

Cybersecurity represents a substantial concern for the water sector, given the ubiquitous access to critical water treatment systems from the internet. In FY 2021, EPA will fulfill its obligations under Executive Order 13636 – *Improving Critical Infrastructure Cybersecurity*¹⁴ – 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 training sessions in cybersecurity threats and countermeasures for about 200 water and wastewater utilities. Specifically, EPA will:

¹² For more information, please see: <https://www.epa.gov/waterlabnetwork>.

¹³ For more information, please see: <https://www.epa.gov/dwlabcert/contact-information-certification-programs-and-certified-laboratories-drinking-water>.

¹⁴ For more information, please see: <https://www.dhs.gov/publication/executive-order-13636-improving-critical-infrastructure-cybersecurity>.

- Conduct a one-day classroom training, at locations distributed nationally, on water sector cybersecurity. The training will address cybersecurity threats (including ransomware), vulnerabilities, consequences, best practices, and incident response planning.
- Update and/or develop new course materials owing to the evolving nature of the cyber threat, such as the recently documented role of Russian state actors in infiltrating water system industrial control processes and business enterprise functions.
- Develop brief, targeted guidance documents for underserved segments of the water sector, such as small systems and technical assistance providers.
- Continue to implement a new training program for technical assistance providers that will create a nationwide, state-level network capable of providing direct assistance to water utilities in adopting and tracking cybersecurity practices across the water sector.

America's Water Infrastructure Act (AWIA)

In FY 2021, EPA will continue its efforts to fulfill the mandates of the Community Water System Risk and Resilience section of AWIA requiring community water systems, serving a population greater than 3,300, to prepare risk assessments and emergency response plans. EPA will provide technical assistance to these systems on how to conduct resilience assessments, prepare Emergency Response Plans (ERPs), and certify completion of these assessments and plans. As required by the law, EPA also will provide guidance to community water systems serving fewer than 3,300 people on how to develop a risk assessment and ERP. EPA will provide technical assistance to water systems to address drinking water vulnerabilities where EPA determines an urgent and immediate need. The EPM Homeland Security: Critical Infrastructure Protection Program also can support AWIA homeland security related work.

Performance Measure Targets:

EPA's FY 2021 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (+\$521.0) This change is an increase due to the recalculation of base payroll costs.
- (-\$1,842.0 / -3.8 FTE) This program change streamlines emergency response efforts for natural disasters through further coordination with other federal agencies and through enhanced coordination of activities with work performed in the Homeland Security: Preparedness, Response, and Recovery Program.

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.

Homeland Security: Preparedness, Response, and Recovery

Program Area: Homeland Security

Goal: A Cleaner, Healthier Environment

Objective(s): Revitalize Land and Prevent Contamination

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
<i>Science & Technology</i>	<i>\$20,492.7</i>	<i>\$23,593.0</i>	<i>\$25,542.0</i>	<i>\$1,949.0</i>
Hazardous Substance Superfund	\$31,526.7	\$31,599.0	\$33,454.0	\$1,855.0
Total Budget Authority	\$52,019.4	\$55,192.0	\$58,996.0	\$3,804.0
Total Workyears	115.3	124.1	127.1	3.0

Program Project Description:

Exposure to hazardous chemicals, 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.

As part of the FY 2021 President’s Budget, EPA’s Research and Development Program’s six integrated and transdisciplinary research programs developed and are implementing the third generation Strategic Research Action Plans (StRAPs). These updated StRAPs continue to reflect the research needs of the Agency’s program and regional offices, states, and tribes. The StRAPs received active collaboration and involvement from EPA’s Research and Development Program’s partners, which ensures that the EPA’s scientific efforts are responsive to today’s environmental concerns.

EPA’s disaster-related responsibilities are described by the following three objectives in the Homeland Security Research Program (HSRP)’s 2019-2022 StRAP: 1) contaminant characterization and consequence assessment; 2) environmental cleanup and infrastructure remediation; and 3) systems approaches to preparedness and response.

Funding supports EPA in carrying out the primary mission essential functions, including EPA’s efforts to help communities prepare for, endure, and recover from disasters – safeguarding their economic, environmental, and social well-being. HSRP collaborates with state, local, and private sector organizations and key federal agencies¹⁵ to prioritize research needs and prevent the duplication of scientific and technical work. HSRP delivers effective tools, methods, information, and guidance to local, state, and federal decision-makers that address both critical terrorism-related issues and natural or manmade disasters.

¹⁵ 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).

EPA also is responsible for operating and maintaining the network of near real-time stationary and deployable 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 Fukushima and is an EPA Critical Infrastructure/Key Resource asset. This monitoring network is supported by the IT system known as ARaDS, Analytical Radiation Data System.

Additionally, EPA serves as the Sector-Specific Agency for the water sector, coordinating water sector-specific risk assessment and management strategies and assessing and mitigating cybersecurity risks with DHS and the sector under Executive Order 13636: Improving Critical Infrastructure Cybersecurity.¹⁶

Recent accomplishments include:

- **Advancing Preparedness for Foreign Animal Disease Outbreaks:** Proper management of livestock carcasses during large-scale foreign animal disease outbreaks can protect humans, livestock, and wildlife from biological hazards. To effectively respond to large-scale animal mortality incidents, while minimizing potential environmental and economic impacts, HSRP studied various livestock carcass management options and provided decision-making criteria to help manage foreign animal disease outbreaks. Healthy livestock can become infected by inhaling or ingesting foot-and-mouth virus or African swine fever virus released from infected animals or carcasses. Carcasses must be managed immediately after death, otherwise nearby livestock will be exposed, threatening the human food supply. Site-specific conditions affect which of seven management options¹⁷ are most appropriate in the aftermath of a biological incident. HSRP developed a technical report¹⁸ to help make site-specific decisions for dissemination to public health and environmental agencies, animal farmers, veterinarians, and other diverse groups of professionals, which is available online through EPA's science inventory.
- **Improving Drinking Water Infrastructure Capabilities Response to Contamination:** EPA is the lead federal agency responsible for working with water utility companies to protect water distribution systems from contamination. Drinking water distribution systems are vulnerable to intentional or accidental contamination, which presents challenges to maintaining water quality and availability. Decontamination of drinking water systems is critical in ensuring system operation and restoring public confidence in the system's safety. A research concern of EPA is the effect of terrorist anthrax attacks against critical infrastructure, including the drinking water sector. EPA research, under HSRP, examined full-scale decontamination demonstration of drinking water infrastructure after a biological agent contamination event, using a nonpathogenic surrogate for anthrax in collaboration with the U.S. Department of Energy's Idaho National Laboratory. This research

¹⁶ For more information, please see: <https://obamawhitehouse.archives.gov/the-press-office/2013/02/12/executive-order-improving-critical-infrastructure-cybersecurity>.

¹⁷ Options include: on-site open burning, on-site air-curtain burning, on-site unlined burial, on-site composting, off-site fixed-facility incineration, off-site landfilling, and off-site carcass rendering.

¹⁸ For more information, please see: Exposure Assessment of Livestock Carcass Management Options During a Foreign Animal Disease Outbreak, https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=342127&Lab=NHSRC.

determined decontamination methodologies best suited for use by water utilities.¹⁹ Effective management of contaminated water is needed to improve emergency response, shorten response time, and improve preparedness.

- **Accelerating Response Time with Effective Waste Management:** Large-scale natural disasters have the potential to generate a significant amount of waste. For example, Hurricane Katrina and the Joplin Missouri tornado resulted in 100 million and 1.5 million cubic yards of waste. Man-made chemical, biological, radiological and nuclear (CBRN) incidents, created by acts of terrorism, war, or accidents, have the potential to generate as much or more hazardous waste. Successful recovery is dependent on effective waste management. The quantification, segregation, transportation, and storage of waste can be an arduous and costly undertaking. For example, following an incident, vehicles will be damaged and/or contaminated to varying degrees and left unattended within the impacted area. The timely removal process may overwhelm local, state, and federal recovery efforts. EPA research identified methods to collect, decontaminate, recycle, or dispose of contaminated vehicles following a wide-area incident in collaboration with federal, state, and local governments, as well as researchers and experts from the automotive recycling, scrap recycling, waste management, and insurance industries.²⁰ The research results help reduce the cost and time associated with the aforementioned process of removing contaminated vehicles resulting from a wide-area incident.

FY 2021 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.3, Revitalize Land and Prevent Contamination in the *FY 2018 - 2022 EPA Strategic Plan*. This work also is subject to evaluation by the Agency's Board of Scientific Counselors (BOSC), which is an independent expert body that performs evaluations and lends advice on the strategic research planning for EPA's Research and Development Program.

The following work is reflected in the HSRP's Strategic Research Action 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.

Characterizing Contamination and Assessing Consequence. Research on contaminant characterization, coupled with an understanding of exposure potential, can be used to inform the public health consequences of contaminant exposure. HSRP addresses how contaminants behave in water systems and the built and natural environment, including the development of capabilities

¹⁹ For more information, please see: Full-Scale Decontamination of Bacillus Spores from Drinking Water Infrastructure, https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=345158&Lab=NHSRC&subject=Homeland%20Security%20Research&view=desc&sortBy=pubDateYear&showCriteria=1&count=25&searchall=%27water%20security%27%20AND%20%27biological%27&

⁶ For more information, please see: Management and Disposal of Vehicles Following a Wide Area Incident: Literature Review and Stakeholder Workshop, https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=345827&Lab=NHSRC&fed_org_id=1253&subject=Homeland%20Security%20Research&view=desc&sortBy=pubDateYear&showCriteria=1&count=25&searchall='indoor%20outdoor%20decontamination.

to support decision makers in their assessment of contamination threats to public health. HSRP will develop contaminant detection, environmental sampling, and analytical capabilities. These research areas provide essential information to support environmental response and remediation decision making to protect public health and the environment. In FY 2021, HSRP will:

- Study the fate of persistent chemical agents and pesticides in porous or permeable materials informing remediation options.
- Conduct studies on biological contaminant fate, transport, and inactivation in water and wastewater systems to inform mitigation decisions.
- Develop biological sample collection methods for environmental matrices and protocols for target biological agent analysis.
- Develop indoor contaminant mapping capabilities for supporting radiological remediation decision making.

Environmental Cleanup and Infrastructure Remediation. EPA has extensive expertise in cleaning up contamination associated with accidental spills and industrial accidents. However, experience in remediating CBRN contamination, released over wide areas, such as outdoor urban centers or impacted water systems, is lacking. Such a release can pose a continual challenge for remediation with long-standing environmental and health consequences. As the lead 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.²¹

EPA research, under HSRP, aims to fill the most critical capability gaps so that EPA can make the most informed mitigation and remediation decisions. HSRP research will focus on: 1) wide-area decontamination research to develop capabilities for addressing hazardous contaminants in the environment, including indoor and outdoor areas, 2) water treatment and decontamination of water systems, and 3) waste management as part of the response and remediation efforts. In FY 2021, HSRP will:

- Develop decontamination methods for biological agent contaminated outdoor surfaces and vehicles.
- Conduct research to test decontamination approaches at the bench, pilot, and the full-scale water security test bed for contaminated drinking water infrastructure.
- Evaluate methods for homeowner decontamination of plumbing and appliances connected to the water distribution system.
- Develop methods to determine water treatment and infrastructure decontamination options for CBR contaminants to assist on-site treatment of CBR contaminated water.
- Develop tools and information to aid in CBR waste and waste water minimization, staging/storage, treatment, transport, and disposal.

System Approaches to Preparedness and Response. Transitioning the research into field ready capabilities involves ensuring that decision makers and responders have knowledge of and access

²¹ 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.

to the latest information. Decision makers need access to tools and information built from a systems approach where each of the research areas are brought together through their interdependencies and relative impacts. Priorities for HSRP address the development of systems-based tools by pulling together the connected elements of the research products to provide technical support and decision-support tools and this ensures that information is readily and easily accessible during an emergency. In FY 2021, EPA's HSRP will:

- Conduct a study to develop resilience tools for community and water networks including associated case studies. This study will improve community resiliency to man-made and natural disasters with the ability to respond rapidly.
- Evaluate and develop data management, communication, and characterization for CBRN response and recovery. New emerging technology to the response community will enhance the ability to gather necessary information to make informed decisions and greatly reduce the time necessary to collect information and improve the safety for responders.

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 will provide the Agency, first responders, and the public with greater access to data, and, should there be a radiological emergency, improve officials' ability to make decisions about protecting public health and the environment during and after the incident. Additionally, the data will be used by scientists to better characterize the effect of a radiological incident.

In FY 2021, the Agency will continue to operate the *RadNet* air monitoring network, add exposure rate meter capability to the network, and provide essential maintenance to the network. In order to best maximize resources, monitors will add exposure rate meter capability 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. Fixed stations will operate in conjunction with deployable monitoring assets available during a radiological incident.

Research Planning:

EPA's Board of Scientific Counselors (BOSC) is a federal advisory committee that provides advice and recommendations to EPA on technical and management issues of its research program. The HSRP will meet regularly over the next several years with the BOSC HSRP Subcommittee to seek their input on topics related to research program design, science quality, innovation, relevance, and impact.

The Agency assesses its research performance through the distribution of research evaluation surveys that are distributed to key users of its research products. This provides evidence for how research products are being used, by whom, and the degree of satisfaction product users have with research product quality, usability, and timeliness of delivery. Through the evaluation process, the Agency identifies its strengths and finds targeted areas for improvement to its research programs.

This work supports the long-term performance goal of percent of research products meeting customer needs in the *FY 2018-2022 EPA Strategic Plan*.

EPA's state engagement²² is designed to inform states about EPA's research programs and role within EPA, and to better understand the science needs of state environmental and health agencies. Key partners at the state level include the Environmental Council of the States—with its Environmental Research Institute of the States and Interstate Technology and Regulatory Council—and the Association of State and Territorial Health Officials, as well as state media associations such as the Association of Clean Water Administrators and the Association of State Drinking Water Administrators.

Performance Measure Targets:

Work under this program supports performance results in the Research: Sustainable and Healthy Communities Program under the S&T appropriation.

FY 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (+\$731.0) This change is an increase due to the recalculation of base payroll costs.
- (-\$361.0) This program change is a decrease in resources for addressing radiological emergency preparedness.
- (+\$609.0 / -2.0 FTE) This net program change is a change in resources and FTE for decontamination research.
- (+\$970.0 / +5.0 FTE) This program change is an increase in resources and FTE for a focused effort to meet EPA's responsibilities as the water Sector-Specific Agency implementing specific statutory and Presidential directives relating to water security.

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 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.

²² For more information, please see: <https://www.epa.gov/research/epa-research-solutions-states>.

Homeland Security: Protection of EPA Personnel and Infrastructure

Program Area: Homeland Security

Goal: Greater Certainty, Compliance, and Effectiveness

Objective(s): Improve Efficiency and Effectiveness

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
Environmental Programs & Management	\$5,755.6	\$5,355.0	\$4,986.0	-\$369.0
<i>Science & Technology</i>	<i>\$410.0</i>	<i>\$443.0</i>	<i>\$500.0</i>	<i>\$57.0</i>
Building and Facilities	\$4,259.1	\$6,676.0	\$6,176.0	-\$500.0
Hazardous Substance Superfund	\$979.3	\$1,017.0	\$915.0	-\$102.0
Total Budget Authority	\$11,404.0	\$13,491.0	\$12,577.0	-\$914.0
Total Workyears	8.8	9.2	9.2	0.0

Total workyears in FY 2021 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 the capability of EPA’s vital laboratory infrastructure assets. Specifically, funds within this appropriation support security needs for the National Vehicle and Fuel Emissions Laboratory (NVFEL).

FY 2021 Activities and Performance Plan:

Work in this program directly supports Goal 3/Objective 3.5, Improve Efficiency and Effectiveness in the *FY 2018 – 2022 EPA Strategic Plan*.

In FY 2021, the Agency will continue to provide enhanced physical security for the NVFEL and its employees. This funding supports the incremental cost of security enhancements required as part of an Agency security assessment review.

Performance Measure Targets:

EPA’s FY 2021 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (+\$57.0) This program change increases resources for infrastructure security at the NVFEL.

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).

IT / Data Management/ Security

IT / Data Management

Program Area: IT / Data Management / Security
Goal: Greater Certainty, Compliance, and Effectiveness
Objective(s): Improve Efficiency and Effectiveness

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
Environmental Programs & Management	\$78,748.7	\$80,223.0	\$79,064.0	-\$1,159.0
<i>Science & Technology</i>	\$3,092.6	\$3,072.0	\$2,890.0	-\$182.0
Hazardous Substance Superfund	\$13,755.5	\$13,792.0	\$13,874.0	\$82.0
Total Budget Authority	\$95,596.8	\$97,087.0	\$95,828.0	-\$1,259.0
Total Workyears	391.4	459.4	469.9	10.5

Total workyears in FY 2021 include 172.0 FTE to support 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,²³ EPA National Library Network, and One EPA Web.

The Quality Program provides quality policies and practices intended to ensure all environmentally-related data activities performed by or for the Agency will result in the production of data that are of adequate quality to support their intended uses. The Quality Program provides Quality Assurance (QA) policies, training, oversight, and technical support to assist EPA’s programs in implementing quality management systems for all environmental data operations. It also oversees the implementation of EPA’s Information Quality Guidelines. The EPA National Library Network provides information resources and services to EPA staff and to the public to support the mission of EPA.

FY 2021 Activities and Performance Plan:

Work in this program directly supports Goal 3/Objective 3.5, Improve Efficiency and Effectiveness in the *FY 2018 - 2022 EPA Strategic Plan*. The Quality Program will continue to provide technical support to all EPA offices and laboratories in implementing EPA quality policies, procedures, and standards. In FY 2021, the Quality Program will conduct one Quality Management Plan review and one Quality System Assessment for selected EPA programs. These oversight activities help ensure the quality of EPA’s data for intended uses, including environmental decision-making.

²³ More information about EPA’s Quality Program can be found at: <http://www.epa.gov/quality>.

The Quality Program also will continue using an enterprise QA tracking and reporting IT system, which is expected to be implemented in FY 2020. The enterprise QA tracking and reporting system simplifies, standardizes, and centralizes the QA annual reporting process by providing a mechanism for EPA organizations' quality activities throughout the year. Additionally, the Quality Program will provide oversight of EPA's Information Quality Guidelines and facilitate the development of the Agency's responses to public requests for correction of information disseminated by EPA. 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 access to environmental information 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 2021, EPA will work to transform the Agency's libraries to meet the needs of the 21st Century customer. EPA will streamline library collections and seek to make enhancements to the physical space to improve the customer service experience.

Performance Measure Targets:

EPA's FY 2021 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (+\$579.0) This change is an increase due to recalculation of base payroll costs.
- (-\$761.0 / -1.5 FTE) This net program change modifies the timeline for development of new technologies to address agency needs such as new assistive technology tools, ability to re-platform legacy applications, and replace end of service IT equipment that provides basic workforce support across the Agency.

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

Facilities Infrastructure and Operations

Program Area: Operations and Administration

Goal: Greater Certainty, Compliance, and Effectiveness

Objective(s): Improve Efficiency and Effectiveness

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
Environmental Programs & Management	\$321,500.4	\$287,595.0	\$317,345.0	\$29,750.0
Science & Technology	\$67,856.9	\$65,372.0	\$67,908.0	\$2,536.0
Building and Facilities	\$23,017.8	\$26,922.0	\$33,377.0	\$6,455.0
Leaking Underground Storage Tanks	\$847.2	\$868.0	\$796.0	-\$72.0
Inland Oil Spill Programs	\$577.3	\$665.0	\$682.0	\$17.0
Hazardous Substance Superfund	\$82,243.2	\$76,473.0	\$76,831.0	\$358.0
Total Budget Authority	\$496,042.8	\$457,895.0	\$496,939.0	\$39,044.0
Total Workyears	329.9	315.4	307.6	-7.8

Total workyears in FY 2021 include 2.1 FTE to support Facilities Infrastructure and Operations working capital fund (WCF) services.

Program Project Description:

Science & Technology (S&T) resources in the Facilities Infrastructure and Operations Program fund 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, sustainable facilities and energy conservation planning and support, and space planning. Funding for such services is allocated among the major appropriations for the Agency.

FY 2021 Activities and Performance Plan:

Work in this program directly supports Goal 3/Objective 3.5, Improve Efficiency and Effectiveness in the *FY 2018 – 2022 EPA Strategic Plan*. In FY 2021, EPA will continue to invest in the reconfiguration of EPA’s workspaces, enabling the Agency to release office space and reduce long-term rent costs, consistent with HR 4465,²⁴ the *Federal Assets Sale and Transfer Act of 2016*. EPA is implementing a long-term space consolidation plan that will reduce the number of occupied facilities, consolidate space within remaining facilities, and reduce square footage wherever practical. EPA also will continue to work to enhance its federal infrastructure and operations in a manner that increases efficiency.²⁵

²⁴ For additional information, please refer to: <https://www.congress.gov/bill/114th-congress/house-bill/4465>, *Federal Assets Sale and Transfer Act of 2016*.

²⁵ For additional information, please refer to: <https://www.whitehouse.gov/presidential-actions/executive-order-regarding-efficient-federal-operations/>, Executive Order 13834 "Efficient Federal Operations". For information on EPA’s FY 2018 performance for efficient Federal operations/management, please visit: <https://www.sustainability.gov/images/scorecards/epa-scorecard-fy2018.png>.

EPA is working toward the long-term performance goal in the *FY 2018 – 2022 EPA Strategic Plan* to reduce unused office and warehouse space by 850,641 square feet nationwide by September 30, 2022. This has the potential to provide a cumulative annual rent avoidance of nearly \$28 million across all appropriations. This will help offset EPA’s escalating rent and security costs. In FY 2019, EPA released 128,150 square feet of unused office and warehouse space. Planned consolidations in FY 2021 will allow EPA to release an expected 319,693 square feet of space. For FY 2021, the Agency is requesting \$27.69 million for rent, \$19.78 million for utilities, and \$15.16 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.

In FY 2021, the Agency will take aggressive action to reconfigure EPA’s workplaces with the goal of reducing long-term rent costs. Space consolidation and reconfiguration enables EPA to reduce its footprint to create a more efficient, collaborative, and technologically sophisticated workplace. EPA will continue to manage lease agreements with GSA and private landlords, and fund costs associated with utilities and building security needs.

Performance Measure Targets:

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

FY 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (+\$2,536.0) This net change to fixed and other costs is an increase due to the recalculation of rent, utilities, security, and transit subsidy.

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

Pesticides: Protect Human Health from Pesticide Risk

Program Area: Pesticides Licensing

Goal: A Cleaner, Healthier Environment

Objective(s): Ensure Safety of Chemicals in the Marketplace

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
Environmental Programs & Management	\$55,368.2	\$58,753.0	\$51,268.0	-\$7,485.0
<i>Science & Technology</i>	\$3,098.5	\$3,154.0	\$2,443.0	-\$711.0
Total Budget Authority	\$58,466.7	\$61,907.0	\$53,711.0	-\$8,196.0
Total Workyears	366.4	387.6	416.5	28.9

Total program workyears in FY 2021 include 126.0 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),²⁶ 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. The Agency must balance the risks and benefits of other uses. For antimicrobial pesticides with public health claims, the EPA requires that manufacturers perform tests to ensure the efficacy (i.e., performance) of products per the labelling.

This program operates two laboratories, the Microbiology Laboratory,²⁷ and the Analytical Laboratory,²⁸ 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 2021 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.4, Ensure Safety of Chemicals in the Marketplace in the *FY 2018 - 2022 EPA Strategic Plan*. In FY 2021, the Microbiology Laboratory

²⁶ On Friday, March 8, 2019, the President signed into law 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.

²⁷ For additional information, please visit: <https://www.epa.gov/aboutepa/about-microbiology-laboratory>.

²⁸ For additional information, please visit: <https://www.epa.gov/aboutepa/about-analytical-chemistry-laboratory-acl>.

will 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 and new claims for existing products. Specific initiatives for FY 2021 include the following:

- Data collection and analysis on the Organization for Economic Cooperation and Development (OECD) quantitative method for bactericidal claims to support adoption of the method for regulatory purposes, including an analysis of data from the FY 2020 multi-laboratory studies. The method is currently used by EPA to assess performance of antimicrobial products against two major public health pests, *Clostridioides difficile* (C. diff.) and *Candida auris*, and the laboratory is developing data to expand the use of the method for testing other human pathogenic bacteria and viruses including drug resistant strains (e.g., MRSA, human influenza virus).
- Continued development of a method and associated guidance for assessing the effectiveness of *Legionella* in recirculating water for cooling tower remediation. Conduct and coordinate verification studies to confirm the method for evaluation of the performance of antimicrobial products against *Legionella* for decontamination and/or remediation claims.
- Support for the Centers for Disease Control and Prevention (CDC) by generating data on a broad range of product formulations (e.g., antimicrobial wipes and ready-to-use formulations) and active ingredients to inform the CDC and other federal agencies (e.g., Veterans Administration) on options for surface decontamination for the emerging fungus pathogen (*Candida auris*) including the drug resistant strain.
- Posting of the final guidance and standard efficacy method for the registration of copper-containing surface.
- Development of a prototype method for evaluating porous materials found in clinical environments (room separation curtains, vinyl surfaces, etc.)
- Development of the first workplan for comment on the risk-based post-registration efficacy testing program (e.g., surveillance testing of *C. difficile* products) per EPA's response to the Office of the Inspector General (Report No. 16-P-0316).
- Continued posting and maintenance of a website for existing and new antimicrobial test methods and guidance documents.²⁹

In FY 2021, 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 Analytical Chemistry 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;
- As needed, 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;

²⁹ For additional information, please refer to the following website: <https://www.epa.gov/pesticide-analytical-methods/antimicrobial-testing-methods-procedures-developed-epas-microbiology>.

- Develop protocols and generate data to improve the Office of Pesticide Programs' dietary risk assessment of household antimicrobial disinfectant products that require potable water rinse;
- Provide analytical assistance and technical advice to all regional offices in support of their enforcement cases;
- Verify that antimicrobial pesticides are properly formulated (as requested); and
- Operate EPA's National Pesticide Standard Repository.

Preventing Disease through Public Health Pesticides: Antimicrobial Testing

Antimicrobial pesticides play an important role in public health and safety by killing germs, bacteria, viruses, fungi, protozoa, algae, and slime. Some of these products are used to sterilize hard surfaces in hospitals. Chemical disinfection of hard, non-porous surfaces such as floors, bed rails, and tables is one component of the infection control systems in hospitals, food processing operations, and other places where disease-causing microorganisms, such as bacteria and viruses, may be present. In reviewing registrations for antimicrobials, EPA is required to ensure that antimicrobials maintain their effectiveness.³⁰

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 currently in the process of developing a new risk-based testing strategy in response to OIG recommendations made in FY 2016.³¹ Consistent with the OIG recommendations, EPA suspended the ATP in November 2017 and 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 in FY 2022.

Evidence and Evaluation

The Microbiology Laboratory will continue efficacy method development activities to support EPA's antimicrobial pesticide regulatory programs. In support of these efforts, the Microbiology Laboratory submitted several methods for emerging pathogens (*Clostridioides difficile* and biofilms) and selected formulation types (towelette) to American Society for Testing and Materials (ASTM) workgroups for technical review in FY 2019. These methods have since been approved by ASTM. The peer-review process provided during the ASTM workgroup meetings helped optimize and improve the clarity of the methods, as well as making the methods more robust and relevant to real-world scenarios. The results of these efforts will help ensure products are available for control of *Clostridioides difficile* and biofilms and inform EPA's method development activities in FY 2021 and beyond.

The Analytical Chemistry Laboratory is developing a protocol to measure the residues of pesticides left on a kitchen counter that has been sprayed with an antimicrobial product and followed with a potable water rinse (PWR). This protocol, when approved, will be used by the manufacturers to collect residue data for active ingredients in antimicrobial products with indirect

³⁰ See, FIFRA section 3(h)(3), 7 U.S.C. 136a(h)(3).

³¹ For additional information, please visit: <https://www.epa.gov/pesticide-registration/antimicrobial-testing-program>.

food uses. These data will help the Agency refine its dietary risk assessments, which historically, were based on the assumption of no residue remaining after a PWR.

Through ongoing efficiency reviews of its analytical data processing procedures, the Analytical Chemistry Laboratory has streamlined its analytical data processing procedures by utilizing automated data transfer from the instruments and customized spreadsheets for data reporting. In FY 2021, the Laboratory will continue to identify ways to improve its efficiency, including streamlining data review processes according to the ISO 17025 guidelines, using electronic media to store analytical data, and establishing a laboratory LAN. By identifying efficiencies in the analytical processing procedures, the Laboratory expects to reduce turn-around time and errors commonly seen with manual data processing, thus providing the Agency with more timely, traceable, and accurate data for use in assessing risks of pesticides to human health and the environment.

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 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (+\$16.0) This change is an increase due to the recalculation of base payroll costs.
- (-\$727.0) This net program change is a reduction in funding for pesticide program activities from annual appropriations with the intent to increase utilization of pesticide user fee collections.

Statutory Authority:

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

Pesticides: Protect the Environment from Pesticide Risk

Program Area: Pesticides Licensing

Goal: A Cleaner, Healthier Environment

Objective(s): Ensure Safety of Chemicals in the Marketplace

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
Environmental Programs & Management	\$39,444.2	\$38,966.0	\$32,100.0	-\$6,866.0
<i>Science & Technology</i>	\$2,415.8	\$2,327.0	\$2,616.0	\$289.0
Total Budget Authority	\$41,860.0	\$41,293.0	\$34,716.0	-\$6,577.0
Total Workyears	295.3	249.6	268.4	18.8

Total program workyears in FY 2021 include 85.0 FTE funded by the Reregistration and Expedited Processing Revolving Fund.

Program Project Description:

In compliance with the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA),³² EPA conducts risk assessments using the latest scientific methods to determine the risks that pesticides pose to human health and the ecological effects on plants, animals, and ecosystems that are not the targets of the pesticide. The Agency’s significant regulatory decisions are posted for review and comment to ensure that these actions are transparent, and to allow stakeholders, including at-risk populations, to be engaged in decisions that affect their environment.

EPA’s Pesticide Program operates two laboratories, the Microbiology Laboratory³³ and the Analytical 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 will continue to provide a variety of technical services to EPA, other federal and state agencies, tribal nations, and other organizations to ensure the protection of the environment from pesticide risk.

FY 2021 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.4 Ensure Safety of Chemicals in the Marketplace in the *FY 2018 – 2022 EPA Strategic Plan*. In FY 2021, EPA must determine that food and residential uses of pesticides are safe. For other risk concerns, EPA must balance the risks of the pesticides with benefits provided from the use of the product. To avoid unreasonable risks, EPA may impose risk mitigation measures such as modifying use rates or application

³² See, FIFRA, Sections 2 and 3, Definitions, Registration of Pesticides (7 U.S.C. §§ 136, 136a). Available online at: <https://www.epa.gov/laws-regulations/summary-federal-insecticide-fungicide-and-rodenticide-act>. Section 3(c)(5) of FIFRA states that the Administrator shall register a pesticide if it is determined that, when used in accordance with labeling and common practices, the product “will also not generally cause unreasonable adverse effects on the environment.” FIFRA defines “unreasonable adverse effects on the environment”, as “any unreasonable risk to man or the environment, considering the economic, social, and environmental costs and benefits of the use of any pesticide.”

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>.

methods, restricting uses, or denying some or all uses. In some regulatory decisions, EPA may determine that uncertainties in the risk determination need to be reduced and may require monitoring of environmental conditions, such as effects on water sources, development of new, standardized methodologies, or the development and submission of additional laboratory or field study data by the pesticide registrant.

In addition to FIFRA responsibilities, the Agency has responsibilities under the Endangered Species Act (ESA).³⁵ 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 ESA standard.

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 in the environment.

In FY 2021, 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, etc., can be devastating to 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 in the field, the response to an animal pathogen outbreak and submission of requests under FIFRA Section 18 to address these outbreaks relies 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 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 the development of new antimicrobial products following contemporary regulatory requirements.

In FY 2021, 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

³⁵ 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: <http://www.fws.gov/endangered/laws-policies/section-7.html>.

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 Laboratory also will continue to support pesticide registration review by evaluating the accuracy and precision of sulfuryl fluoride detection devices used to detect the presence of a fumigant prior to re-entry. In addition, the Laboratory will continue to review the effectiveness of a potable water rinse at removing residues of antimicrobial active ingredients from different surface types in an effort to refine the exposure estimates used in risk assessments for these active ingredients. Finally, in FY 2021, the Analytical Chemistry Laboratory 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 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (-\$36.0) This change is a decrease due to the recalculation of base payroll costs.
- (+\$325.0) This change is an increase in laboratory operation 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: A Cleaner, Healthier Environment

Objective(s): Ensure Safety of Chemicals in the Marketplace

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
Environmental Programs & Management	\$7,193.6	\$7,722.0	\$6,014.0	-\$1,708.0
<i>Science & Technology</i>	<i>\$354.6</i>	<i>\$405.0</i>	<i>\$684.0</i>	<i>\$279.0</i>
Total Budget Authority	\$7,548.2	\$8,127.0	\$6,698.0	-\$1,429.0
Total Workyears	31.9	35.8	46.3	10.5

Total program workyears in FY 2021 include 10.5 FTE funded by the Reregistration and Expedited Processing Revolving Fund.

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 Laboratory³⁶ and the Analytical Chemistry Laboratory,³⁷ that support the goal of protecting human health and the environment through diverse analytical testing and analytical method development, and validation efforts.

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*, which collects and maintains pesticide standards (*i.e.*, samples of pure active ingredients or technical grade active ingredients, regulated metabolites, degradates, and related compounds).

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.

³⁶ For additional information, please visit: <https://www.epa.gov/aboutepa/about-microbiology-laboratory>.

³⁷ For additional information, please visit: <https://www.epa.gov/aboutepa/about-analytical-chemistry-laboratory-acl>.

FY 2021 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.4 Ensure Safety of Chemicals in the Marketplace in the *FY 2018 – 2022 EPA Strategic Plan*. In FY 2021, EPA will realize the benefits of pesticides by ensuring the continued operation of the National Pesticide Standard Repository. The Laboratories 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).

In FY 2021, the Microbiology Laboratory will continue to evaluate FIFRA Section 18 emergency exemptions and novel protocol requests for new uses and novel pathogens. The Laboratory 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 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 2021.

The Analytical Chemistry Laboratory will continue its work in developing and validating multiresidue methods using state-of-the-art methodology and instrumentation; in providing chemical analysis for assessing risk to human health and to the environment from agricultural use of pesticides; and in providing technical support to all EPA regions to ensure that pesticide products are formulated according to approved labels.

The Microbiology Laboratory will continue to refine and develop methods to support EPA's Section 3 and Section 18 regulatory programs. In FY 2019, in support of these efforts, the Laboratory expanded the scope of porous materials (e.g., wood, concrete, rubber etc.) used in a new quantitative efficacy test method to enable the U.S. Department of Agriculture (USDA) to evaluate chemicals against new high consequence animal pathogens (e.g., Newcastle disease virus) on hard and porous surfaces. The results of USDA's use of the method will help inform EPA's method development activities for other emerging and high consequence pathogens in FY 2021 and beyond.

The Analytical Chemistry Laboratory maintains EPA's *National Pesticide Standard Repository* pursuant to 40 CFR part 158. This laboratory collects and maintains an inventory of analytical standards of registered pesticides in the United States, as well as some that are not currently registered. EPA provides the 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 is approximately 15 working days. Using the results of the efficiency review, in FY 2021 and beyond, the Analytical Chemistry Laboratory will implement procedural changes to identify areas for improvement and reduce the turnaround time to 12 days (for those pesticide

standard requests that are not complicated and/or standards that are not expiring) to help federal agencies, states, and tribes laboratories expedite enforcement efforts.

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 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (+\$292.0) This change is an increase due to the recalculation of base payroll costs.
- (-\$13.0) This program change is a slight decrease in funding for pesticide laboratory operations and maintenance activities.

Statutory Authority:

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

Research: Air and Energy

Research: Air and Energy

Program Area: Research: Air and Energy

Goal: Greater Certainty, Compliance, and Effectiveness

Objective(s): Prioritize Robust Science

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
<i>Science & Technology</i>	<i>\$85,895.8</i>	<i>\$94,496.0</i>	<i>\$33,543.0</i>	<i>-\$60,953.0</i>
Total Budget Authority	\$85,895.8	\$94,496.0	\$33,543.0	-\$60,953.0
Total Workyears	252.8	258.0	153.8	-104.2

Program Project Description:

The Air and Energy (A-E) Research Program provides scientific information to EPA program and regional offices, states, tribes, and other stakeholders. A-E strives to advance the science needed to achieve clean air and attain the National Ambient Air Quality Standards³⁸ (NAAQS), which will protect human health and ecosystems throughout the Nation.

The A-E Research Program is one of six integrated and transdisciplinary research programs in the Research and Development Program. Each of the six integrated and transdisciplinary research 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 implemented with their active collaboration and involvement. As part of the FY 2021 Budget, the new A-E FY 2019-2022 StRAP builds upon prior A-E StRAPs and continues a practice of conducting innovative scientific research aimed at solving the problems encountered by Agency partners and stakeholders.

The resources requested for A-E will support the analysis of research data, as well as the publication of scientific journal articles to disseminate findings from prior EPA research related to air quality, its impacts to health and the environment, and resilience. The A-E Research Program also will offer critical support to provide essential science and tools for policy decisions and public awareness on the following research topics: science for air quality decisions, extreme events and emerging risks, and next-generation methods to improve public health and the environment. The A-E Research Program relies on successful partnerships with others, including academic and industry researchers, states, local and private sector organizations, as well as key federal agencies.

³⁸ 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.

Recent Accomplishments of the A-E Research Program include:

- **Smoke from Wildland Fires:** EPA conducts research on emissions and air quality impacts from wildland fires. Timely communication of health risks and health protective actions during wildland fire smoke events also is a commitment for EPA. The interagency Wildland Fire Sensors Challenge³⁹ involved coordination across multiple agencies and states to stimulate innovation in the development of multipollutant sensors that can operate in wildfire conditions. Winners of the challenge were announced in September 2018; and in 2019, EPA evaluated the winning prototype sensors for their performance compared to regulatory-grade instruments. The Smoke Sense Project⁴⁰ (which includes a mobile app, a web-based data visualization tool, and scientific analyses of citizen science generated data) is providing valuable insights into where and when people are exposed to wildfire smoke, the health symptoms they experience, and the types of behaviors they engage in to reduce exposures. This effort has engaged over 30,000 citizen scientists from all 50 states. In 2019, EPA also began a collaboration with the Missoula City-County Health Department in Montana and the Hoopa Valley Tribe in California on a research study to evaluate how air-handling systems can reduce indoor exposure to wildfire smoke and a laboratory study on the efficacy of various portable air cleaners during smoke episodes.
- **Sensor Technology:** EPA conducts a wide range of research that involves the discovery, evaluation, and the direct integration of novel or experimental air quality monitoring technology. A wide range of stakeholders have benefited directly from EPA’s sensor research. For example, Agency staff rely on information sharing, performance evaluation consultation, and the implementation of new technologies whose purposes range from citizen science to environmental assessment. State agencies often rely upon A-E to provide technical knowledge on the use of emerging air quality technologies. Sensor manufacturers regularly consult with A-E on sensor research progress, interactions that were facilitated by public workshops⁴¹ in 2018 and 2019. As of 2019, EPA’s Regional Applied Research Efforts⁴² and Regional-State-Tribal Innovation⁴³ programs funded sensor projects in California, Washington, North Carolina, Georgia, and Florida, as well as states in EPA Region 5. Through the Science to Achieve Results (STAR) Program, EPA funded six ‘Air Pollution Monitoring for Communities’ grants⁴⁴ to research organizations working with communities in five states and the Yakima Nation to set up sensors to monitor local air quality. To enable broader use of sensors, EPA will develop guides for ensuring data quality, evaluating sensor performance, and approaching sensor data management, while engaging with stakeholders to ensure the guides meet their needs.

³⁹ For more information, please see: <https://www.epa.gov/air-research/winners-wildland-fire-sensors-challenge-develop-air-monitoring-system-prototypes>.

⁴⁰ For more information, please see: <https://www.epa.gov/air-research/smoke-sense-study-citizen-science-project-using-mobile-app>.

⁴¹ For more information, please see: <https://www.epa.gov/air-research/deliberating-performance-targets-air-quality-sensors-workshops>.

⁴² For more information, please see: <https://www.epa.gov/sites/production/files/2013-12/documents/rare-201304.pdf>.

⁴³ For more information, please see: <https://www.epa.gov/innovation/science-innovation>.

⁴⁴ For more information, please see: https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/recipient.display/rfa_id/587.

- **Perfluoroalkyl and polyfluoroalkyl substances (PFAS) Research:** In April 2019, the New Hampshire Department of Environmental Services released a report⁴⁵ summarizing the 2018 results for PFAS analyses performed by EPA. The Research and Development Program evaluated the initial steps toward developing a method to sample for the presence of PFAS compounds from air emission sources. Field testing was conducted at a site in New Hampshire and confirmed at least 12 different PFAS compounds in the emission source. EPA researchers are continuing work with states and other agencies to improve the technique and to enable emissions to be quantified with greater confidence in support of efforts to identify and reduce PFAS emissions into the atmosphere. For example, emissions testing and analysis of a soil incineration process are planned in collaboration with the Department of Defense in Alaska for 2019 through 2021.
- **Community Multi-Scale Air Quality Model (CMAQ) Update:**⁴⁶ EPA released a publicly available, updated version of the CMAQ on August 28, 2019. A beta version of the new version was released earlier in 2019. Since its inception in 1998, CMAQ has been updated regularly to incorporate new science as it emerges. CMAQ is used to evaluate potential air quality policy management decisions and is currently used by 27 states⁴⁷ to develop strategies to meet the NAAQS. The newest version was recently peer reviewed and will have an emphasis on understanding background contribution of particulate matter and ground level ozone, improved real-world treatment of organic aerosol formation, and will allow integration with other modeling systems to understand multimedia interactions between atmosphere, land, and water. In FY 2020, CMAQ developers will incorporate updates to allow users to more accurately target emissions reductions to meet air quality standards that protect human health and the environment and help understand the impacts of extreme events such as wildland fires.

FY 2021 Activities and Performance Plan:

Work in this program directly supports Goal 3/Objective 3.3, Prioritize Robust Science in the *FY 2018 – 2022 EPA Strategic Plan*. In FY 2021, the A-E Research Program will continue research in areas that support EPA’s mission to protect human health and the environment, fulfill the Agency’s legislative mandates, advance cross-agency priorities, and provide research and scientific analyses to inform policymaking.

The A-E Research Program prioritizes key activities to support attainment of the NAAQS and implementation of stationary and mobile source regulations, as well as national and multi-state programs. The A-E Research Program continues to develop, evaluate, and apply methods and models to support air quality management programs and provides foundational science to inform decision making. In addition, critical work on PFAS research will be conducted which supports the FY 2020 – 2021 PFAS Agency Priority Goal.

⁴⁵ For more information, please see: <https://www4.des.state.nh.us/OneStopPub/Air/330110016504192019TypeCR.pdf>.

⁴⁶ For more information, please see: <https://www.epa.gov/cmaq>.

⁴⁷ AK, CA, CO, CT, GA, ID, IL, IA, KS, KY, MD, MA, MO, MT, NV, NH, NJ, NM, NY, NC, ND, RI, TN, TX, UT, VA, WY.

In FY 2021, the A-E Research Program will continue to:

- Deliver state-of-the-art tools for states and tribes to use in identifying effective emission reduction strategies to meet NAAQS and enhance air quality measurement methods used to ascertain compliance with the NAAQS.
- Assess human and ecosystem exposures and effects associated with air pollutants on individual, community, regional, national, and global scales.⁴⁸
- Develop and evaluate approaches to prevent and reduce pollution, particularly sustainable, cost-effective, and innovative multi-pollutant and sector-based approaches.
- Provide human exposure and environmental modeling, monitoring, metrics, and information needed to inform air quality decision making at the federal, state, tribal, and local level.
- Ensure that the program and regional information needs guide research that will advance EPA's capabilities and understanding of air pollution sources, fate and transport, and effects.
- Address emerging areas of concern to EPA and state policymakers, including PFAS, ethylene oxide, and wildland fires.
- Measure progress toward environmental health goals and translate research results to inform communities and individuals about measures that can be taken to reduce the impacts of air pollution.
- Analyze existing data from EPA on air quality, its impacts to health and the environment, and research to adapt to and prepare for extreme events and environmental change.

Research Planning:

EPA's Board of Scientific Counselors (BOSC) is a federal advisory committee that provides advice and recommendations to EPA on technical and management issues of its research programs. The A-E Research Program will continue to meet regularly over the next several years with the BOSC A-E subcommittee to seek input on topics related to research program design, science quality, innovation, relevance, and impact.

The Agency assesses its research performance through the distribution of research evaluation surveys to key users of its research products. This provides evidence for how research products are being used, by whom, and the degree of satisfaction product users have with research product quality, usability and timeliness of delivery. Through the evaluation process, the Agency identifies its strengths and finds targeted areas for improvement to its research programs.

⁴⁸ 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.

EPA's state engagement⁴⁹ 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. Key partners at the state level include: the Environmental Council of the States, with its Environmental Research Institute of the States and the Interstate Technology and Regulatory Council; the Association of State and Territorial Health Officials; as well as state media associations, such as the National Association of Clean Air Agencies.

Performance Measure Targets:

Work under this program supports performance results in the Research: Safe and Sustainable Water Resources Program under the S&T appropriation.

FY 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (+\$1,465.0) This change is an increase due to the recalculation of base payroll costs.
- (-\$34,383.0 / -61.7 FTE) This net program change prioritizes research needed to achieve clean air and attain the NAAQS.
- (-\$17,535.0 / -42.5 FTE) This program change eliminates climate change research.
- (-\$10,500.0) This program change prioritizes intramural activities over extramural activities by eliminating funding for the Science to Achieve Results (STAR) Program.

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.

⁴⁹ For more information, please see: <https://www.epa.gov/research/epa-research-solutions-states>.

Research: Safe and Sustainable Water Resources

Research: Safe and Sustainable Water Resources

Program Area: Research: Safe and Sustainable Water Resources

Goal: Greater Certainty, Compliance, and Effectiveness

Objective(s): Prioritize Robust Science

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
<i>Science & Technology</i>	<i>\$100,123.7</i>	<i>\$110,890.0</i>	<i>\$78,948.0</i>	<i>-\$31,942.0</i>
Total Budget Authority	\$100,123.7	\$110,890.0	\$78,948.0	-\$31,942.0
Total Workyears	343.4	358.1	268.9	-89.2

Program Project Description:

The Safe and Sustainable Water Resources (SSWR) Research Program develops cost-effective, innovative solutions to current, emerging, and long-term water resource challenges for complex chemical and microbial contaminants. SSWR research targets foreseen, immediate needs and builds capacity for future capabilities for emergency response science, technical support, and anticipatory research. The SSWR Research Program takes an integrated approach that evaluates the entire water cycle. It produces robust research and scientific analysis for decision-making and inventive, practical solutions for partners and stakeholders.⁵⁰ This work yields innovative tools and information needed to protect and restore America’s watersheds, aquatic ecosystems, and water infrastructure.

The SSWR Research Program is one of six integrated and transdisciplinary research programs in the Research and Development Program. Each of the six integrated and transdisciplinary research 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 implemented with their active collaboration and involvement. As part of the FY 2021 Budget, the new SSWR FY 2019-2022 StRAP builds upon prior SSWR StRAPs and continues a practice of conducting innovative scientific research aimed at solving the problems encountered by Agency partners and stakeholders.

Recent Accomplishments of the SSWR Research Program include:

- **Cyanobacteria Assessment Network Application (CyAN app):**⁵¹ CyAN app (released in August 2019) aids local and state water quality managers to make faster and better-informed management decisions related to cyanobacterial blooms using mobile devices. It provides an easy-to-use and customizable interface for accessing algal bloom satellite data for over 2,000 of the largest lakes and reservoirs in the United States. The CyAN app can be used to scan water bodies for changes in cyanobacteria occurrence without requiring

⁵⁰ For more information, please see: <https://www.epa.gov/research/epa-research-solutions-states>.

⁵¹ For more information, please see: <https://www.epa.gov/water-research/cyanobacteria-assessment-network-mobile-application-cyan-app>.

computer programming expertise, allowing users to quickly make informed decisions regarding recreational and drinking water safety. The research that led to the development of the CyAN app was conducted in collaboration with the National Aeronautics and Space Administration, the National Oceanic and Atmospheric Administration, and the U.S. Geological Survey (USGS).⁵²

- **Contaminants of Emerging Concern (CECs):**⁵³ Wastewater treatment plant effluents contain traces of chemicals that escape the wastewater treatment process. These contaminants, including per- and polyfluoroalkyl substances (PFAS) and pharmaceuticals, can potentially persist downstream, ending up in drinking water sources. The potential risks are not yet clearly understood. SSWR researchers have and continue to conduct studies to monitor the occurrence of these CECs in wastewater, surface waters, groundwater, and drinking water, with some studies being done in collaboration with the USGS. The combined research efforts of EPA and USGS in FY 2018 produced a data set of approximately 700 chemically-characterized CECs and identified a group of the most highly contaminated watersheds that may have been impacted by wastewater. SSWR's continued research efforts to monitor the potential effects of these chemical mixtures will increase our understanding of wastewater effluent impacts on human and aquatic health and help to prioritize future research on developing solutions, as necessary, for the removal of CECs in wastewater treatment operations.
- **Rapid *E. coli* Detection at Beaches Improves Public Health Protection:**⁵⁴ The development and application of *E. coli* qPCR⁵⁵ method provides same-day notification of fecal contamination at beaches, allowing state agencies and beach managers to make rapid decisions on beach closures.⁵⁶ In October 2019, EPA provided training and technical assistance on the *E. coli* qPCR method to multiple state water quality laboratories in Michigan, and assisted EPA's Water Program and the Michigan Department of Environment, Great Lakes, and Energy in developing Beach Action Values⁵⁷ for the *E. coli* qPCR method. The State of Michigan implemented the Beach Action Values during the 2019 beach season.
- **New PFAS Analytical Method:**^{58, 59} In June 2019, EPA completed a multiple laboratory validation study for a new PFAS analytical method (SW-846 Method 8327) for the rapid analysis of 24 PFAS in groundwater, surface water, and wastewater.

⁵² For more information, please see: <https://www.epa.gov/water-research/cyanobacteria-assessment-network-cyan>.

⁵³ For more information, please see: [epa.gov/water-research/determining-prevalence-contaminants-treated-and-untreated-drinking-water](https://www.epa.gov/water-research/determining-prevalence-contaminants-treated-and-untreated-drinking-water).

⁵⁴ For more information, please see: <https://www.epa.gov/cwa-methods/other-clean-water-act-test-methods-microbiological>.

⁵⁵ Quantitative Polymerase Chain Reaction Assay (qPCR) is a laboratory technique of molecular biology based on the polymerase chain reaction. It monitors the amplification of a targeted DNA molecule during the PCR, not at its end, as in conventional PCR. For more information, please see: https://www.epa.gov/sites/production/files/2019-03/documents/method_1697_draft_2019.pdf.

⁵⁶ EPA's 2012 Recreational Water Quality Criteria established criteria to protect the public from exposure to fecal contaminants at beaches. For more information, please see: <https://www.epa.gov/wqc/recreational-water-quality-criteria-and-methods>.

⁵⁷ For more information, please see: <https://www.epa.gov/sites/production/files/2014-07/documents/beach-guidance-final-2014.pdf>.

⁵⁸ For more information, please see: <https://www.epa.gov/hw-sw846/validated-test-method-8327-and-polyfluoroalkyl-substances-pfas-using-external-standard>.

⁵⁹ For more information, please see: <https://www.epa.gov/hw-sw846/sw-846-update-vii-announcements>.

- **Stormwater Contaminants:**⁶⁰ A nationwide assessment of contaminants in urban storm water runoff, in collaboration with USGS, was completed in September 2019 for the benefit of states, cities, municipalities, and water utilities.

FY 2021 Activities and Performance Plan:

Work in this program directly supports Goal 3/Objective 3.3, Prioritize Robust Science in the *FY 2018 – 2022 EPA Strategic Plan*. In FY 2021, the SSWR Research Program’s work will focus explicitly on informing EPA’s implementation of key environmental regulations by leveraging research in the areas of nutrients, harmful algal blooms, watersheds, and water infrastructure (including water reuse).

SSWR work also supports performance results in Goal 1: A Cleaner, Healthier Environment in the *FY 2018 – 2022 EPA Strategic Plan*. SSWR primarily supports clean and safe drinking water, but also supports efforts to: improve air quality through work on nitrogen, phosphorus, and wildland fires; revitalize land and prevent contamination through work on biosolids and groundwater; and ensure safety of chemicals through research on PFAS and other contaminants like lead.

SSWR work also supports Goal 2: More Effective Partnerships. EPA works closely with states and tribes to understand their water resource challenges, which are reflected in SSWR’s research priorities.

In FY 2021, the SSWR Research Program will continue to:

- Assist states, communities, and utilities in addressing stormwater and wastewater infrastructure needs through applied models and technical assistance and develop risk assessments on stormwater capture for enhanced aquifer recharge.
- Work with EPA program offices, regions, and states to develop methods for collection, extraction, characterization, quantification, and evaluation of microplastics in surface water and sediments. These standard methods will allow comparability across studies, aid in comprehensive exposure assessment and risk characterization of microplastics, and, if necessary, support evaluation of effectiveness of approaches, products, and technologies used to prevent plastics from entering aquatic systems.
- Research and provide technical support to deliver safe drinking water. Efforts will focus on the complete water cycle including protecting source waters and wetlands to improving drinking water and wastewater infrastructure and management. Research will assess the distribution, composition, and potential health risks of known and emerging chemical and biological contaminants.
- Improve methods for rapid and cost-effective monitoring of waterborne pathogens in recreational waters. For example, improving rapid low-cost methods for real time

⁶⁰ For more information, please see: <https://pubs.acs.org/doi/10.1021/acs.est.9b02867>.

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.

- Investigate health impacts from exposure to harmful algal/cyanobacteria toxins, and develop innovative methods to monitor, characterize, and predict blooms for early action.
- Support states in prioritizing watersheds for nutrient management and in setting water quality and aquatic life thresholds. These research and communication efforts will help states verify whether investments in implementing nutrient reduction management practices achieve their predicted benefits.
- Provide water reuse research support for safe, fit-for-purpose potable and non-potable use by states.

In addition to the activities listed above, EPA also conducts 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 in understanding and managing risks associated with these chemicals. A significant challenge for risk managers at the 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. Within the SSWR Research Program, EPA is: (1) developing and validating standard methods for measuring different PFAS chemicals in water; (2) reviewing available literature on effectiveness and cost data for different water treatment technologies applied to different PFAS chemicals; and (3) 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.⁶¹ This work supports the FY 2020 – 2021 PFAS Agency Priority Goal (APG).
- **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.⁶² In response to overwhelming scientific consensus and continued public health concern, reducing childhood lead exposure is one of the highest priorities for EPA.⁶³ SSWR research focuses on: (1) establishing reliable models for estimating lead exposure from drinking water; (2) developing improved sampling techniques and strategies for identifying and characterizing lead in plumbing materials, including lead service lines; (3)

⁶¹ For more information, please see: <https://iaspub.epa.gov/tdb/pages/general/home.do#content>.

⁶² For more information, please see: <https://www.cdc.gov/nceh/lead/prevention/blood-lead-levels.htm>.

⁶³ For more information, please see: <https://www.epa.gov/lead>.

developing guidance on optimizing lead mitigation strategies; and (4) 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. This work supports the FY 2020 – 2021 Lead APG.

- **Excessive Nutrients:** The challenge of excessive nutrients is one of the most common water quality problems facing the United States, with potential consequences for human and animal health and economic prosperity.⁶⁴ EPA research comprehensively addresses the problems of excess nutrients in water bodies, including harmful algal blooms (HABs). The overall impact of this research will be to provide information and tools that can be used by EPA’s Water Program, Air and Radiation Program, and regions as well as states, tribes, and local communities. Information and tools can be used to: detect HABs and mitigate exposure to HABs via predictive modeling and treatment; determine nutrient-related impacts in watersheds and water bodies across multiple scales; apply best practices for nutrient management; and monitor the effectiveness of those practices and evaluate their efficacy. Resources requested in FY 2021 provide scientific and research support to the multi-office initiative to reduce and better predict harmful algal blooms, including tool development for market-based approaches and pilot projects to reduce exposure and toxic events that include predictive modeling and monitoring.

Research Planning:

EPA’s Board of Scientific Counselors (BOSC) is a federal advisory committee that provides advice and recommendations to EPA’s Research and Development Program on technical and management issues of its research programs. The SSWR Research Program and the BOSC SSWR subcommittee will continue to meet regularly over the next several years to seek input on topics related to research program design, science quality, innovation, relevance, and impact.

The Agency assesses its research performance through the distribution of research evaluation surveys to key users of its research products. This provides evidence for how research products are being used, by whom, and the degree of satisfaction product users have with research product quality, usability, and timeliness of delivery. Through the evaluation process, the Agency identifies its strengths and finds targeted areas for improvement to its research programs.

EPA’s state engagement⁶⁵ 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. Key partners at the state level include: the Environmental Council of the States, with its Environmental Research Institute of the States and Interstate Technology and Regulatory Council; the Association of State and Territorial Health Officials; as well as state media associations, such as the Association of Clean Water Administrators and the Association of State Drinking Water Administrators.

⁶⁴ For more information, please see: <https://www.epa.gov/nutrientpollution/problem>.

⁶⁵ For more information, please see: <https://www.epa.gov/research/epa-research-solutions-states>.

Performance Measure Targets:

(PM RD1) Percentage of Office of Research and Development (ORD) research products meeting customer needs.

	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	Units
Target					No Target Estab- lished	77	80	82	Percent
Actual					77	79			
Numerator					171	154			Products
Denominator					222	196			

Work under this program supports performance results in the Surface Water Protection Program under the EPM appropriation.

FY 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (+\$2,744.0) This change is an increase due to the recalculation of base payroll costs.
- (+\$2,500.0) This increase supports research and technical assistance regarding lead issues and contributes to the Lead Exposure Reduction Initiative focus area. This work will be guided by the *Federal Action Plan to Reduce Childhood Lead Exposures and Associated Health Impacts*, as well as related activities in the 2019-2022 StRAPs and the FY 2020-2021 Lead APG.
- (+\$236.0 / +0.5 FTE) This increase for the PFAS focus area includes resources and FTE to support science and research to advance implementation of the PFAS Action Plan and associated milestones in support of the new FY 2020-2021 PFAS APG.
- (+\$3,344.0 / +2.0 FTE) This increase of resources and FTE provides scientific and research support to the multi-office focus area to reduce and better predict harmful algal blooms, including tool development for market-based approaches and pilot projects that include predictive modeling and monitoring to reduce exposure and toxic events.
- (-\$10,718.0 / -34.9 FTE) This net program change streamlines funding for research related to: technical and site-specific support; communication and technology transfer efforts; translation of nutrient modeling and monitoring data; and research on assisting states in prioritizing watersheds and differentiating sources of nutrient overloading.
- (-\$23,448.0 / -56.8 FTE) This program change: refocuses resources from research on recovering resources (e.g., nutrients) from wastewater, transformative water systems and life cycle analysis, and research on advancing water systems technologies; streamlines research on innovative monitoring systems for drinking water treatment (e.g., bioassays), small system drinking water treatment, and unregulated disinfection by-products; and reduces research support for EPA’s program offices and states, including work to assist communities in prioritizing infrastructure improvements.

- (-\$6,600.0) This program change prioritizes intramural activities over extramural activities by eliminating funding for the Science to Achieve Results (STAR) Program for FY 2021.

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

Research: Sustainable and Healthy Communities

Program Area: Research: Sustainable Communities
 Goal: Greater Certainty, Compliance, and Effectiveness
 Objective(s): Prioritize Robust Science

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
Science & Technology	\$135,083.1	\$132,477.0	\$58,597.0	-\$73,880.0
Leaking Underground Storage Tanks	\$130.5	\$320.0	\$304.0	-\$16.0
Inland Oil Spill Programs	\$599.6	\$664.0	\$522.0	-\$142.0
Hazardous Substance Superfund	\$11,004.7	\$16,463.0	\$11,448.0	-\$5,015.0
Total Budget Authority	\$146,817.9	\$149,924.0	\$70,871.0	-\$79,053.0
Total Workyears	411.9	421.8	294.6	-127.2

Program Project Description:

EPA’s Sustainable and Healthy Communities (SHC) Research Program conducts research to support community-based solutions to environmental stressors, management of solid waste, clean-up of contaminated sites, and regulatory activities. SHC provides technical support at federal, tribal, or state-led contaminated site clean-ups and during environmental emergencies. SHC’s research products emphasize the interrelationships between socio-economic, human health, and environmental factors. Program scientists conduct health, environmental engineering, and ecological research and translate results into tools for localities throughout the United States to facilitate regulatory compliance and improve environmental and health outcomes. These tools aim to minimize negative unintended consequences to human health and the environment and promote more robust and efficient infrastructure in built and natural environments.

The SHC Research Program is one of six integrated and transdisciplinary research programs in the Research and Development Program. Each of the six integrated and transdisciplinary research 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 implemented with their active collaboration and involvement. As part of the FY 2021 Budget, the new SHC FY 2019-2022 StRAP builds upon prior SHC StRAPs and continues a practice of conducting innovative scientific research aimed at solving the problems encountered by Agency partners and stakeholders.

Recent Accomplishments of the SHC Research Program include:

- **Publication of “Ingestion of Soils and House Dusts by Children: The Role of Chemical and Non-chemical Stressors in Determining the Bioaccessibility of Sorbed Organics” (February 2019):**⁶⁶ Following soil and dust ingestion, the bioaccessibility (percent mobilization) of sorbed organic toxicants determines the amount of chemical that is

⁶⁶ For more information, please see: <https://www.sciencedirect.com/science/article/pii/S0045653518320666?via%3Dihub>.

available for uptake into the circulatory system. Previous bioaccessibility estimates used by the Agency assume all organics are released into the body; however, empirical results suggest that this may result in an overestimation of dose. This research evaluated different types of soils, dusts, and organics to estimate bioaccessibility under different exposure conditions and to reduce uncertainty in bioaccessibility calculations to improve exposure and risk assessment estimates.

- **Development of an Application Programming Interface for an Environmental Material Flow Accountability Model to Support Multi-Scale Life Cycle Assessments (September 2019):**⁶⁷ The U.S. Environmentally-Extended Input-Output (USEEIO) model is a national model for calculating direct and indirect environmental and socioeconomic impacts of U.S. goods and services. This research provides better automation of the creation, update, and assembly of model components for the national and state models. USEEIO provided access for states and others to underlying state model components and code to enable customization and those model components are used in EPA web applications like the Sustainable Materials Management Tool Suite and in other external applications.
- **CDDPath: A Method for Quantifying the Loss and Recovery of Construction and Demolition Debris (CDD) in the United States (February 2019):**⁶⁸ CDDPath incorporates the best available data and represents the first known method for estimating final disposition of CDD materials in the Nation. CDD represent a large fraction of U.S.-generated waste sent to landfills, the sheer mass and variety of which warrant special attention. Sustainable materials management approaches seek to minimize landfilling of such waste (e.g., through reuse or recycling) and to manage the toxicity of what must be landfilled. A strong understanding of the waste's amount and composition, as well as the usual end-of-life management pathways, is critical to developing an effective plan in managing it effectively and sustainably.
- **Long-Term in Situ Reduction in Soil Lead Bioavailability Measured in a Mouse Model:**⁶⁹ This is one of a series of peer-reviewed published reports on bioavailability and soil amendments published by EPA in 2019. Contaminated site remediation currently involves soil removal and replacement with clean topsoil, which is expensive and difficult at contaminated sites. Adding soil amendments that combine with lead in soil so that the human body cannot absorb the lead can be a cost-effective way to reduce human health risks associated with continued presence of the contaminant. This research showed that the addition of phosphate and iron to contaminated soil significantly reduced soil lead bioavailability 16 years after the original soil treatment, showing that soil amendments can be a long-lasting, low-cost method of reducing toxic exposure to lead. This assessment used a low cost, rapid bioavailability method developed and validated by EPA to produce these results.

⁶⁷ For more information, please see: https://cfpub.epa.gov/si/si_public_record_Report.cfm?dirEntryId=347251&Lab=NRMRL;
<https://github.com/USEPA/Federal-LCA-Commons-Elementary-Flow-List>.

⁶⁸ For more information, please see: https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NRMRL&dirEntryId=344639.

⁶⁹ For more information, please see: <https://doi.org/10.1021/acs.est.8b04684>.

FY 2021 Activities and Performance Plan:

Work in this program directly supports Goal 3/Objective 3.3, Prioritize Robust Science in the *FY 2018 – 2022 EPA Strategic Plan* and the recommendations of the Superfund Task Force of July 2017.⁷⁰ The program provides science that supports EPA's FY 2020-2021 Agency Priority Goal (APG) to accelerate the pace of Superfund and brownfields cleanups and return sites to beneficial use in their communities. These efforts support regulatory activities and protocol development for EPA's Land and Emergency Management Program, EPA's regional offices, and state-delegated programs. EPA research under SHC will provide technical support at federal-, tribal-, and state-managed cleanup sites, and assistance during emergencies.

SHC's FY 2021 research will focus on three topic areas: (1) Contaminated Sites, (2) Waste and Sustainable Materials Management, and (3) Healthy and Resilient Communities. This research will integrate and translate public health, environmental engineering, and ecosystem science to provide:

- Remediation solutions through permanent remedies and innovative treatment technologies for returning contaminated sites to safe and productive use;
- Operational tools for waste sites and for sustainable materials management; and
- Approaches for revitalizing communities impacted by contamination and natural disasters.

The SHC Research Program provides state-of-the-science methods, models, tools, and technologies that the Land and Emergency Management Program uses in programmatic guidance and that EPA decision makers use in the site cleanup process. These tools 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.

Specifically, in FY 2021, SHC will work in the following areas:

- **Waste and Sustainable Materials Management:** EPA research under SHC's Waste and Sustainable Materials Management aims to strengthen the scientific basis for the United States' materials management decisions and guidance. Primary research efforts will focus on developing lifecycle-based assessment tools for sustainable materials management, evaluating the use of landfills 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 are an agencywide initiative on Improving the U.S. Recycling System and Reducing Food Loss and Waste.
- **Remediation, Restoration, and Revitalization:** 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 in socio-

⁷⁰ For more information, please see: <https://www.epa.gov/superfund/superfund-task-force-recommendations>.

ecological systems, 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 partners and stakeholders, states, and tribes to optimize health and well-being outcomes while minimizing unintended consequences.

- **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 in understanding and managing risks associated with these chemicals. A significant challenge for risk managers at the state and local level is how to remove or treat PFAS at sites contaminated through: 1) the use of Aqueous Film-Forming Foam,⁷¹ a common fire-fighting method at military bases and airports; or 2) industrial operations which create, consume, or dispose of PFAS containing compounds. Within the SHC Research Program, EPA is developing and testing methods for site remediation including treating or removing PFAS from groundwater and soil. The research includes examination of *in situ* chemical transformation that may take place to better understand which PFAS chemical precursors might result in the highest risk outcomes. This work is being done in collaboration with the Department of Defense through participation in their Strategic Environmental Research and Development Program.⁷² EPA research under the SHC also is focusing on end-of-life management of PFAS-containing materials (e.g., industrial waste, household waste) to ensure that PFAS from these materials do not impact the environment. This work provides a technical support and assistance function for state, tribes, and local communities on issues pertaining to ecological and human health risk assessment and site engineering challenges related to PFAS. Additional resources requested in FY 2021 will support implementation of the PFAS Action Plan and the FY 2020 – 2021 PFAS APG.
- **Lead Research:** *The Federal Action Plan to Reduce Childhood Lead Exposures and Associated Health Impacts* was produced by the President’s Task Force on Environmental Health Risks and Safety Risks to Children, comprised of 17 federal agencies and co-led by EPA. It is a blueprint to reduce lead exposure and associated harms to children.⁷³ EPA’s Research and Development Program has co-led Action Plan efforts to develop science and technology to support efforts to reduce lead exposures and related health risks. SHC is working to identify locations of high exposures and blood lead levels to target lead sources for mitigation; develop innovative methods for cleaning up 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 will work to 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 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 EPA regulatory and non-regulatory efforts, as well as filling in the data gaps for federal partners, states, tribes, and local communities. This work supports the FY 2020 – 2021 Lead APG.

⁷¹ For more information, please see: https://pfas-1.itrcweb.org/wp-content/uploads/2018/10/pfas_fact_sheet_afff_10_3_18.pdf.

⁷² About SERDP: <https://www.serdp-estcp.org/About-SERDP-and-ESTCP/About-SERDP>.

⁷³ For more information, please see: <https://www.epa.gov/lead/federal-action-plan-reduce-childhood-lead-exposure>.

Research Planning:

EPA’s Board of Scientific Counselors (BOSC) is a federal advisory committee that provides advice and recommendations to EPA on technical and management issues of its research programs. The SHC Research Program will continue to meet regularly over the next several years with the BOSC SHC subcommittee to seek input on topics related to research program design, science quality, innovation, relevance, and impact.

The Agency assesses its research performance through the distribution of research evaluation surveys to key users of its research products. This provides evidence for how research products are being used, by whom, and the degree of satisfaction product users have with research product quality, usability, and timeliness of delivery. Through the evaluation process, the Agency identifies its strengths and finds targeted areas for improvement to its research programs.

EPA’s state engagement⁷⁴ 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. Key partners at the state level include: the Environmental Council of the States, with its Environmental Research Institute of the States and Interstate Technology and Regulatory Council; the Association of State and Territorial Health Officials; as well as state media associations, such as the Association of State and Territorial Solid Waste Management Officials.

Performance Measure Targets:

(PM RD1) Percentage of Office of Research and Development (ORD) research products meeting customer needs.

	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	Units
Target					No Target Estab- lished	77	80	82	Percent
Actual					77	79			
Numerator					171	154			Products
Denominator					222	196			

Work under this program supports performance results in the RCRA: Waste Minimization & Recycling Program under the EPM appropriation.

FY 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (+\$2,242.0) This change is an increase due to the recalculation of base payroll costs.
- (+\$1,500.0) This increase supports research and technical assistance regarding lead issues and contributes to the Lead Exposure Reduction Initiative focus area. This work will be guided by the *Federal Action Plan to Reduce Childhood Lead Exposures and Associated*

⁷⁴ For more information on EPA’s work with States, please see: <https://www.epa.gov/research/epa-research-solutions-states>.

Health Impacts, as well as related activities in the 2019-2022 StRAPs and in the FY 2020-2021 Lead Agency Priority Goal.

- (+\$850.0) This increase includes \$350 thousand for research that increases the effectiveness of food waste campaigns and \$500 thousand to study food waste collection and pretreatment technologies from a lifecycle perspective. This investment supports the multi-office focus area of Improving the U.S. Recycling System and Reducing Food Loss and Waste.
- (+\$238.0 / +0.5 FTE) This increase for the PFAS focus area includes resources and FTE to support science and research to advance implementation of the PFAS Action Plan and associated milestones in support of the new FY 2020-2021 PFAS APG.
- (-\$34,142.0 / -60.0 FTE) This net program change streamlines research by eliminating work related to the following activities:
 - The Ecotox database, a source for locating single chemical toxicity data for aquatic life, terrestrial plants, and wildlife;
 - The EPA's Report on the Environment (ROE), which reports on the status and trends of 85 environmental indicators like cancer rates and air pollution levels;
 - The inclusion of a data layer on ecosystem services and their beneficiaries, as well as research efforts to apply a systems approach (multi-media) to integrating the environmental impacts of transportation, waste management, and energy and water infrastructure development at the city-scale of governance;
 - Significantly reduces efforts to provide web-based tools, such as EnviroAtlas, to assess how ecosystem goods and services affect the health and well-being of residents, particularly those that are vulnerable.
- (-\$18,447.0 / -51.6 FTE) This program change streamlines research efforts across environmental media by eliminating work related to: Research on the life cycle of materials in commerce; and the People, Prosperity & the Planet (P3) program for college-level competition.
- (-\$18,821.0 / -24.6 FTE) This net program change streamlines research on the following areas:
 - The Health Impact Assessment (HIA) approach for assessing the impact of major planned infrastructure development (e.g., use of green infrastructure; highway construction) at a city scale of governance;
 - Human health research into the mechanisms of chemical exposures and effects on human health outcomes and well-being, especially research into cumulative effects;
 - Research into the uptake and distribution of contaminants (e.g., lead, arsenic) within vulnerable populations, especially children;
 - Research into the environmental component of children's asthma.

- (-\$7,300.0) This program change proposes to eliminate funding for the Science to Achieve Results (STAR) Program for FY 2021.

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).

Research: Chemical Safety and Sustainability

Research: Chemical Safety for Sustainability

Program Area: Research: Chemical Safety for Sustainability

Goal: Greater Certainty, Compliance, and Effectiveness

Objective(s): Prioritize Robust Science

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
Environmental Programs & Management	\$131.9	\$0.0	\$0.0	\$0.0
<i>Science & Technology</i>	<i>\$87,304.2</i>	<i>\$88,917.0</i>	<i>\$66,952.0</i>	<i>-\$21,965.0</i>
Total Budget Authority	\$87,436.1	\$88,917.0	\$66,952.0	-\$21,965.0
Total Workyears	259.7	271.9	241.4	-30.5

Total Workyears in FY 2021 include 0.8 FTE funded by TSCA fees.

Program Project Description:

The Chemical Safety for Sustainability (CSS) Research Program provides information, tools, and methods to make better-informed, more-timely decisions about the chemicals and their potential risks to human health and the environment.⁷⁵ EPA's Research and Development Program is committed to producing research results that address real-world problems, inform implementation of environmental regulations, and help EPA partners and stakeholders make timely decisions based on the best available science. CSS products strengthen the Agency's ability 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.

The CSS Research Program is one of six integrated and transdisciplinary research programs in the Research and Development Program. Each of the six integrated and transdisciplinary research 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 implemented with their active collaboration and involvement. As part of the FY 2021 Budget, the new CSS FY 2019-2022 StRAP builds upon prior CSS StRAPs and continues a practice of conducting innovative scientific research aimed at solving the problems encountered by Agency partners and stakeholders.

The CSS Research Program works with EPA programs to deliver innovative research that directly addresses Agency challenges. CSS products inform Agency programs as they implement environmental regulations that govern Agency actions, including the evaluation of existing and new chemicals (Toxic Substances Control Act [TSCA]), development and use of alternative testing protocols (TSCA, Federal Insecticide Fungicide and Rodenticide Act [FIFRA], Food Quality Protection Act [FQPA], Federal Food Drug Cosmetics Act), chemical prioritization (TSCA, Safe Drinking Water Act [SDWA]), evaluation of pesticide registrations (FIFRA), and mitigation activity at Superfund sites (Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA]). The CSS Research Program works in conjunction with the Human and Environmental Risk Assessment (HERA) Research Program to improve chemical risk assessments

⁷⁵ For more information, please see: <https://www.epa.gov/tsca-inventory/about-tsca-chemical-substance-inventory>.

conducted by the Agency, reduce uncertainties associated with those assessments and increase the speed of delivering chemical information to Agency partners. The CSS and HERA Research Programs will continue to increase collaborative activities to provide the chemical information and scientifically robust chemical assessments needed by the Agency.

Recent Accomplishments of the CSS Research Program include:

- **Engineering a human thyroid organotypic culture model (OCM):** FQPA directs the Agency to screen and test chemicals for potential endocrine disrupting effects. In FY 2019, EPA scientists developed an *in vitro* OCM⁷⁶ of the human thyroid that can be used for assessing the disruptive effects of chemicals on thyroid hormone synthesis. Integration of the model into a thyroid-related, high-throughput screening assay battery will enable testing of chemicals prioritized for targeted key events. This provides critical context to concentration-response relationships relevant to chemical disruption of normal thyroid activity. The thyroid is an essential endocrine organ that regulates a number of diverse physiological processes required for normal growth, development, and metabolism. Detecting reduction of thyroid hormone levels is a key consideration in hazard identification for developmental neurotoxicity and in the evaluation of potential endocrine disrupting effects of chemicals.
- **Release of Multiple Digital Information Products to Inform Decision Making:** In 2019, CSS scientists delivered numerous products that inform decision making, including: major upgrades to the *Computational Toxicology Chemicals Dashboard*⁷⁷ (version 3.0.9) which houses curated information on 875,000 chemicals; major upgrades and improvements to the *ECOTOX Knowledgebase*⁷⁸ (version 5.0); release of the *Chemical Transformation Simulator* which now includes predictions of per- and polyfluoroalkyl substances (PFAS) reactions in the environment; and *SeqAPASS*⁷⁹ (version 4.0) to help predict the effects of chemicals across different species.
- **Enabling Cutting Edge Science Through Use of Science to Achieve Results (STAR) Grants:** CSS uses EPA's STAR Grant Program⁸⁰ to engage with the academic community through competitive assistance agreements involving grants and cooperative agreements. These grants support research that contributes to significant advances in the field of chemical safety, providing cutting-edge science that enables new avenues of investigation within CSS. In 2019, EPA awarded 5 grants under the Request for Applications (RFA) titled *Advancing Actionable Alternatives to Vertebrate Animal Testing for Chemical Safety Assessment*. The objective of these awards is to develop and apply alternative test methods and strategies to replace, reduce, and refine vertebrate animal testing. In 2019, EPA also announced an RFA titled *Advancing Toxicokinetics for Efficient and Robust Chemical Evaluations*. The objective of this initiative is to advance the development of chemical toxicokinetic tools and approaches for broader applicability during chemical evaluations,

⁷⁶ For more information, please see: https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NCCT&dirEntryId=344470.

⁷⁷ For more information, please see: <https://comptox.epa.gov/dashboard>.

⁷⁸ For more information, please see: <https://cfpub.epa.gov/ecotox/>.

⁷⁹ For more information, please see: <https://www.epa.gov/chemical-research/sequence-alignment-predict-across-species-susceptibility>.

⁸⁰ For more information, please see: <https://www.epa.gov/research-grants/safer-chemicals-research-grants>.

with an emphasis on their application within new approach methodologies (NAMs) framework.

- **Alternative Toxicity Testing Strategy (TSCA Section 4):** The Research and Development Program’s scientists collaborate closely with EPA’s Chemical Safety and Pollution Prevention Program to implement the June 2018 TSCA Strategic Plan to promote the development and implementation of alternative test methods. NAMs are focused on providing better understanding of toxicity with faster, less expensive approaches that reduce the use of mammals and other vertebrate animals for toxicity testing. EPA maintains a published list of NAMs and updated this list in December 2019.⁸¹ CSS NAMs research also supports the EPA Administrator’s recent goal of reducing the Agency’s requests for, and funding of, mammal studies by 30 percent by 2025.⁸²

In addition to these specific accomplishments, the CSS Research Program provides ongoing support to the Agency’s Chemical Safety and Pollution Prevention Program for the successful implementation of TSCA activities related to alternative toxicity testing (Section 4), the evaluation of new chemicals (Section 5), and the evaluation of existing chemicals in the TSCA active inventory list (Section 6). The CSS Research Program also provides ongoing support for the evaluation of pesticides under FIFRA and the development of the Endocrine Disruption Screening Program under FQPA.

FY 2021 Activities and Performance Plan:

Work in this program directly supports Goal 3/Objective 3.3, Prioritize Robust Science in the *FY 2018 – 2022 EPA Strategic Plan*. Traditional approaches for evaluating potential chemical safety have had difficulty in keeping pace with innovations in chemical design, synthesis, and use. Currently available data do not always provide a complete understanding of the potential risks that many chemicals present to human health and the environment. This can result in EPA programs, states, tribes, and others making risk-based decisions with incomplete data for chemical hazard and exposure. Of particular relevance are “chemicals of emerging concern”, such as PFAS, which heighten the need for rapid, scientifically-sound approaches to evaluate potential chemical safety.

Therefore, the CSS Research Program is focused on developing approaches, tools, models, and data systems to deliver information about chemicals to address these challenges. CSS research products use innovative *in vitro* and *in silico* approaches to provide more comprehensive information about chemical hazard and exposure using methods that reduce the need for animal testing and can be faster and more cost effective compared to existing *in vivo* approaches.

The CSS Research Program is organized into eight, integrated research areas. Selected research areas are highlighted below for work in FY 2021:

⁸¹ For more information, please see: <https://www.epa.gov/chemicals-under-tsca/updates-epa-list-alternative-test-methods-animal-testing>.

⁸² For more information, please see: <https://www.epa.gov/newsreleases/administrator-wheeler-signs-memo-reduce-animal-testing-awards-425-million-advance>.

- High-Throughput Toxicity (HTT) Testing:** In FY 2021, the CSS Research Program will continue to produce innovative tools that accelerate the pace of data-driven chemical evaluations, enabling EPA and state decisions to be environmentally sound and protective of public health and ecological resources. CSS research in the HTT research area is focused on developing, testing, and applying NAMs. NAMs address the limitations of current chemical testing methods and fulfill EPA’s need to more efficiently evaluate large numbers of chemicals for potential adverse human and ecological effects. Scientific and technological advances have paved the way for using additional NAMs in the HTT research area. These will enable EPA to make better, more timely decisions about chemicals by increasing toxicological information for more chemicals. These new approaches also reduce the need to use mammals in chemical testing, which is an Agency priority. This research directly supports the Agency’s efforts to fulfill requirements for: chemical evaluation under TSCA as amended by the Frank R. Lautenberg Chemical Safety for the 21st Century Act; pesticide evaluation under FIFRA; chemical testing for endocrine system impacts under FQPA; and chemical evaluation as part of SDWA.
- Rapid Exposure Modeling and Dosimetry:** In FY 2021, EPA research under the CSS Research Program will continue to provide data, models, and tools to characterize total human exposure to environmental chemicals. This will inform Agency chemical prioritizations and evaluations; Agency implementation of TSCA Section 5 (New Chemicals) and Section 6 (Existing Chemicals); Agency chemical prioritization efforts; and identify contaminants of emerging concern. Research in the Rapid Exposure Modeling and Dosimetry research area 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 environmental media, biological media, and consumer products.
- PFAS Research:**⁸³ PFAS are a class of chemicals of growing concern in the environment, and EPA has committed to action supporting states, tribes, and local communities in understanding and managing risks associated with these chemicals.⁸⁴ The CSS Research Program has responded to this Agency priority with research designed to: improve understanding of the toxicity of PFAS chemicals; evaluate PFAS fate, transport, occurrence, and persistence in the environment and in consumer products; and deliver chemical information to partners and stakeholders in the government and private sector. A significant challenge is understanding potential PFAS chemical toxicity because this class of chemicals includes thousands of different chemical compounds, most of which have little or no published toxicity data available.⁸⁵ CSS is addressing this gap by conducting high throughput computational toxicological screening assays on an initial set of 150 PFAS chemicals, which have been selected to represent a broad array of chemical and physical structural properties of the PFAS universe of compounds. The results will be used to identify subsets of PFAS chemicals having similar structural and toxicological properties

⁸³ For the EPA PFAS Action Plan, please see: https://www.epa.gov/sites/production/files/2019-02/documents/pfas_action_plan_021319_508compliant_1.pdf.

⁸⁴ For more information, please see: <https://www.epa.gov/pfas/pfas-community-engagement>.

⁸⁵ For more information, please see: <https://www.epa.gov/pfas/epa-pfas-research>.

thus increasing the strength of predictive toxicological models. Additionally, the results of these studies will be used to help the Agency prioritize more detailed studies. This work is being done in collaboration with the National Institute of Environmental Health Sciences: National Toxicology Program. Resources requested in FY 2021 will support science and research to advance implementation of the PFAS Action Plan and the EPA FY 2020 – 2021 PFAS Agency Priority Goal (APG).

- **Improved Understanding of Biological Impacts:** The CSS Research Program will employ data generated from its chemical evaluation research to develop interpretive frameworks and models to put complex information into biological, chemical, and toxicological context. This information is captured in adverse outcome pathways (AOPs) which link molecular initiating events to apical outcomes. These pathways help decision-makers understand the significance of chemical impacts on biological systems. Included in the development of these AOPs are data developed in the HTT and Virtual Tissue Modeling research areas to capture information on chemical impacts to molecular pathways, cells, and complex tissues. This is especially important to understanding chemical impacts on developmental and reproductive biology. CSS also is applying AOP frameworks to model ecological outcomes across broad taxonomic and ecological scales.
- **Delivery of Chemical Information:** The CSS Research Program will deliver chemical data and related information to its partners in a scientifically robust, transparent manner. The Chemical Safety Analytics research area of CSS provides computational, predictive tools to estimate physicochemical, toxicological, and exposure information for data poor chemicals. The Informatics, Synthesis, and Integration research area brings together chemical information developed by the CSS Research Program with information from other sources to inform Agency decision makers. Building on this foundation, EPA is working with its partners to build program-specific applications, such as RapidTox. These applications will give risk assessors and decision-makers confidence that the new approaches, data, and tools developed in CSS are both scientifically sound and relevant to environmental decision making. CSS continues to invest in the CompTox Chemicals Dashboard⁸⁶ as a “first-stop-tool” for the delivery of chemical information.

Research Planning:

EPA’s Board of Scientific Counselors (BOSC) is a federal advisory committee that provides advice and recommendations to EPA on technical and management issues of its research programs. The CSS Research Program and BOSC CSS subcommittee will continue to meet regularly over the next several years to seek input on topics related to research program design, science quality, innovation, relevance, and impact.

The Agency assesses its research performance through the distribution of research evaluation surveys to key users of its research products. This provides evidence for how research products are being used, by whom, and the degree of satisfaction product users have with research product quality, usability, and timeliness of delivery. Through the evaluation process, the Agency identifies its strengths and finds targeted areas for improvement to its research programs.

⁸⁶ For more information, please see: <https://www.epa.gov/chemical-research/comptox-chemicals-dashboard>.

EPA’s state engagement program⁸⁷ 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. Key partners at the state level include: the Environmental Council of the States, with its Environmental Research Institute of the States and the Interstate Technology and Regulatory Council; the Association of State and Territorial Health Officials; as well as state media associations, such as the Association of State and Territorial Solid Waste Management Officials.

Performance Measure Targets:

(PM RD1) Percentage of Office of Research and Development (ORD) research products meeting customer needs.

	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	Units
Target					No Target Estab- lished	77	80	82	Percent
Actual					77	79			
Numerator					171	154			Products
Denominator					222	196			

FY 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (+\$3,130.0) This change is an increase due to the recalculation of base payroll costs.
- (+\$289.0 / +0.5 FTE) This increase for the PFAS focus area includes resources and FTE to support science and research to advance implementation of the PFAS Action Plan and associated milestones in support of the FY 2020 – 2021 PFAS APG.
- (-\$4,200.0) This program change prioritizes intramural activities over extramural activities by eliminating funding for the Science to Achieve Results (STAR) program for FY 2021.
- (-\$12,962.0 / -1.8 FTE) This net program change streamlines resources available for the development of high-throughput toxicity testing, the Agency’s development of improved methods for chemical evaluations, and research efforts focused on endocrine disrupting chemicals in order to focus on the most pressing chemical evaluations.
- (-\$8,222.0 / -30.0 FTE) This net program change streamlines funding for the development of virtual tissue models and tools to conduct chemical toxicity screening.
- (+0.8 FTE) This FTE increase is a change due to the need to support risk assessment and evaluation science to support new TSCA requirements.

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

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).

Health and Environmental Risk Assessment

Program Area: Research: Chemical Safety for Sustainability

Goal: Greater Certainty, Compliance, and Effectiveness

Objective(s): Prioritize Robust Science

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
<i>Science & Technology</i>	<i>\$37,003.7</i>	<i>\$37,351.0</i>	<i>\$24,694.0</i>	<i>-\$12,657.0</i>
Hazardous Substance Superfund	\$2,864.9	\$12,824.0	\$6,159.0	-\$6,665.0
Total Budget Authority	\$39,868.6	\$50,175.0	\$30,853.0	-\$19,322.0
Total Workyears	144.0	154.9	111.6	-43.3

Program Project Description:

EPA’s Health and Environmental Risk Assessment (HERA) Research 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: Clean Air Act, Clean Water Act; Safe Drinking Water Act; Toxic Substances Control Act (TSCA); and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The HERA Research Program is one of six integrated and transdisciplinary research programs in the Research and Development Program. Each of the six integrated and transdisciplinary research 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 implemented with their active collaboration and involvement. As part of the FY 2021 Budget, the new HERA FY 2019-2022 StRAP builds upon prior Human Health Risk Assessment (HHRA) StRAPs and continues a practice of conducting innovative scientific research aimed at solving the problems encountered by Agency partners and stakeholders.

For the FY 2021 Budget, EPA renamed the HHRA Research Program to the HERA Research Program to more accurately reflect the breadth of assessments conducted under this research program, including exposure and ecological assessments as well as human health hazard assessments. For example, this research program prepares the Integrated Science Assessments (ISAs) for both the primary and secondary National Ambient Air Quality Standards (NAAQS), the former statutorily related to human health effects and the latter covering human welfare, which includes ecological and other environmental impacts of the air pollutants. The timing of the name change to HERA also coincides with, and is supportive of, the Research and Development Program’s reorganization which occurred in September 2019.

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

- **Science Assessments and Translation:** The Science Assessments and Translation topic showcases EPA’s focus on the science and practice of assessment development. A portfolio of assessment products will be produced that are responsive to Agency priorities and timelines. The portfolio will include assessments from among the traditional product lines – Integrated Risk Information System (IRIS), ISAs, and Provisional Peer-Reviewed Toxicity Values (PPRTVs) – in addition to a wide range of innovative fit-for-purpose modules, such as those developed for TSCA. Additionally, significant emphasis will be placed on providing scientific and technical support throughout the lifecycle of decisions, from development to application of the assessment products.
- **Advancing the Science of Risk Assessment:** The HERA Research Program is multidisciplinary and aimed at incorporating scientific innovations to advance analytic approaches and applications. Research under this topic is targeted at enhancing hazard characterization, expanding the repertoire of dose-response methods and models, and characterizing the utility of emerging data and new computational tools as applied to risk assessment. It also enhances and maintains critical assessment infrastructure, including database models and software support, to ensure transparency and to facilitate understanding and translation to Agency partners and external stakeholders. Refinements to current approaches will be anchored in assessment development and are expected to improve the accuracy, efficiency, flexibility, and utility of applications across a large landscape of assessment activities.

Recent Accomplishments of the HERA Research Program include:

The HERA Research Program has been developing new assessment product lines to enhance timely response, improve screening capabilities, and augment toxicity value derivations for risk assessments.

- **IRIS:** In FY 2019, IRIS assessment materials for hexavalent chromium⁸⁸ and methyl mercury⁸⁹ were released publicly. The National Academy of Science (NAS) peer reviewed the systematic review protocol for inorganic arsenic. Science Advisory Board (SAB) peer reviews for Ethyl tert-Butyl Ether and tert-Butyl Alcohol IRIS assessments were completed and the assessments are expected to be finalized in quarter three of FY 2020. Several NAS workshops were held to continue to advance the science and practice of assessment development. The draft assessment of Perfluorobutane Sulfonic Acid and related compound Potassium Perfluorobutane Sulfonate was released for public comment, revised in response, and is now expected to be published as final in quarter three of FY 2020. Additionally, work in FY 2019 facilitated the release of the IRIS assessment materials for polychlorinated biphenyls, mercury salts, and Per- and Polyfluoroalkyl Substances (PFAS) in early FY 2020.

⁸⁸ For more information, please see: https://cfpub.epa.gov/ncea/iris_drafts/recordisplay.cfm?deid=343950.

⁸⁹ For more information, please see: https://cfpub.epa.gov/ncea/iris_drafts/recordisplay.cfm?deid=343693.

- **TSCA Risk Evaluation Support:** HERA continues to provide targeted support to TSCA on the first 10 TSCA risk evaluations under the Lautenberg Chemical Safety Act. HERA also provides information management support utilizing the HERA *Health and Environmental Research Online*⁹⁰ database. Additionally, new workflows to provide support for the next 20 TSCA high priority risk evaluations are underway in FY 2020.
- **ISAs:** The draft ISAs for Particulate Matter and Ozone were provided for peer review to the Clean Air Scientific Advisory Committee. EPA updated the Particulate Matter report based on comments on the draft and released the final report in December 2019.⁹¹ The Ozone ISA is expected to be finalized in quarter three of FY 2020. HERA also provided scientific and regulatory support to the Air and Radiation Program in rulemaking and in the development of the Ozone and Particulate Matter Risk and Exposure and Policy Assessments.⁹²
- **PPRTV Assessments:** HERA continues to provide ongoing technical support for EPA’s human health and ecological risk assessment programs. HERA delivered three⁹³ high-priority PPRTV assessments in FY 2019 to support Superfund priorities; at least five more assessments are expected in FY 2020. Chapter three of the 2011 Edition of the Exposure Factors Handbook⁹⁴ (EFH) was updated to cover ingestion of water and other select liquids, and ExpoFIRST, a companion tool to the EFH, was updated accordingly. The All Ages Lead Model⁹⁵ was provided in September 2019 to the SAB for peer review. The SAB convened during an October 2019 public meeting and continued advancements were made to HERA’s dose-response analysis tool, Benchmark Dose Software.
- **Innovations in Risk Assessment:** Having modernized its assessment infrastructure, EPA research under HERA is using evidence mapping to provide a better understanding of the extent and nature of data available to address Agency chemical assessment priorities. It also serves to focus the assessments on support for specific decision contexts (i.e., ‘fit for purpose’). This approach is expected to improve assessment throughput and prioritize more timely assessments responsive to the priority needs of Agency offices and partners.

FY 2021 Activities and Performance Plan:

Work in this program directly supports Goal 3/Objective 3.3, Prioritize Robust Science in the *FY 2018 – 2022 EPA Strategic Plan*. In FY 2021, the HERA Research Program’s work will focus on efforts integral to achieving EPA priorities and informing the Agency’s implementation of key environmental regulations. Specifically, in FY 2021 HERA will:

⁹⁰ For more information, please see: <https://hero.epa.gov/hero/index.cfm/content/home>.

⁹¹ For more information, please see: <https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=347534>.

⁹² To view assessment documents, please see: <https://www.epa.gov/naaqs/carbon-monoxide-co-standards-risk-and-exposure-assessments-current-review>.

⁹³ Please see the HERA Superfund narrative for more information and for links to these three assessments.

⁹⁴ For more information, please see: <https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=236252>.

⁹⁵ For more information, please see: <https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=343670>.

- Continue developing additional assessments through IRIS of perfluorinated compounds as described in EPA’s PFAS Action Plan,⁹⁶ as well as other priority chemicals of interest to EPA’s Water Program and Land and Emergency Management Program. In addition, HERA will continue to provide assessments on priority chemicals that include polychlorinated biphenyls, methylmercury, mercury salts, vanadium compounds, hexavalent chromium, inorganic arsenic, perfluorononanoate, perfluorobutyrate, perfluorohexanoic acid, perfluorohexane sulfonic acid, and perfluorodecanoate. HERA will continue to provide scientific and technical support to the Air and Radiation Program on decisions to retain or revise the NAAQS, and to the Chemical Safety and Pollution Prevention Program on TSCA implementation.
- 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, and focus the assessments on support for specific decision contexts (i.e., ‘fit for purpose’) through a modernized assessment infrastructure.
- Provide the resources and workflow to two of the five Research and Development Program’s technical support centers (TSCs)⁹⁷ to provide localized and tailored technical assistance and scientific expertise on human and ecological risk assessments to states, tribes, and EPA. 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, in cooperation with the Chemical Safety for Sustainability Research Program.

In addition to the activities listed above, EPA also conducts 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 in understanding and managing risks associated with these chemicals. Decision-making at the state and local level is hindered by a limited number of standard toxicity values (such as reference doses and cancer risk estimates) for many PFAS chemicals of interest. Toxicity values currently exist for PFOA and PFOS.⁹⁸ The Agency will soon finalize toxicity assessments for GenX⁹⁹ chemicals and PFBS,¹⁰⁰ but there are other PFAS of high interest to stakeholders which currently have no federal published, peer-reviewed toxicity values. Within the HERA Research Program, EPA is prioritizing additional PFAS for development

⁹⁶ For more information, please see: <https://www.epa.gov/pfas/epas-pfas-action-plan>.

⁹⁷ 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>.

⁹⁸ Perfluorooctanoic Acid (PFOA), Perfluorooctanesulphonic Acid (PFOS).

⁹⁹ GenX chemical assessments are owned by EPA’s Water Program; the timeline for these assessments is different than PFBS. For more information on the timeline of these assessments, please contact EPA’s Water Program.

¹⁰⁰ ORD is moving through with the assessment process for Perfluorobutane sulfonate (PFBS) as planned and anticipate finalizing in quarter three of FY 2020.

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. This work supports the FY 2020 – 2021 PFAS Agency Priority Goal (APG).

- **Lead:** Childhood lead exposure continues to be one of the highest priorities for EPA. To advance lead exposure and biokinetic models used in EPA regulatory decisions and site assessments, research focuses on enhancing, evaluating, and applying lead exposure and biokinetic models used for estimating potential blood lead levels and related analyses for regulatory determinations. Additionally, the Exposure Factors Handbook¹⁰¹ provides up-to-date data on various human factors, including soil and dust ingestion rates, used by risk assessors. This work supports the FY 2020 – 2021 Lead APG.

Research Planning:

EPA’s Board of Scientific Counselors (BOSC) is a federal advisory committee that provides advice and recommendations to EPA on technical and management issues of its research programs. The HERA Research Program and the BOSC HERA subcommittee will continue to meet regularly over the next several years to seek input on topics related to research program design, science quality, innovation, relevance, and impact.

The Agency assesses its research performance through the distribution of research evaluation surveys to key users of its research products. This provides evidence for how research products are being used, by whom, and the degree of satisfaction product users have with research product quality, usability, and timeliness of delivery. Through the evaluation process, the Agency identifies its strengths and finds targeted areas for improvement to its research programs.

EPA’s state engagement¹⁰² 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. Key partners at the state level include: the Environmental Council of the States, with its Environmental Research Institute of the States and the Interstate Technology and Regulatory Council; the Association of State and Territorial Health Officials; as well as state media associations, such as the Association of State and Territorial Solid Waste Management Officials.

Performance Measure Targets:

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

FY 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (+\$1,141.0) This change is an increase due to the recalculation of base payroll costs.

¹⁰¹ For more information, please see: <https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=236252>.

¹⁰² For more information, please see: <https://www.epa.gov/research/epa-research-solutions-states>.

- (+\$1,000.0) This increase supports research and technical assistance regarding lead issues and contributes to the Lead Exposure Reduction Initiative focus area. This work will be guided by the *Federal Lead Action Plan to Reduce Childhood Lead Exposures and Associated Health Impacts* as well as related activities in the 2019-2022 StRAPs and the FY 2020-2021 Lead APG.
- (-\$12,284.0 / -43.3 FTE) This program change streamlines the HERA Research Program to focus on the highest priority assessments.
- (-\$2,514.0 / -14.7 FTE) This rebalances resources from the S&T appropriation within this program to the Superfund appropriation for work related to IRIS assessments.

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).

Water: Human Health Protection

Drinking Water Programs

Program Area: Water: Human Health Protection

Goal: A Cleaner, Healthier Environment

Objective(s): Provide for Clean and Safe Water

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
Environmental Programs & Management	\$92,373.1	\$100,903.0	\$97,462.0	-\$3,441.0
<i>Science & Technology</i>	\$3,227.6	\$4,094.0	\$4,364.0	\$270.0
Total Budget Authority	\$95,600.7	\$104,997.0	\$101,826.0	-\$3,171.0
Total Workyears	461.6	475.2	459.9	-15.3

Program Project Description:

The Drinking Water Technical Support Center leads the collection of national occurrence data for unregulated contaminants in drinking water; develops and evaluates analytical methods that are used to monitor drinking water contaminants accurately and reliably; leads the national program under which laboratories are certified to conduct the analyses of water contaminants with designated analytical methods; and works with states and public water systems collaboratively to implement tools that help systems achieve performance and optimization practices that achieve compliance and maximize technical capacity while reducing operational costs.

FY 2021 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.2, Provide for Clean and Safe Water in the *FY 2018 - 2022 EPA Strategic Plan*. In FY 2021, EPA's Drinking Water Technical Support Center will continue to carry out the following activities:

- Lead the development, revision, evaluation, and approval of chemical and microbiological analytical methods for unregulated and regulated contaminants to assess and ensure protection of public health from contaminants in drinking water (e.g., toxins resulting from harmful algal blooms, and polyfluoroalkyl substances [PFAS].) This work supports the PFAS FY 2020 – 2021 Agency Priority Goal.
- Implement EPA's Drinking Water Laboratory Certification Program,¹⁰³ which sets direction for oversight of state, municipal, and commercial laboratories that analyze drinking water samples. Conduct three regional program reviews during FY 2021 and deliver two laboratory certification officer training courses (chemistry and microbiology) for state and regional representatives to ensure the quality of analytical results.
- Partner with states and water systems to optimize their treatment technology and distribution systems under the drinking water Area Wide Optimization Program

¹⁰³ For more information, please see: <https://www.epa.gov/dwlabcert>.

(AWOP).¹⁰⁴ AWOP is a highly successful technical/compliance assistance and training program that enhances the ability of small systems to comply with existing microbial, disinfectant, and disinfection byproduct standards, and addresses distribution system integrity and water quality issues. During FY 2021, EPA expects to work with states and tribes to train them how to identify performance limiting factors at public water systems and develop and apply tailored tools to help them overcome operational challenges, achieve performance and optimization levels, and address health-based compliance challenges.

- Complete monitoring under the fourth Unregulated Contaminant Monitoring Rule³ (UCMR 4). The UCMR 4 was published in December 2016 and addresses the collection of data on occurrence of 30 contaminants of interest (e.g., cyanotoxins, disinfection byproducts, pesticides) to assess the frequency and levels at which these contaminants are found in public water systems. The UCMR 4 is a federal direct implementation program coordinated by EPA, as directed by the Safe Drinking Water Act (SDWA). The data collected are used by EPA as part of the Agency's determination of whether to establish health-based standards to protect public health. Monitoring and reporting activities for UCMR 4 started in FY 2018 and will conclude in FY 2021. 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 data available to our state and tribal partners and to the general public. During FY 2021, EPA also expects to publish the proposed rule for the fifth cycle of UCMR monitoring (UCMR5) for public comment.
- Conduct pre-monitoring implementation activities to prepare for the UCMR 5 sampling period from 2023 through 2025. EPA expects UCMR 5 to be the first cycle of UCMR that will implement the monitoring provisions of the America's Water Infrastructure Act of 2018 (AWIA) which require, subject to the availability of appropriations and adequate laboratory capacity, sampling at all public water systems (PWSs) serving between 3,300 and 10,000 persons, and a representative sample of PWSs serving fewer than 3,300 persons.

Performance Measure Targets:

Work under this program supports performance results in the Drinking Water State Revolving Fund and Categorical Grant: Public Water System Supervision Programs under the STAG appropriation and the Drinking Water Programs under the EPM appropriation.

FY 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (+\$168.0) This change is an increase due to the recalculation of base payroll costs.
- (+\$102.0 / +4.2 FTE) This program change increases resources and FTE for the implementation and administration of the requirements of AWIA.

¹⁰⁴ For more information, please see: <https://www.epa.gov/dwstandardsregulations/optimization-program-drinking-water-systems>.

³For more information, please see: <https://www.epa.gov/dwucmr/learn-about-unregulated-contaminant-monitoring-rule>.

Statutory Authority:

SDWA.

Congressional Priorities

Water Quality Research and Support Grants

Program Area: Congressional Priorities

Goal: A Cleaner, Healthier Environment

Objective(s): Provide for Clean and Safe Water

(Dollars in Thousands)

	FY 2019 Actuals	Estimated FY 2020 Enacted	FY 2021 Pres Budget	FY 2021 Pres Budget v. Estimated FY 2020 Enacted
Environmental Programs & Management	\$0.0	\$17,700.0	\$0.0	-\$17,700.0
<i>Science & Technology</i>	<i>\$4,092.0</i>	<i>\$6,000.0</i>	<i>\$0.0</i>	<i>-\$6,000.0</i>
Total Budget Authority	\$4,092.0	\$23,700.0	\$0.0	-\$23,700.0

Program Project Description:

In FY 2020, Congress appropriated \$6.0 million in the Science and Technology appropriation to fund high priority water quality and water availability research. EPA was instructed to award grants on a competitive basis, independent of the Science to Achieve Results (STAR) Program, and give priority to not-for-profit organizations that: conduct activities that are national in scope; can provide a 25 percent match, including in-kind contributions; and often partner with the Agency.

FY 2021 Activities and Performance Plan:

Resources have been proposed for elimination for this program in FY 2021.

Performance Measure Targets:

EPA’s FY 2021 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2021 Change from Estimated FY 2020 Enacted Budget (Dollars in Thousands):

- (-\$6,000.0) This decrease proposes to eliminate funding for the Water Quality Research and Support Grants Program.

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; WRRRA; and WWWQA.