



*National Emerging Contaminants Research Initiative
Implementation Plan*

A Report by the
JOINT SUBCOMMITTEE ON ENVIRONMENT, INNOVATION, AND
PUBLIC HEALTH
CONTAMINANTS OF EMERGING CONCERN STRATEGY TEAM
of the
NATIONAL SCIENCE AND TECHNOLOGY COUNCIL

January 2024

About the National Science and Technology Council

The National Science and Technology Council (NSTC) is the principal means by which the Executive Branch coordinates science and technology policy across the diverse entities that make up the federal research and development (R&D) enterprise. A primary objective of the NSTC is to ensure science and technology policy decisions and programs are consistent with the President's stated goals. The NSTC prepares R&D strategies that are coordinated across federal agencies aimed at accomplishing multiple national goals. The work of the NSTC is organized under committees that oversee subcommittees and working groups focused on different aspects of science and technology. More information is available at <http://www.whitehouse.gov/ostp/nstc>.

About the Office of Science and Technology Policy

The Office of Science and Technology Policy (OSTP) was established by the National Science and Technology Policy, Organization, and Priorities Act of 1976 to provide the President and others within the Executive Office of the President (EOP) with advice on the scientific, engineering, and technological aspects of the economy, national security, homeland security, health, foreign relations, the environment, and the technological recovery and use of resources, among other topics. OSTP leads interagency science and technology policy coordination efforts, assists the Office of Management and Budget (OMB) with an annual review and analysis of federal research and development in budgets, and serves as a source of scientific and technological analysis and judgment for the President with respect to major policies, plans, and programs of the federal government. More information is available at <http://www.whitehouse.gov/ostp>.

About the Contaminants of Emerging Concern Strategy Team

The Contaminants of Emerging Concern (CECs) Interagency Working Group (IWG) was established in May 2020 in response to the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2020, in which Congress directed the IWG to coordinate federal research on CECs.¹ This effort extends the work of the Task Force on Emerging Contaminants that produced the 2018 document, “Plan for Addressing Critical Research Gaps Related to Emerging Contaminants in Drinking Water” in response to FY2018 Appropriations legislation.² The CEC IWG updated the 2018 Plan in response to FY2019 Appropriations legislation.³ The IWG also organized technical advice for a national CEC research initiative and launched near-term interagency coordination actions. The IWG was reconfigured as a NSTC Strategy Team (ST) under the Joint Subcommittee on Environment, Innovation, and Public Health (JSCEIPH) in autumn of 2021. The ST is co-chaired by EPA, NIEHS, and OSTP; and consists of the following agencies: DHS,

¹ National Defense Authorization Act for Fiscal Year 2020 (Pub. L. 116-92) (hereafter “FY2020 NDAA”) § 7342(b) (15 U.S.C. §8952(b)).

² S. Rept. 115-139 (Committee Report to accompany S. 1662, Departments of Commerce and Justice, Science and Related Agencies Appropriations Bill, 2018) adopted by reference in the Explanatory Statement for Division B—Commerce, Justice, Science, and Related Agencies Appropriations Act, 2018 of the House Amendment to Senate Amendment on H.R. 1625, Consolidated Appropriations Act, 2018 (Pub. L. 115-141) (hereafter “FY2018 Appropriations Report”), at 101.

³ H. Rept. 116-9 (Conference Report to accompany H.J. Res. 31, Making Further Continuing Appropriations for the Department of Homeland Security for Fiscal Year 2019, and for Other Purposes (Pub. L. 116-6)) (hereafter “FY2019 Appropriations Report”), at 633.

DOC/NIST, DoD, DOE, DOI/USGS, DOT, DOT/FAA, EOP/OSTP, EPA, HHS/CDC/ATSDR, HHS/CDC, HHS/FDA, HHS/NIH/NIEHS, NASA, NSF, SBA, and USDA. The ST coordinates interagency CEC activities and supports the development and implementation of the CEC research initiative.

About this Document

The FY2020 NDAA directs OSTP, in coordination with several federal agencies that are members of the CEC ST, to create a national research initiative to improve the identification, analysis, monitoring, and treatment methods of CECs, and develop any necessary program, policy, or budget to support the implementation of the initiative.⁴ OSTP published the National Emerging Contaminants Research Initiative (NECRI) in 2022,⁵ which organizes CEC research into five strategic goals and provides guidance for an implementation plan that outlines steps to achieve the strategic goals and metrics to track progress. The capabilities and approaches developed under the NECRI should lead to a holistic treatment of CECs. This implementation plan for the NECRI provides short-term and long-term activities for cross-government collaboration that when achieved will help fulfill the goals of the NECRI.

Copyright Information

This document is a work of the United States Government and is in the public domain.⁶ Subject to the stipulations below, it may be distributed and copied with acknowledgment to OSTP. Copyrights to graphics included in this document are reserved by the original copyright holders or their assignees and are used here under the Government's license and by permission. Requests to use any images must be made to the provider identified in the image credits or to OSTP if no provider is identified. Published in the United States of America, 2023.

⁴ FY2020 NDAA § 7342(c) (15 U.S.C. §8952(c)).

⁵ OSTP. 2022. National Emerging Contaminants Research Initiative. <https://www.whitehouse.gov/wp-content/uploads/2022/08/08-2022-National-Emerging-Contaminants-Research-Initiative.pdf>.

⁶ See 17 U.S.C. §105

Acknowledgments

OSTP and the CEC Strategy Team thank Michael Focazio, USGS, for his significant contributions to the National Emerging Contaminants Research Initiative and development of this implementation plan prior to his retirement.

In addition, OSTP and the Strategy Team thank Avanti Corporation, including Justin Crane, Courtney Gunderson, and Mackenzie Carter, for their outstanding work in support of the development of this implementation plan.

NATIONAL SCIENCE AND TECHNOLOGY COUNCIL

Chair

Arati Prabhakar, Assistant to the President for Science and Technology; Director, OSTP

Executive Director (Acting)

Kei Koizumi, Principal Deputy Director for Policy, OSTP

COMMITTEE ON ENVIRONMENT

Co-Chairs

Jane Lubchenco, Deputy Director for Climate and Environment, OSTP

Chris Frey, Assistant Administrator, Office of Research and Development, EPA

Rick Spinrad, Administrator, DOC/NOAA

JOINT SUBCOMMITTEE ON ENVIRONMENT, INNOVATION, AND PUBLIC HEALTH

Co-Chairs

Benjamin Place, Assistant Director for Environmental Health, OSTP

Annette Guiseppi-Elie, National Program Director, Chemical Safety for Sustainability, EPA

David Balshaw, Director, Division of Extramural Research and Training, HHS/NIH/NIEHS

Executive Secretary

Brooke Holmes, Program Analyst, Office of Research and Development, EPA

CONTAMINANTS OF EMERGING CONCERN STRATEGY TEAM

Co-Chairs

Benjamin Place, Assistant Director for Environmental Health, OSTP

Annette Guiseppi-Elie, National Program Director, Chemical Safety for Sustainability, EPA

David Balshaw, Director, Division of Extramural Research and Training, HHS/NIH/NIEHS

Melanie Buser, Environmental Health Scientist, Division of Environmental Health Science and Practice, HHS/CDC/NCEH

Executive Secretary

Jennifer Collins, Health Specialist, Exposure, Response, and Technology Branch, HHS/NIH/NIEHS

Strategy Team Members

Melanie Buser, HHS/CDC/ATSDR, *co-chair*

Benjamin Place, EOP/OSTP, *co-chair*

Annette Guiseppi-Elie, EPA/ORD, *co-chair*

David Balshaw, HHS/NIH/NIEHS, *co-chair*

Jennifer Collins, HHS/NIH/NIEHS

Kei Koizumi, EOP/OSTP

Jay Collert, DHS

Jessica Cox, DHS

Lisa Quiveors, DHS

Carlos Gonzales, DOC/NIST

Mark Johnson, DOD

Monica Slade, DOD

James Smith, DOD

Patricia Underwood, DOD

Natalia Vinas, DOD

Debbie Rosano, DOE

Hannah Hidle, DOE/EM

April Kluever, DOE/EM

Kathy Lee, DOI/USGS

Kelly Smalling, DOI/USGS

Elissa Ashley, DOT/FAA

Mitchell Otey, DOT/FAA

Christopher Zevitas, DOT/Volpe

Amina Pollard, EPA/OW

Christine Whittaker, HHS/CDC/NIOSH

Pamela Protzel Berman, HHS/CDC/ATSDR

Moiz Mumtaz, HHS/CDC/ATSDR

Chris Reh, HHS/CDC/ATSDR

Rachel Rogers, HHS/CDC/ATSDR

Elizabeth Hamelin, HHS/CDC/NCEH

Suzanne Fitzpatrick, HHS/FDA

David Whitman, HHS/FDA

Daniel Shaughnessy, HHS/NIH/NIEHS

Timothy Appleman, NASA

Amanda Haes, NSF

Nora Savage, NSF

Jeanne VanBriesen, NSF

Jonathan Alter, SBA

Jennifer Shieh, SBA

Astrika Adams, SBA/Advocacy

James Dobrowolski, USDA

Coordination Teams

Non-Targeted Analysis / Effect-Based Monitoring Team

Carlos Gonzalez , DOC/NIST, <i>co-chair</i>	Suzanne Fitzpatrick , HHS/FDA
Susan Glassmeyer , EPA/ORD, <i>co-chair</i>	Ann Knolhoff , HHS/FDA
Benjamin Place , EOP/OSTP	Danilo Tagle , HHS/NIH/NCATS
Annette Guiseppi-Elie , EPA	Jennifer Collins , HHS/NIH/NIEHS
David Balshaw , HHS/NIH/NIEHS	Yuxia Cui , HHS/NIH/NIEHS
Valerie Adams , USARMY MEDCOM APHC	Daniel Shaughnessy , HHS/NIH/NIEHS
Natalia Vinas , DOD	Casey Warren , HHS/NIH/NIEHS
Hannah Hidle , DOE/EM	Suzanne Fenton , HHS/NIH/NIEHS
Paul Bradley , DOI/USGS	Ruth Lunn , HHS/NIH/NIEHS
Kathy Lee , DOI/USGS	James Smith , Navy and Marine Corps Public Health Center
Kelly Smalling , DOI/USGS	Amanda Haes , NSF
Jon Sobus , EPA	Nora Savage , NSF
Moiz Mumtaz , HHS/CDC/ATSDR	
Elizabeth Hamelin , HHS/CDC/NCEH	

Risk Characterization Team

Suzanne Fitzpatrick , HHS/FDA, <i>co-chair</i>	Kelly Smalling , DOI/USGS
Chad Blystone , HHS/NIH/NIEHS, <i>co-chair</i>	Christine Whittaker , HHS/CDC/NIOSH
Benjamin Place , EOP/OSTP	Moiz Mumtaz , HHS/CDC/ATSDR
Annette Guiseppi-Elie , EPA	Melanie Buser , HHS/CDC/ATSDR
David Balshaw , HHS/NIH/NIEHS	Goncalo Gamboa , HHS/FDA
Jessica Cox , DHS	Leah Croucher , HHS/NIH/NCATS
Mark Johnson , DOD	Marc Ferrer , HHS/NIH/NCATS
Natalia Vinas , DOD	Danilo Tagle , HHS/NIH/NCATS
Hannah Hidle , DOE/EM	Jennifer Collins , HHS/NIH/NIEHS
Paul Bradley , DOI/USGS	Nicole Kleinstreuer , HHS/NIH/NIEHS

Joint Solicitation Team

Daniel Shaughnessy, HHS/NIH/NIEHS, *co-chair*

Nora Savage, NSF, *co-chair*

Benjamin Place, EOP/OSTP

Tracy Gerstle, DOC/ITA

Mary Bedner, DOC/NIST

Marie DeLorenzo, DOC/NOAA

Natalia Vinas, DOD

Janice Wiley, DOD

Felicia Lucci, DOE

Victoria Distefano, DOE

Rip Shively, DOI/USGS

James Gentry, EPA

Suzanne Fitzpatrick, HHS/FDA

Eric McGill, HHS/FDA

Jennifer Collins, HHS/NIH/NIEHS

Amanda Haes, NSF

Jeanne VanBriesen, NSF

Jim Dobrowolski, USDA

Thomas Moreland, USDA

Abbreviations and Acronyms

ATSDR	Agency for Toxic Substances and Disease Registry	NCATS	National Center for Advancing Translational Sciences
CDC	Centers for Disease Control and Prevention	NCEH	National Center for Environmental Health
CEC	Contaminant of Emerging Concern	NDAA	National Defense Authorization Act
DHS	Department of Homeland Security	NECRI	National Emerging Contaminants Research Initiative
DOC	Department of Commerce	NIH	National Institutes of Health
DoD	Department of Defense	NIEHS	National Institute of Environmental Health Sciences
DOE	Department of Energy	NIST	National Institute of Standards and Technology
DOI	Department of the Interior	NOAA	National Oceanic and Atmospheric Administration
DOT	Department of Transportation	NSF	National Science Foundation
EBM	Effect-Based Monitoring	NSTC	National Science and Technology Council
EM	Office of Environmental Management	NTA	Non-targeted analysis
EOP	Executive Office of the President	OSTP	Office of Science and Technology Policy
EPA	Environmental Protection Agency	ORD	EPA Office of Research and Development
FAA	Federal Aviation Administration	OMB	Office of Management and Budget
FDA	Food and Drug Administration	OW	EPA Office of Water
HHS	Department of Health & Human Services	SBA	Small Business Administration
IWG	Interagency Working Group	ST	Strategy Team
JSCEIPH	Joint Subcommittee on Environment, Innovation and Public Health	USDA	United States Department of Agriculture
NAMs	New Approach Methodologies	USGS	United States Geological Survey
NASA	National Aeronautics and Space Administration		

Table of Contents

Executive Summary x

Introduction 1

Implementation Activities 2

 Short-Term Activities 2

 Long-Term Activities 3

Outcomes/Measures of Success 4

Appendix: Improving Coordination of CEC Research Efforts Across Federal Agencies 5

 Processes and Timelines for a Generalized Multi-Agency Program 6

 Categories of Collaborative Agency Activities..... 7

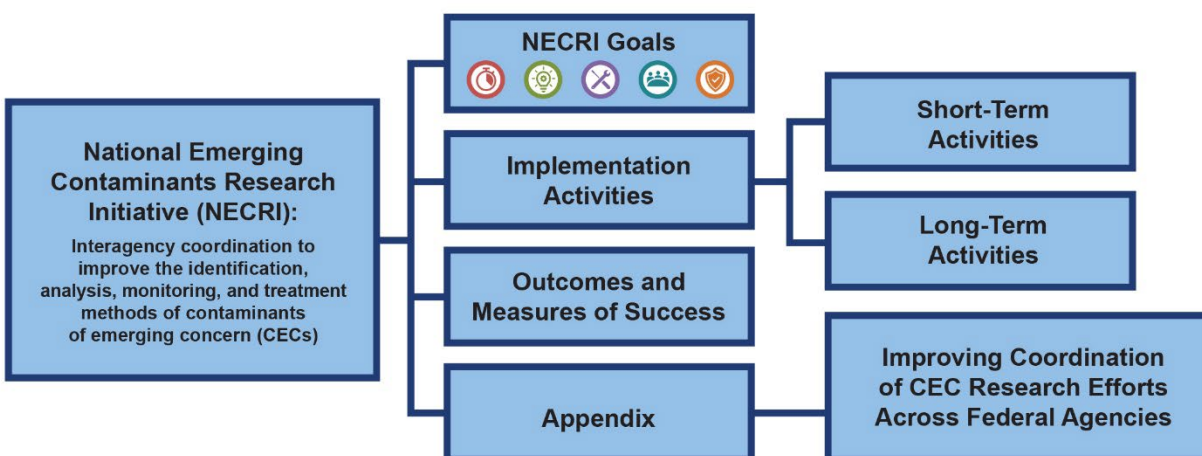
 Hypothetical Example of a Joint Solicitation..... 10

Executive Summary

In August 2022, the National Science and Technology Council (NSTC) Contaminant of Emerging Concern Strategy Team (CEC ST) released The National Emerging Contaminants Research Initiative (NECRI). The NECRI set a national vision to address contaminants of emerging concern, as part of efforts to ensure access to clean and plentiful drinking water for every person in the nation.⁷ Contaminants of emerging concern (CECs) are newly identified or reemerging manufactured or naturally occurring physical, chemical, biological, radiological, or nuclear materials that may cause adverse effects to human health or the environment and do not currently have a national primary drinking water regulation. The NECRI outlined five broad goals to address critical research gaps in detecting and assessing emerging contaminants in drinking water, and identifying and mitigating adverse health effects:

- 1) Decrease the time from contaminant of emerging concern identification to risk mitigation.
- 2) Promote technological innovation in tools to discover, track, understand, and mitigate CECs.
- 3) Develop and deploy tools and approaches for CEC decision making.
- 4) Coordinate transdisciplinary CEC research activities among federal and non-federal partners.
- 5) Foster transparency and public trust when communicating about CECs.

The Implementation Plan at a Glance



This implementation plan identifies activities that make the plan’s five goals actionable. Implementation activities are summarized as either short-term activities (achievable within the next three years) or long-term activities (achievable in more than three years). The success of the five NECRI goals will culminate in four pragmatic outcomes:

- 1) A cooperative interagency process to identify CECs that require cross-governmental coordination and action.
- 2) A coordinated mechanism to efficiently evaluate identified CECs to enable decision-making across government entities.

⁷ OSTP. 2022. National Emerging Contaminants Research Initiative. <https://www.whitehouse.gov/wp-content/uploads/2022/08/08-2022-National-Emerging-Contaminants-Research-Initiative.pdf>.

NECRI IMPLEMENTATION PLAN

- 3) A framework to support the implementation and utilization of new tools and data in risk characterization for more effective risk mitigation.
- 4) Effective and equitable community engagement at every stage of the CEC paradigm⁸ to ensure public trust and more effective and equitable risk communication.

The overall success of the NECRI depends on collaboration and possible joint solicitations across the federal government as directed in the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2020. This implementation plan includes an appendix to facilitate cross-governmental collaboration and provide resources that can inform collaborations for joint solicitations.

⁸ The CEC paradigm is the process of identification, quantification, toxicological evaluation, and risk characterization and communication of a newly detected contaminant.

Introduction

This National Emerging Contaminant Research Initiative (NECRI) Implementation Plan is the culmination of a charge to the White House Office of Science and Technology Policy (OSTP) under the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2020. The FY 2020 NDAA directed OSTP to coordinate with several federal agencies to create a national research initiative to improve the identification, analysis, monitoring, and mitigation methods of CECs, and develop any necessary program, policy, or budget to support the implementation of the initiative.⁹ The NECRI (and its implementation) is built on the premise that every American deserves to drink clean water—free of chemicals and pollutants that harm the health and wellbeing of children, families, and communities.

Per the FY 2020 NDAA charge, the NECRI outlined a federal strategy to address critical research gaps related to detecting and assessing emerging contaminants in drinking water to identify and mitigate adverse health effects. Further, the NECRI emphasizes the importance of partnerships and effective communication in building a strong foundation for future research. The NECRI also integrates climate change and environmental justice tenets to ensure equitable access to clean water. In this context, the NECRI identified five goals for CEC research:

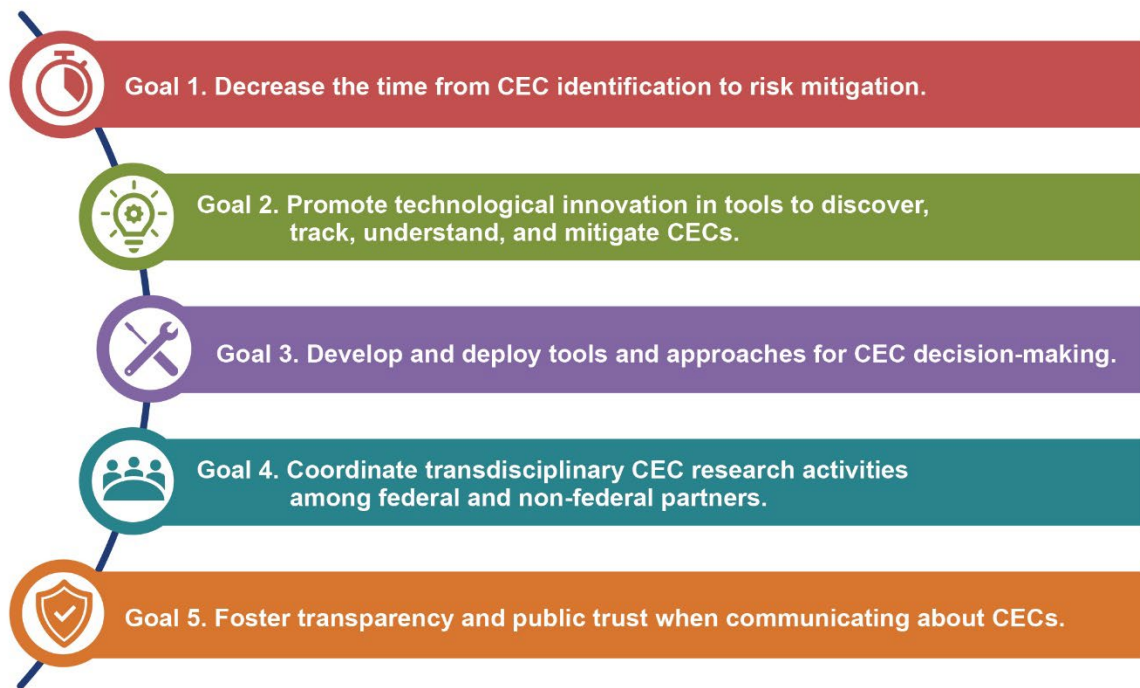


Figure 1. The five strategic goals identified through the NECRI.

⁹ FY2020 NDAA § 7342(c) (15 U.S.C. §8952(c)).

This document describes activities that can be used to make the goals of the NECRI actionable. After the introduction, the document outlines short- and long-term implementation activities, as well as outcomes/measures of success.

The overall success of the NECRI depends on collaboration among multiple federal agencies in order to establish distinct policies and procedures for supporting research activities. The main document is intentionally brief and includes an appendix to outline a system to facilitate cross-governmental collaboration. The appendix provides a resource that can be used to inform mechanisms for collaborations related to joint solicitations including an illustrative example. Exemplar projects that can be used as the basis of joint solicitations will continue to be developed by the Strategy Team and be available as opportunities for joint solicitations arise.

Implementation Activities

This implementation plan includes proposed short-term (less than 3 years) and long-term (more than 3 years) activities that will fuel impactful progress to address the five NECRI goals.

Short-Term Activities

1. Cross-Government Coordination and Action
 - a. Establish an interagency core of subject matter experts to develop cross-government chemical and material reference standards for analyzing environmental samples in real time, using non-targeted monitoring methods. This will include both developing an understanding of the current inventory of authenticated standards, as well as developing a framework for efficiently creating new standards.
 - b. Develop a resource guide for how to coordinate emerging contaminant research across agencies (see [appendix](#)).
 - c. Establish a process for a coordinated response to the discovery/identification of a potential CEC (including an initial coordinated alert mechanism) and ensure broad adoption of this process across federal agencies.
 - d. Conduct research to establish an upper limit for calculated concentrations of newly identified CECs that will initiate further measurement and risk characterization.
2. Knowledge Management and Data Sharing
 - a. Collate existing mitigation and treatment technologies and their effectiveness based on the physical and chemical characteristics of known contaminants, and assess the effectiveness of those various technologies based on characteristics of newly identified CECs.
 - b. Identify gaps in mitigation technologies and establish plans for mitigation technologies that do not introduce other contaminants.
 - c. Develop and standardize sampling approaches to assess drinking water contamination within a community water system at sequential points in the treatment (plant intake, treatment stages, pre-distribution), distribution, and

- premise-plumbing systems, to inform the life cycle (origin, transformation, and removal) of CECs in drinking water.
- d. Build framework recommendations to support the implementation and utilization of innovative tools for CEC identification and risk characterization.
- 3. Community Engagement and Communication
 - a. Develop recommended strategies to engage with communities to ensure that efforts are responsive to community concerns.
 - b. Work with science communication experts to develop, foster, and implement CEC communication strategies to disseminate ongoing research and findings from CEC efforts to guide solution-oriented mitigation efforts.
 - c. Create and maintain a web presence for CEC information sharing with the public.

Long-Term Activities

- 1. Cross-Government Coordination and Action:
 - a. Formalize a collaborative CEC network that provides access to research data, methods, tools, and equipment that includes existing regional centers and encourages the development of new centers that fill geographical or research gaps.
 - b. Develop a recommended framework for incorporating the results of new approach methodologies and computational risk models into regulatory decisions.
 - c. Create a centralized data repository of information on CECs that serves as a shared environment for data storage, access, and computing used to administer, coordinate, and facilitate tasks and to streamline operations.
 - d. Develop a CEC Non-Targeted Analysis/Effects Based Monitoring (NTA/EBM) Multi-Agency Center, which provides centralized methods, instruments, and data analysis and sharing for federal and non-federal laboratories.
- 2. Knowledge Management and Data Sharing
 - a. Develop and maintain a list of capabilities and specific areas of technical expertise for scientific problem formulation and resolution related to CECs.
 - b. Develop a unified data infrastructure and an interagency data management plan that incorporates federal data sharing policies and includes guidelines for access to the data repository; review of existing data; decisions about the format, content, and provenance for generated data; and best practices to organize, secure, and store data.
 - c. Develop a real-time, nationwide water monitoring and reporting infrastructure.
 - d. Expand, validate, and adopt rapid risk assessment methods, and link data to critical biological endpoints and exposure scenarios.
- 3. Community Engagement and Communication
 - a. Ensure technological innovation is equitably driven, with accessibility as a core component of innovation.

- b. Incorporate community engagement to ensure confidence in the integration of evidence in the decision-making process and make sure that the decision-making process is transparent and grounded in science.

Outcomes/Measures of Success

Meeting the goals of the NECRI depends (in part) on accomplishing the actionable activities listed above. These activities can be broadly grouped into outcomes that if achieved can be used as measures of success. These outcomes are:

- 1) A cooperative interagency process to identify CECs that require cross-governmental coordination and action.
- 2) A coordinated mechanism to efficiently evaluate identified CECs to enable decision-making across government entities.
- 3) A framework to support the implementation and utilization of new tools and data in risk characterization for more effective risk mitigation.
- 4) Effective and equitable community engagement at every stage of the CEC paradigm to ensure public trust and more effective and equitable risk communication.

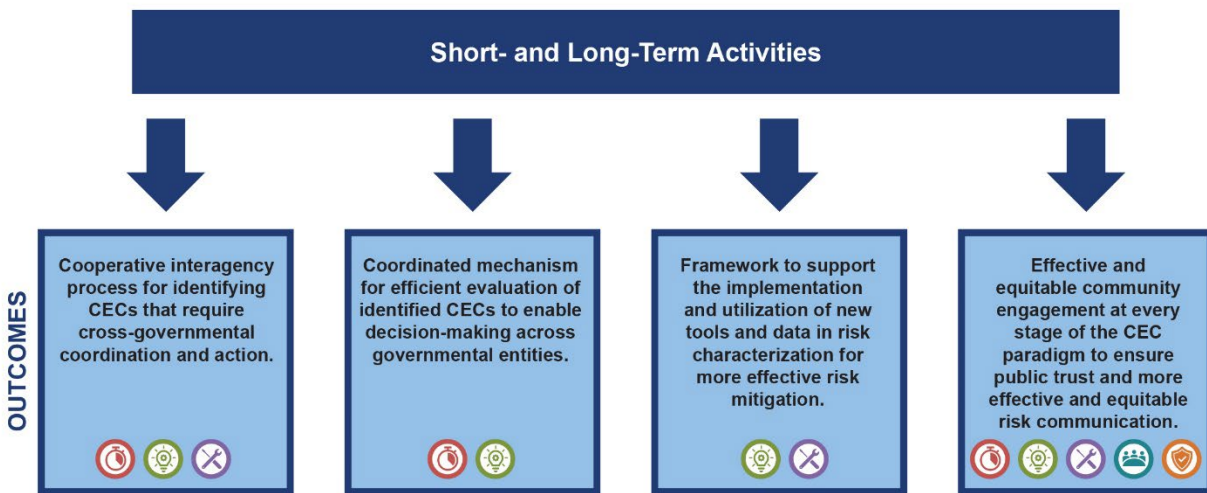


Figure 2. Diagram of the four stated outcomes for success with the associated implementation plan goals for each outcome.

Appendix

Improving Coordination of CEC Research Efforts Across Federal Agencies

Each of the activities outlined in this implementation plan may be addressed by multiple agencies, or individual agencies may address particular action items aligning to their current activities. Federal agencies have the ability and capacity to engage in cross-agency research solicitations; however, the timing, amount of support, and mechanisms differ from one agency to another. In addition, some agencies, such as DOE, EPA, FDA, NIH, NIEHS, and NIST, most often participate in such activities via operating and maintaining user facilities and providing subject matter expertise. These facilities and areas of expertise can strengthen supported research projects on emerging contaminants.

Those agencies or sub-units of agencies that can support projects closer to commercial products or application can work with other agencies' Small Business Innovation Research Programs to identify novel technologies necessary to quantify, detect, characterize, and analyze contaminants of emerging concern.

A resource guide that consolidates information on the key parameters (including constraints) around collaboration and/or joint funding of activities across the federal agencies has the potential to improve coordination of CEC research across federal agencies. Key parameters include information on different funding mechanisms and coordination opportunities, timelines for agencies, and opportunities and barriers for each mechanism. This can then help inform the mechanisms that will be used for cross-agency collaborative projects.

1. Processes and Timelines for a Generalized Multi-Agency Program

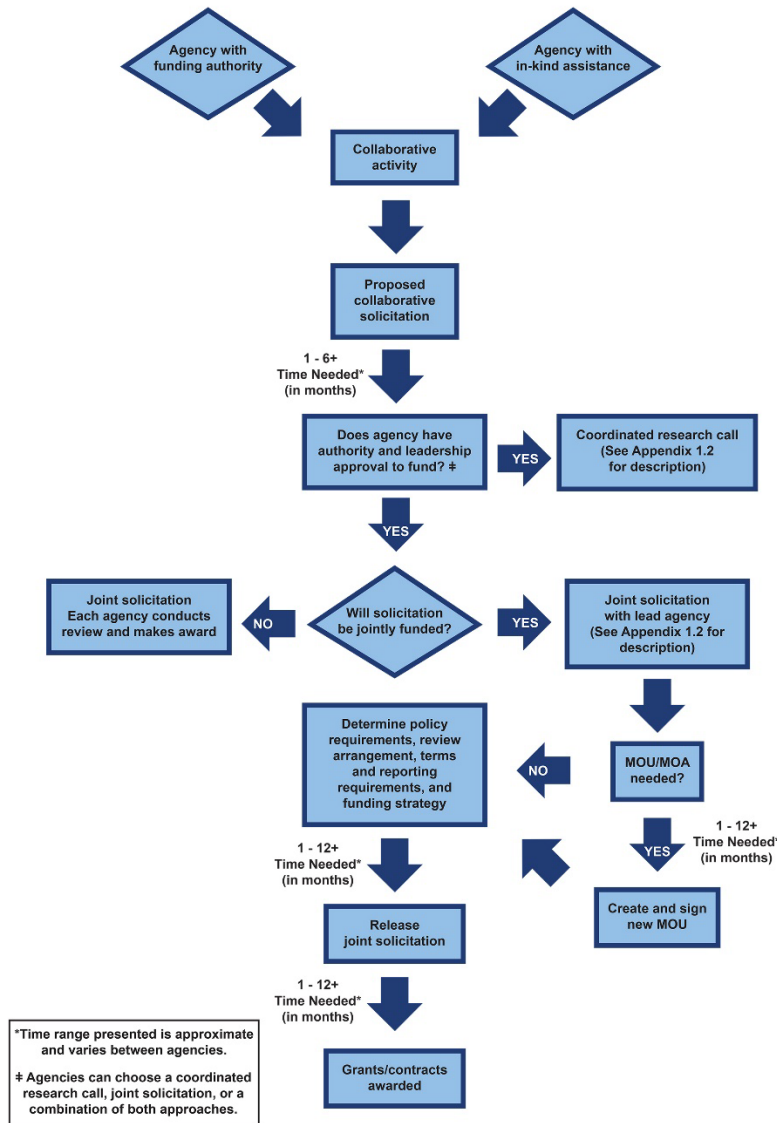


Figure A1. This diagram illustrates some of the processes and timelines for a generalized multi-agency program that involves joint funding solicitations. Federal agencies may have different technical areas of purview, funding timelines, concept approval processes, authorities and approval processes for funding programs, requirements for creating and signing memoranda of understanding or memoranda of agreement, fiscal year guidelines for allocation of funds, proposal review, and grant terms and conditions. Although some agencies listed do not typically participate in funding opportunities, all agencies can provide expertise and resources that can contribute greatly to the success of a multi-agency program. Note that timelines for participating agencies are approximate, dependent upon specific office or program within the agency, and may be expedited or extended in some cases.

2. Categories of Collaborative Agency Activities

In addition to the current processes used in multi-agency programs involving grants, contracts, and/or cooperative agreements, other possible joint programs can include coordinated research calls, in which agencies solicit, review, and fund grants independently, and research projects are coordinated across the program through steering committees or regular consortium meetings. There may be multiple opportunities for CEC programs to involve participatory science efforts for contaminant monitoring using new or available exposure assessment tools. Agencies may also contribute to centralized programs by contributing laboratory and scientific expertise. A Challenge Prize contest may afford a more rapid, efficient option for soliciting and applying specific technology applications. Brief descriptions of these categories are presented below, in order of low to high complexity.

- **Access to User Facilities / Subject Matter Expertise**
 - **Description:** Federal agencies with internal or contractor-operated laboratories could give access to state-of-the-art laboratory facilities, equipment, and expertise to external users, both federal and non-federal, under joint or coordinated solicitations. Alternatively, federal researchers could partner with external users to conduct research projects under coordinated and joint solicitations.
 - **Examples:** DOE User Facilities¹⁰ and NIST Center for Nanoscale Science and Technology¹¹
 - **Complexity:** Low
 - **Time requirement:** 3-6 months
 - **Member agency participation:** Limited to agencies that possess user facilities or routinely provide researcher access to subject matter experts.

- **Coordinated Research Call**
 - **Description:** Agency representatives identify common areas of interest in science and utilize ongoing funding announcements to solicit research projects from research-supporting institutions for targeted and specific research projects in the common research topic. Agencies fund projects separately. These calls are separately published on agency websites and via various federal public communiques, detailing areas of interest, proposal deadlines, anticipated award amounts and eligibility criteria for submitters. Awards are made according to each agency's protocol. Periodic workshops may be held in which all researchers supported by individual agencies convene to disseminate and discuss research findings.
 - **Example:** NIEHS/DTT Emerging Contaminants and Issues of Concern Program¹² and NIH/NCATS Tissue Chip Initiatives and Projects¹³
 - **Complexity:** Low-to-Medium

¹⁰ <https://ess.science.energy.gov/user-facilities/>

¹¹ <https://www.nist.gov/cnst>

¹² <https://www.niehs.nih.gov/research/atniehs/dtt/strategic-plan/responsive/emerging/index.cfm>

¹³ <https://ncats.nih.gov/tissuechip/projects>

- **Planning time required:** 1-6 months
- **Member agency participation:** Multiple agency involvement including funding agencies and coordination committee that could include funding and non-funding agencies.
- **Participatory Science**
 - **Description:** As granted by the Crowdsourcing and Citizen Science Act of 2017 (15 USC § 3724), federal agencies are authorized to use federal funds to support crowdsourcing and other public participatory projects. This could involve the collection of contaminant data or samples by the public, as part of a collaborative project with researchers supported by federal agencies. Agencies would provide expertise and/or material resources to encourage public participation. The support would include compensation for the public to gather specific data. Public-sourced samples or data may not be appropriate for all agency activities (e.g., regulatory risk assessment). This involvement of the public would be described in the attendant solicitation issued by agencies.
 - **Examples:** USGS Characterization of PFAS Contamination in Underserved Private-Wells and Public-Supply¹⁴, USGS White-Tailed Deer Study¹⁵, and NOAA's Mussel Watch program¹⁶
 - **Complexity:** Low-to-Medium
 - **Planning time required:** 1-9 months
 - **Member agency participation:** Multiple agencies that perform research where participatory science could provide the quality of samples and/or data needed.
- **Coordinated Surveillance / Monitoring**
 - **Description:** Some agencies perform environmental and/or biomonitoring or health monitoring campaigns as part of their mission. Coordination of these efforts between federal agencies, or as part of a joint or coordination solicitation with external partners, could address the multiple research objectives of various participating organizations in an efficient manner.
 - **Example:** USGS/EPA Drinking Water Sampling Coordination¹⁷
 - **Complexity:** Medium
 - **Planning time required:** 6-9 months
 - **Member agency participation:** Multiple agencies with monitoring or surveillance programs and those with research objectives that could benefit from coordinated campaigns.

¹⁴ <https://www.usgs.gov/news/national-news-release/tap-water-study-detects-pfas-forever-chemicals-across-us>

¹⁵ <https://www.usgs.gov/centers/columbia-environmental-research-center/science/a-national-assessment-pesticide-pfas>

¹⁶ <https://coastalscience.noaa.gov/project/mussel-watch-program-assessment-chesapeake-bay-charleston-harbor/>

¹⁷ https://www.epa.gov/sites/default/files/2014-11/documents/epa_and_usgs_drinkingwater_0.pdf

- **Challenge Prize/Contest**
 - **Description:** Agencies can identify a critical technology or device need and use prizes (monetary or honorary) to solicit competition for successful development of tools, technologies, and approaches to characterize CECs. This approach can spark imagination and stimulate new ideas from non-traditional audiences.
 - **Example:** EPA/USGS/NOAA/Army Water Toxicity Sensor Challenge¹⁸
 - **Complexity:** Medium
 - **Planning time required:** 6-9 months
 - **Member agency participation:** Limited to agencies that have funding sources to establish challenges.

- **Joint Solicitation**
 - **Description:** Joint solicitations are coordinated activities where participating agencies collectively solicit research grants, cooperative agreements or contracts. Agency representatives compose text for soliciting research projects from academic, industrial, non-governmental organizations and other research-supporting institutions for targeted and specific scientific, engineering, or technological research projects. These calls are published on agency websites and via various federal public communiques, detailing areas of interest, proposal deadlines, anticipated award amounts and eligibility criteria for submitters. Joint solicitations could leverage access to user facilities (discussed above) or subject matter expertise of agencies. Funding support and funding decisions can be made using pooled funding from the participating agencies, or participating agencies may elect to fund only the grants, contract or cooperative agreements within their mission area.
 - **Example:** See [Appendix 3](#)
 - **Complexity:** High
 - **Planning time required:** 2 years or more
 - **Member agency participation:** Limited to funding agencies, except in cases where other agencies could provide in-kind support via user facility access or subject matter expertise.

¹⁸ <https://www.epa.gov/innovation/water-toxicity-sensor-challenge-phase-2>

3. Hypothetical Example of a Joint Solicitation

<p>Topic: Detection and quantification of Nanoplastic particles – An Emerging Contaminant</p> <p>SUMMARY OF SOLICITATION</p> <p>There is increasing evidence that micro and nano plastic materials are entering surface waters, foods, and ultimately, organisms. Consequently, there is a critical need to both quantify the amounts of these materials as well as assess and characterize them. Of specific interest are devices which could be employed in surface waters, water treatment systems, and other locations from which our drinking and recreational water supplies draw. Current strategies are hampered by the lack of rapid, inexpensive, accurate and simple devices which might be widely disseminated and used across a variety of aqueous media containing potential confounding compounds. This interagency solicitation seeks research proposals to address this national concern.</p>	
<p>As granted by the Crowdsourcing and Citizen Science Act of 2017 (15 USC § 3724), the use of crowdsourcing samples or data through community volunteers is encouraged.</p>	<p>Incorporate goals from the CEC implementation plan.</p> <p>Identify participatory science opportunities</p>
<p>The following federal agencies are partnering to provide grant or contract support as a mechanism for soliciting novel techniques, technologies and devices which can address these challenges: EPA; NIEHS; and NSF. The following agencies will offer access to state-of-the-art analytical equipment and/or expertise provided by internal staff, who are available to partner on projects: FDA, USDA, and NIST.</p>	<p>State user facilities / subject matter expertise available</p>
<p>Proposals are due by 5 PM local submitters' time, Tuesday, April 30th, 2020. Submitted proposals will undergo review coordinated by the National Science Foundation and the National Institute of Environmental Health Sciences. Awards are anticipated to be made by August 1, 2020, with each agency providing separate funds to those selected, as appropriate for the mission and purview of each agency.</p> <p>Release of Solicitation: January 2020</p> <p>Proposal Review: May 2020</p> <p>Awards: July 2020 (Separate funding)</p>	<p>Identify specific reviewing agencies</p>
<p>Agencies Participating via grants: DOE, EPA, NIEHS, NSF, USDA</p>	<p>State funding agencies</p>
<p>Agencies participating via in-kind (facilities, internal lab, or technology commercialization): DOC, DOD, DOE, EPA, NIST, USDA</p>	<p>State agencies providing in-kind support</p>

Figure A2. A hypothetical example of a joint solicitation intended to demonstrate the incorporation of multiple forms of collaborative activities. This example is not meant to represent a current or future solicitation.