

GAO

Report to the Ranking Member,  
Subcommittee on Energy and  
Environment, Committee on Science,  
Space, and Technology, House of  
Representatives

July 2011

**ENVIRONMENTAL  
PROTECTION  
AGENCY**

**To Better Fulfill Its  
Mission, EPA Needs a  
More Coordinated  
Approach to Managing  
Its Laboratories**

U.S. Government Accountability Office

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Highlights of [GAO-11-347](#), a report to the Ranking Member, Subcommittee on Energy and Environment, Committee on Science, Space, and Technology, House of Representatives

## Why GAO Did This Study

The Environmental Protection Agency (EPA) operates 37 laboratories to provide the scientific foundation for its mission. Over the past 20 years, independent evaluations have identified problems with the laboratories' operations and management and called for improved planning, coordination, and leadership, as well as consolidation of laboratories. In its 2012 budget, EPA requested \$2 million for another independent study of its laboratories. GAO was asked to examine the extent to which EPA (1) has addressed the findings of prior independent evaluations; (2) uses an agencywide, coordinated approach to manage its laboratory infrastructure and whether its new study will achieve stated cost savings and laboratory improvement goals; and (3) uses a comprehensive planning process to manage its laboratory workforce. GAO reviewed agency documents and independent evaluations, visited EPA laboratories, interviewed agency officials, and examined agency databases.

## What GAO Recommends

GAO recommends, among other things that EPA develop a coordinated planning process for its scientific activities and appoint a top-level official with authority over all the laboratories, improve physical and real property planning decisions, and develop a workforce planning process for all laboratories that reflects current and future needs of laboratory facilities. EPA generally agreed with the findings and recommendations.

View [GAO-11-347](#) or key components. For more information, contact David C. Trimble at (202) 512-3841 or [trimbled@gao.gov](mailto:trimbled@gao.gov).

July 2011

## ENVIRONMENTAL PROTECTION AGENCY

### To Better Fulfill Its Mission, EPA Needs a More Coordinated Approach to Managing Its Laboratories

## What GAO Found

EPA has not fully addressed the findings and recommendations of independent evaluations of its science activities. For example, EPA has yet to implement an overarching issue-based planning process integrating and coordinating scientific efforts throughout the agency, including the important work of its 37 laboratories as recommended by a 1992 independent evaluation. The agency also has not fully addressed recommendations from a 1994 independent evaluation to consolidate or realign its laboratory facilities and workforce, although several studies found that such action could eliminate unnecessary duplication and improve planning and coordination. In addition, although three independent evaluations identified weaknesses in EPA's scientific leadership, the agency has not appointed a top science official with responsibility and authority over all of the agency's research, science, and technical activities, including integrating and coordinating the science activities conducted by its laboratories. Instead, these activities remain fragmented and largely uncoordinated, reflecting the independent organizational and management structures of the 15 senior officials charged with managing the scientific work performed at each laboratory.

EPA has not taken an agencywide, coordinated approach to managing its scientific efforts and related facilities as part of an interrelated portfolio of facilities, as recommended by the National Research Council. As a result, EPA cannot be assured that it is allocating its limited capital improvement funds most appropriately. EPA officials said they attempt to spread capital improvement funds equitably across the 15 organizations that maintain the laboratories, but this does not ensure that all mission-critical laboratory assets are functioning at an optimal or acceptable level. In 2008, EPA reported that because the laboratories operate independently, opportunities for increased resource sharing and operating efficiencies are inhibited. EPA also has not finalized the scope and methodology to be used for its proposed new laboratory study, and therefore, it is unclear whether the proposed study will produce meaningful change or fulfill the envisioned cost-savings targets. In addition, EPA lacks complete and reliable data about use of laboratory space, condition, and operating costs, and therefore cannot be assured of making informed decisions about capital investments or the disposition of its real property assets.

EPA does not use a comprehensive planning process for managing its laboratories' workforce. To the extent that workforce planning is performed for the laboratories, it is done independently by each of the 15 separate organizations that maintain laboratories. EPA also lacks basic information on its laboratory workload and workforce, including demographic data on the number of federal and contract employees currently working in its 37 laboratories. Such information is essential to identify, on an agencywide basis, any critical skill gaps in its current workforce and the workforce it may need in the future. Without such information, EPA cannot successfully undertake succession planning and management to help the organization adapt to meet emerging and future needs.

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# Contents

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Letter		1
	Background	4
	EPA Has Not Fully Addressed Findings of Evaluations on Long-standing Planning, Coordination, or Leadership Issues	9
	EPA Has Not Taken an Agencywide, Coordinated Approach to Manage Its Laboratory Physical Infrastructure	13
	EPA Does Not Use a Comprehensive Workforce Planning Process for Its Laboratories	22
	Conclusions	25
	Recommendations for Executive Action	27
	Agency Comments and Our Evaluation	28
Appendix I	Objectives, Scope, and Methodology	30
Appendix II	EPA's Inventory of Laboratory Properties	33
Appendix III	Summary of the Planning, Coordination, and Leadership Findings and Recommendations of Independent Evaluations and EPA's Response	37
Appendix IV	Comments from the Environmental Protection Agency	39
Appendix V	GAO Contact and Staff Acknowledgments	49
Table		
	Table 1: EPA's Inventory of Laboratory Properties	33
Figures		
	Figure 1: Location of EPA's Laboratories	6
	Figure 2: Organizational and Management Structure for EPA's Laboratories	8

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Figure 3: Incomplete and Unreliable EPA Data Used to Make  
Facility Disposition Decisions

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**Abbreviations**

EPA Environmental Protection Agency  
FTE full-time equivalent  
OMB Office of Management and Budget  
ORD Office of Research and Development

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**G A O**

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United States Government Accountability Office  
Washington, DC 20548

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July 25, 2011

The Honorable Brad Miller  
Ranking Member  
Subcommittee on Energy and Environment  
Committee on Science, Space, and Technology  
House of Representatives

Dear Mr. Miller:

The Environmental Protection Agency (EPA) was established in 1970 to consolidate a variety of federal research, monitoring, standard-setting, and enforcement activities into one agency for ensuring the joint protection of environmental quality and human health.<sup>1</sup> Scientific research, knowledge, and technical information are fundamental to EPA's mission and inform its standard-setting, regulatory, compliance, and enforcement functions. The agency's scientific performance is particularly important as complex environmental issues emerge and evolve, and controversy continues to surround many of the agency's areas of responsibility. EPA works with many providers of scientific information to accomplish its mission, including international and domestic academic institutions, state and local agencies, industry, and other federal scientific agencies. But unlike other primarily science-focused federal agencies, such as the National Institutes of Health or the National Science Foundation, EPA's scientific research, technical support, and analytical services underpin the policies and regulations the agency implements. Therefore, the agency operates its own laboratory enterprise. This enterprise is made up of 37 laboratories that are housed in about 170 buildings and facilities located in 30 cities across the nation.

Over the past 20 years, independent evaluations by the National Research Council and others have addressed planning, coordination, or leadership issues associated with the EPA's science activities.<sup>2</sup> While the scope of these evaluations varied, collectively they recognized the need

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<sup>1</sup>Reorganization Plan No. 3 of 1970, 35 Fed. Reg. 15623 (Dec. 2, 1970) (5 U.S.C. Appendix 1).

<sup>2</sup>The National Research Council is the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering.

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for EPA to improve long-term planning, priority setting, and coordination of laboratory activities; establish leadership for agencywide scientific oversight and decision making; and better manage the laboratories' workforce and infrastructure. In addition, in response to budget pressures, in 2006 EPA's Chief Financial Officer called for a 10 percent reduction in the cost of the agency's laboratory physical infrastructure by fiscal year 2009 and another 10 percent reduction by fiscal year 2011. Specifically, the Chief Financial Officer requested that the Office of Research and Development (ORD), along with the program and regional offices, develop a plan that would achieve the cost-savings targets through closing, relocating, and consolidating laboratories. In lieu of developing such a plan, however, ORD and the regions proposed conducting near- and long-term studies of the agency's laboratory capabilities and operations, with the goal of identifying and implementing cost savings and efficiencies and improving the laboratories' ability to support the agency's mission. EPA completed the near-term study in 2008,<sup>3</sup> but since then, senior EPA managers have been considering the proposed scope and methodology of the long-term study, to be conducted by an independent expert panel convened by the National Academy of Sciences. EPA requested \$2 million for the study in the President's fiscal year 2012 budget but provided no details about why the proposed study is needed in its congressional budget justification. The study's prospects for fiscal year 2012 are unclear, given current efforts to reduce the federal budget deficit and the significant cuts that have been proposed for the budgets of most departments and agencies, including EPA's.

In the present atmosphere of constrained budgets, coupled with EPA's increasing need to understand complex environmental problems so as to formulate sound environmental protection policies, you asked us to evaluate the ability of EPA's laboratory enterprise to meet the agency's mission and current and future program needs. Specifically, our objectives were to examine the extent to which EPA (1) has addressed the findings of independent evaluations performed by the National Research Council and others regarding long-term planning, coordination, and leadership issues; (2) uses an agencywide, coordinated approach for managing its laboratory physical infrastructure and whether the agency's near- and long-term studies will achieve their stated cost saving and

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<sup>3</sup>Environmental Protection Agency, *Commonsense Actions and Best Practices That Improve Laboratory Efficiency and Effectiveness*, EPA 600/R-03/069 (Washington, D.C., October 2008).

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laboratory improvement goals; and (3) uses a comprehensive planning process to manage its laboratory workforce.

To address these objectives, we identified and reviewed the major independent evaluations of EPA's science activities over the past 20 years. Of these evaluations, five addressed planning, coordination, and leadership issues, including issues related to the organization and infrastructure of the agency's laboratories. We analyzed EPA's relevant funding and workforce documents, policies, procedures, and guidance, as well as related laws, requirements, and leading practices pertinent to EPA's laboratories and efforts to improve the agency's operations. We interviewed officials in EPA headquarters and officials representing all ORD and program laboratories and 5 of 10 regional offices and laboratories. In addition, we visited a nonprobability sample of laboratories located in Athens, Georgia; Chapel Hill, Durham, and Research Triangle Park, North Carolina; Corvallis, Oregon; Denver, Colorado; Edison, New Jersey; Fort Meade, Maryland; and Port Orchard, Washington. We selected the offices and laboratories we visited based on geographic dispersion and proximity to other EPA laboratories. Because we used nonprobability sampling to select these EPA offices and laboratories, information we obtained from these visits cannot be generalized to other laboratories, but the visits provide us with information on the perspectives of various laboratory officials. We also interviewed representatives from EPA's Science Advisory Board and Board of Scientific Counselors and discussed various aspects of the organization and operation of EPA's laboratories.<sup>4</sup> To examine the organizational and management structure of EPA's laboratories, we analyzed the policies and procedures EPA follows to plan the work of its laboratories, internal and external studies, and the steps it has taken to coordinate its program offices and laboratories. To examine EPA's management of its physical laboratory infrastructure, we analyzed the agency's inventory of laboratory property and its policies; and guidance for acquiring, maintaining, and disposing of laboratories. To examine EPA's management of its laboratory workforce, we analyzed EPA's strategic

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<sup>4</sup>The Board of Scientific Counselors is a federal advisory committee created by EPA to provide advice and recommendations on all aspects of technical and management issues of the Office of Research and Development. The Science Advisory Board is a federal advisory committee established by Congress in 1978 to provide independent advice to EPA's administrator on the scientific and technical aspects of environmental issues.

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workforce documents of offices with laboratories. In addition, we examined EPA budget documents and our and EPA's Inspector General's report on workforce planning.

We found that some of the laboratory property data maintained by EPA's facility management and real property tracking system lacked sufficient data quality controls necessary for assuring sufficiently reliable data for management decisions. Although we determined that descriptive data on EPA's inventory of laboratory buildings and facilities in the database were sufficiently reliable for our purposes, other data such as operating costs and condition assessments were not sufficiently reliable for the purposes of our review. As EPA does not publish the number of employees in EPA's laboratories, either separately or in total, we made several efforts to gather such information including requesting it from program managers and regional offices with laboratories and from the ORD. However, we were unable to verify the reliability of the data the offices provided because they used inconsistent data sources and did not provide supporting documentation describing how the data were compiled. Because reliable data were not available, we were unable to document trends in the laboratory workforce and operating costs. Appendix I presents a more detailed description of our scope and methodology.

We conducted this performance audit from January 2010 through July 2011, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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## Background

When it was established in 1970, EPA inherited 42 laboratories from programs in various federal departments, including the Department of the Interior; the former Department of Health, Education and Welfare; and the Department of Agriculture. According to EPA's historian, EPA closed or consolidated some laboratories it inherited and created additional laboratories to support its mission. Nevertheless, EPA's historian reported that the location of most of EPA's present laboratories is largely the same as the location of its original laboratories (see fig. 1), in part because of political objections to closing facilities; the relative ease of acquiring space in existing federal facilities; the relative ease of securing funds for renovation and expansion, compared with planning and building entirely new facilities; and conflicting organizational philosophies, such as



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operating centralized laboratories for efficiency versus operating decentralized laboratories for flexibility and responsiveness.<sup>5</sup> Other federal agencies face similar challenges. Since GAO designated federal real property as an area of high risk in 2003, federal agencies continue to face problems with excess and underused property. In 2007, we reported that as a result of competing stakeholder interests, decisions about federal real property often do not reflect the most cost-effective or efficient alternative but instead reflect other priorities.<sup>6</sup> In particular, this situation often arises when the federal government attempts to consolidate facilities or otherwise dispose of unneeded assets. We recommended that the Office of Management and Budget (OMB) develop an action plan to reduce the effect of competing stakeholder interests.<sup>7</sup>

EPA's 37 laboratories, that are housed in about 170 buildings and facilities, occupy approximately 4.5 million square feet of space and represent almost half (47 percent) of EPA's total square footage of real property.<sup>8</sup> EPA owns approximately 80 percent of its laboratory space and leases the other 20 percent (see app. II for EPA's inventory of laboratory properties).

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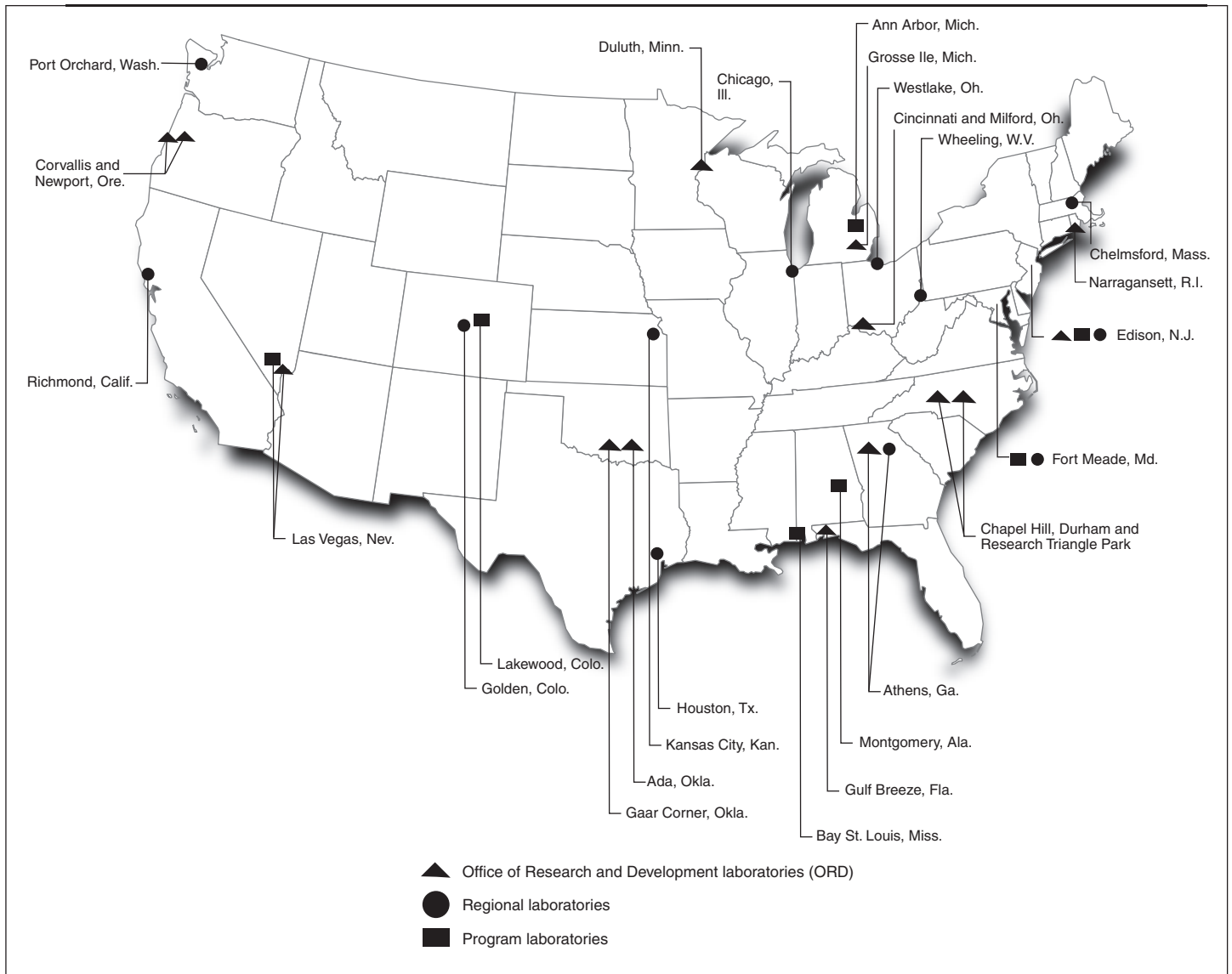
<sup>5</sup>Environmental Protection Agency, *EPA Regional Facilities: A Historical Perspective on Siting* (Washington, D.C., March 1993).

<sup>6</sup>GAO, *Federal Real Property: Progress Made Toward Addressing Problems, but Underlying Obstacles Continue to Hamper Reform*, [GAO-07-349](#) (Washington, D.C.: Apr. 13, 2007).

<sup>7</sup>OMB has yet to develop an action plan.

<sup>8</sup>EPA also maintains mobile laboratories housed in buses, such as the Trace Atmospheric Gas Analyzers buses, and ships, such as the *Bold* and *Lake Guardian* that are water monitoring vessels.

**Figure 1: Location of EPA's Laboratories**



Sources: GAO; Map Resources (map).

Note: EPA's 37 laboratories are located in 30 cities. Some laboratories are located in more than one city.

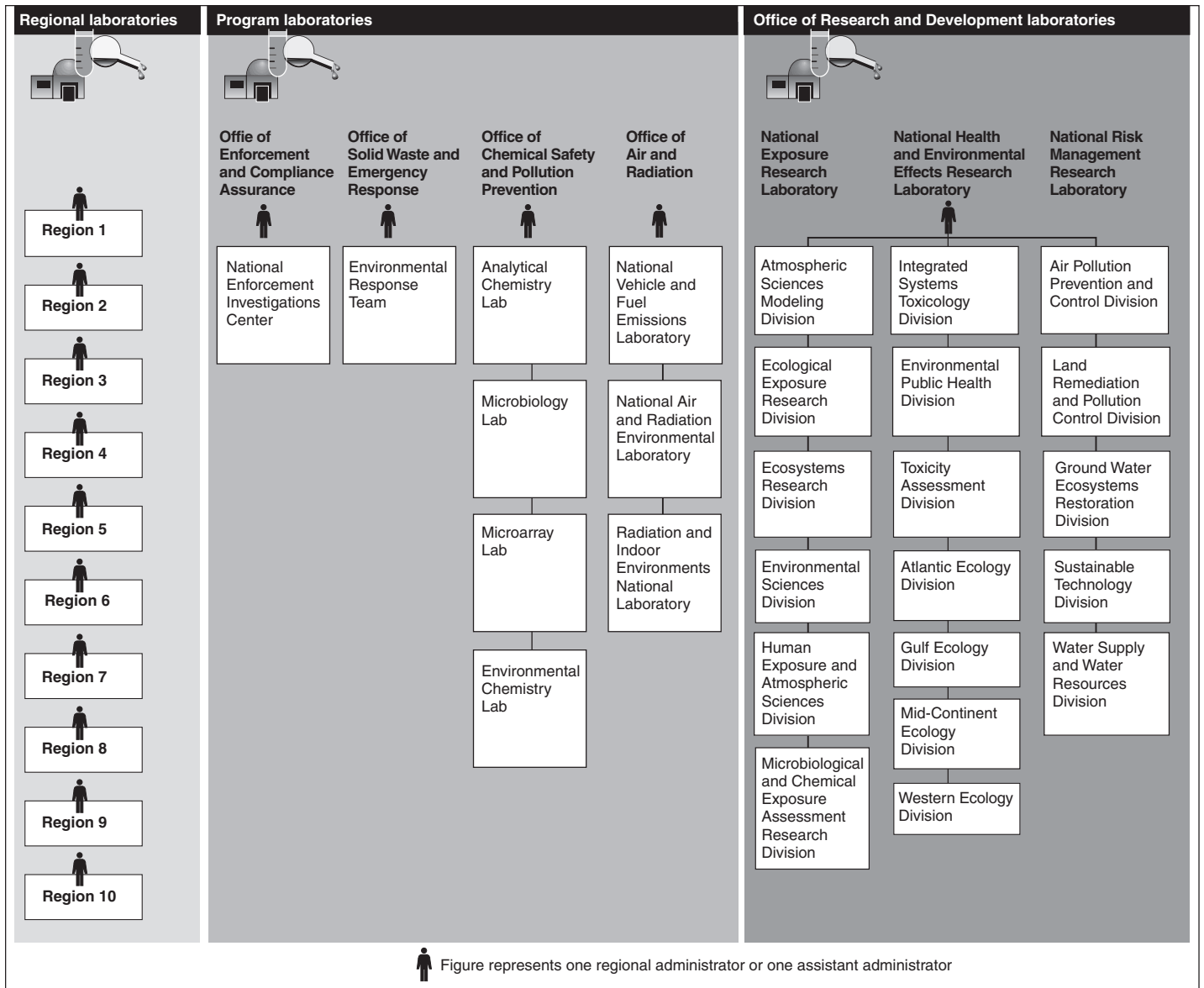
EPA's current enterprise of 37 laboratories is managed by a total of 15 senior officials—10 assistant administrators and 5 regional administrators—and is organized into three distinct groups (see fig. 2):

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- *ORD laboratories:* This office operates 18 laboratories grouped under three national laboratory organizations with primary responsibility for research and development. Examples of work performed include evaluating human exposure to multiple pollutants, assessing the risks that pesticides pose to humans and the environment, and developing methods to prevent and control pollution. The ORD laboratories are managed by one assistant administrator.
  - *Program office laboratories:* Four of EPA's five national program offices—the Office of Air and Radiation, the Office of Enforcement and Compliance Assurance, the Office of Chemical Safety and Pollution Prevention, and the Office of Solid Waste and Emergency Response—operate nine laboratories with primary responsibility for basic and applied research and analytical services supporting regulatory implementation, compliance, enforcement, and emergency response.<sup>9</sup> Examples of work performed include testing and certifying vehicle emission and fuel economy compliance; developing and validating testing methods for pesticides; conducting technical and forensic analysis to support civil and criminal enforcement; and performing radiation testing. Four assistant administrators—one from each national program office—manage the program laboratories.
  - *Regional laboratories:* Each of EPA's 10 regional offices operates a laboratory with responsibilities for a variety of applied sciences; analytical services; technical support to federal, state, and local laboratories; monitoring; compliance and enforcement; and emergency response. Examples of work performed include the development and modification of analytical methods to detect emerging chemicals of concern; identifying and monitoring the levels of contaminants in the air, water, soil, and animal tissues; providing expert witness testimony in enforcement cases; and auditing states' drinking water certification programs. Ten regional administrators—one from each regional office—manage the regional laboratories.

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<sup>9</sup>The Office of Water does not operate its own laboratory.

**Figure 2: Organizational and Management Structure for EPA's Laboratories**



Source: GAO.

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## EPA Has Not Fully Addressed Findings of Evaluations on Long-standing Planning, Coordination, or Leadership Issues

Although EPA has taken some actions, it has not fully addressed the findings and recommendations of five independent evaluations over the past 20 years regarding long-standing planning, coordination, and leadership issues that hamper the quality, effectiveness, and efficiency of its science activities, including its laboratory operations (see app. III for details on the evaluations). Specifically, EPA has not fully implemented recommendations intended to address planning and coordination issues including (1) developing and implementing an overarching issue-based planning process that integrates and coordinates scientific efforts throughout the agency or (2) consolidating, reorganizing, or streamlining laboratory facilities and workforce. In addition, EPA has not addressed the leadership issues raised in these evaluations by appointing a top science official with the authority and responsibility to coordinate and oversee scientific activities throughout the agency, including the work of all program, regional, and ORD laboratories.

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## EPA Lacks an Overarching Planning Process for Its Scientific Activities

EPA has yet to fully address planning and coordination issues identified by a 1992 independent evaluation<sup>10</sup> that recommended that EPA develop and implement an overarching issue-based planning process that integrates and coordinates scientific efforts throughout the agency, including the important work of its 37 laboratories. That evaluation found that EPA's science was of uneven quality and the agency lacked a coherent science agenda and operational plan to guide scientific efforts throughout the agency. In response to this evaluation, EPA appointed a science advisor to provide advice to the administrator on agencywide science issues, but later evaluations found that the position does not provide the level of authority needed to oversee and coordinate laboratory activities. Further, EPA did not implement the evaluation's recommendation regarding an overarching planning process for all of the agency's scientific efforts. Consequently, EPA's programs, regional officials, and ORD continue to independently plan and coordinate the activities of their respective laboratories based on their own office's priorities and needs. Although EPA has pursued other initiatives in an effort to improve laboratory coordination, these efforts do not fully address the planning and coordination issues in the 1992 evaluation. In 2008, EPA's Administrator acknowledged that planning and coordination issues

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<sup>10</sup>Environmental Protection Agency, *Safeguarding the Future: Credible Science, Credible Decisions, The Report of the Expert Panel on the Role of Science at EPA*, EPA/600/9-91/050 (Washington, D.C., March 1992).

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continue to affect EPA's science credibility and decision making in a letter to the Science Advisory Board requesting a new study on strengthening scientific assessments.<sup>11</sup>

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### EPA Has Not Consolidated Its Laboratories as Recommended

EPA has also not fully addressed recommendations from a 1994 independent evaluation<sup>12</sup> to consolidate and realign its laboratory facilities and workforce—even though this evaluation found that the geographic separation of laboratories hampered their efficiency and technical operations and that consolidation and realignment could improve planning and coordination issues that have hampered its science and technical community for decades. The 1994 evaluation was in response to congressional direction to explore, and report back to Congress, whether a consolidated laboratory structure would better enable EPA to accommodate the need for integrated research and monitoring.<sup>13</sup> As such, EPA tasked the MITRE Corporation to perform an independent evaluation of its laboratories to be used by the agency as one of the inputs in developing its report to Congress.

In its evaluation, MITRE identified various restructuring options and identified opportunities for EPA to improve the efficiency and effectiveness of its operations. The MITRE recommendations were intended to eliminate apparent duplications of facilities and equipment and increase disciplinary strength of EPA's human resource base. Specifically, MITRE recommended that EPA (1) realign and consolidate the ORD laboratories; (2) consolidate laboratories in the Office of Prevention, Pesticides and Toxic Substances<sup>14</sup> and the two laboratories under the Office of Radiation and Indoor Air; and (3) through consolidation, reduce the number of regional office laboratories to a few laboratories with a national service focus. According to the evaluation, these changes could be made over time, as leases for current facilities expired or investment decisions on facility and major equipment upgrades

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<sup>11</sup>EPA Administrator request for Science Advisory Board Study, October 20, 2008.

<sup>12</sup>MITRE Corporation, Center for Environment, Resources, and Space, *Assessment of the Scientific and Technical Laboratories and Facilities of the U.S. Environmental Protection Agency* (McLean, Va., May 1994).

<sup>13</sup>S. Rep. No. 103-137 (1993).

<sup>14</sup>Now known as the Office of Chemical Safety and Pollution Prevention.

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were being made. In addition to the MITRE evaluation, in 1994 EPA tasked the National Academy of Public Administration and EPA's Science Advisory Board to review MITRE's evaluation and provide EPA with input regarding the management and organization of EPA's laboratories. Both reviews generally supported the MITRE recommendations but emphasized the importance of key management improvements as part of any reorganization of ORD laboratories.

After considering its restructuring and consolidation options, an agencywide steering committee issued a report to the administrator in July 1994.<sup>15</sup> Although the steering committee report stated that combining ORD laboratories at a single location could improve teamwork and raise productivity, the report concluded that, for the near term, ORD should be functionally reorganized but not physically consolidated. The report's justification for this decision suggests that other important science and management improvements should be implemented and given time to be integrated into planning and budgeting operations before any decision on physical consolidation and relocation of staff would occur. Regarding program office laboratory consolidations, EPA's 1994 report recommended maintaining the current structural configuration of program office laboratories but requested that the Office of Radiation and Indoor Air and Office of Prevention, Pesticides, and Toxic Substances evaluate the merits of laboratory consolidation. Upon evaluation, while the Office of Radiation and Indoor Air did not physically consolidate its laboratories, it did administratively and physically consolidate its Las Vegas laboratory with ORD's Las Vegas radiation laboratory and the Office of Prevention, Pesticides, and Toxic Substances colocated three of four laboratories with the region 3 laboratory. The report also recognized the advantages of colocation, including the sharing of laboratory equipment and technical knowledge, facility services, and cost savings, and the need to address existing and potential duplication. Therefore, the report recommended improved planning processes across EPA's laboratories; however, EPA has yet to implement an overarching, long-term planning process for all of its laboratories. As for the regional laboratories, EPA's 1994 report endorsed the current decentralized regional model but did not provide a justification for its position.

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<sup>15</sup>Environmental Protection Agency, *Research, Development, and Technical Services at EPA: A New Beginning*, Report to the Administrator, EPA/600/R-94/122 (Washington, D.C., July 1994).

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## EPA Has Not Addressed Leadership Issues

EPA has not fully addressed recommendations from the independent evaluations regarding leadership of its research and laboratory operations. Over the past two decades, three independent evaluations<sup>16</sup> have identified weaknesses in EPA's scientific leadership. For example, the National Research Council's evaluation in 2000 concluded that the lack of a top science official was a formula for weak scientific performance in the agency and poor scientific credibility outside the agency. Nonetheless, EPA has not appointed a top science official with responsibility and authority for all the research, science, and technical functions of the agency, including integrating and coordinating the science activities conducted by EPA's laboratories.

EPA's efforts to establish leadership over its laboratory enterprise have relied on consensus and voluntary cooperation of ORD and the agency's program and regional offices. As discussed previously, EPA created a science advisor position to provide advice to the administrator on agencywide science issues in response to a 1992 expert panel recommendation aimed at strengthening EPA's scientific coordination and leadership. Then, in 1993, EPA formed the Science Policy Council<sup>17</sup> to serve as a mechanism for addressing significant science policy issues that go beyond regional and program boundaries. However, in 2000, the National Research Council reported that efforts relying on consensus and voluntary cooperation were not an effective approach to providing needed scientific leadership. Further, in 2008, EPA's Administrator noted that the agency's existing science coordinating bodies lack the longer-term strategic viewpoint needed to address today's more complex

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<sup>16</sup>National Research Council, *Interim Report of the Committee on Research and Peer Review in EPA* (Washington, D.C., National Academies Press, 1995); Environmental Protection Agency, Office of Inspector General, *Regional Laboratories* (Washington, D.C., Aug. 20, 1997); and National Research Council, *Strengthening Science at the U.S. Environmental Protection Agency: Research-Management and Peer Review Practices* (Washington, D.C., National Academies Press, 2000).

<sup>17</sup>The Science Policy Council was reconstituted as the Science and Technology Policy Council in July 2010 with the goal of integrating EPA policies that guide agency decision makers in their use of scientific and technical information. The council works to implement and ensure the success of selected initiatives recommended by external advisory bodies such as the National Research Council and the EPA's Science Advisory Board, as well as others such as Congress, industry and environmental groups, and agency staff. EPA's science advisor chairs the council, which comprises senior managers from EPA's programs and regions and is supported by ad hoc working groups formed to study specific topics.



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environmental problems as they primarily focus on the immediate scientific needs of the agency.

Because of the limited success of EPA's advisory positions and councils and in the absence of a central science policy authority, the National Research Council in 2000 recommended that EPA request authority from Congress to create a new position of deputy administrator for science and technology, with managerial authority to coordinate and oversee all the agency's scientific and technical activities. The council reported that EPA's designation of the assistant administrator of the Office of Research and Development as coordinator for scientific planning had proven to be insufficient because the position did not provide adequate authority or responsibility for oversight, coordination, and decision making. To date, EPA has not requested authority to create a new position of deputy administrator for science and technology and continues to operate its laboratories under the direction of 15 different senior officials using 15 different organizational and management structures. As a result, EPA has a limited ability to know if scientific activities are being unintentionally duplicated among the laboratories or if opportunities exist to collaborate and share scientific expertise, equipment, and facilities across EPA's organizational boundaries. Instead, these activities remain fragmented and largely uncoordinated—reflecting the independent organizational and management structure of EPA's 15 senior officials charged with planning and managing the scientific work performed at each of EPA's laboratories.

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## **EPA Has Not Taken an Agencywide, Coordinated Approach to Manage Its Laboratory Physical Infrastructure**

EPA's laboratories are an integral part of the infrastructure necessary for the agency to meet the analytical services and scientific research aspects of its mission, yet the agency has not taken an agencywide, coordinated approach to managing its investment in the approximately 170 laboratory buildings and facilities it owns or leases as part of an interrelated portfolio of facilities. In addition, EPA's 2008 near-term laboratory study identified reasons hindering an agencywide approach for managing the laboratories. EPA also lacks complete and reliable data on which to make informed decisions about the management of its laboratory facilities.

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## EPA Does Not Manage Its Laboratory Facilities as Part of an Interrelated Portfolio of Facilities

As discussed above, EPA's management of its laboratory enterprise is decentralized, with 15 different senior officials using 15 different organizational and management structures. Since 2003, when GAO designated federal real property management as an area of high risk, agencies have come under increasing pressure to manage their real property assets more effectively.<sup>18</sup> In 2004 the National Research Council recommended that federal departments and agencies make investment and management decisions about individual projects in relation to their entire portfolio of facilities.<sup>19</sup> Based on our analysis of EPA's master planning process, we found that EPA manages its facilities on a site-by-site basis and does not evaluate each site in the context of all the agency's real property holdings. As a result, EPA cannot be assured that it is investing its capital improvement funds most appropriately or identifying possible cost-savings opportunities.

According to EPA's real property asset management plan, developing and updating facility master plans is an integral part of managing the agency's laboratory infrastructure. Master plans should contain, among other things, information on mission capabilities, use of space, and condition of individual laboratory sites. EPA's facility master plans are intended to be the basis for justifying its building and facilities spending, which was \$29.9 million in fiscal year 2010, and allocating those funds to specific repair and improvement projects. However, we found that EPA does not use its master planning process to manage its laboratory infrastructure as a portfolio that considers mission capabilities, facility condition, and space allocation across all sites. Instead, the Office of Administration and Resource Management, which is responsible for allocating funds for repairs and improvements to buildings and facilities, uses each facility's master plans to make decisions in isolation for individual sites. In addition, we found that most facility master plans were out of date. Although EPA's real property asset management plan states that facility master plans are supposed to be updated every 5 years to

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<sup>18</sup>GAO, *High-Risk Series: Federal Real Property*, [GAO-03-122](#) (Washington, D.C.: January 2003).

<sup>19</sup>National Research Council, *Investments in Federal Facilities: Asset Management Strategies for the 21st Century* (Washington, D.C., National Academies Press, 2004).

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reflect changes in facility condition and mission, we found that 11 of 20 master plans were out of date and 2 of 20 had not been created yet.<sup>20</sup>

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### EPA May Not Be Allocating Capital Improvement Funds Most Appropriately

Because the Office of Administration and Resource Management makes capital improvement decisions on a site-by-site basis using master plans that are often outdated, EPA cannot be assured it is allocating its funds most appropriately. According to senior Office of Administration and Resource Management officials responsible for allocating capital improvement resources, they try to spread these funds across the agency's offices and regions equitably. These officials said that EPA's capital improvement funds have not kept pace with requests—funds declined from \$32.6 million to \$29.9 million between fiscal years 2006 and 2010, while requests for laboratory capital improvements call for spending about \$78 million per year. The pressure and need to effectively share and allocate limited resources among EPA's many laboratories were also noted in the 1994 National Academy of Public Administration report on EPA's laboratory infrastructure, which found that EPA has "too many labs in too many locations often without sufficient resources to sustain a coherent stable program."<sup>21</sup> Office of Administration and Resource Management officials told us some challenges to reducing space are stakeholder interest, an organizational culture that equates space with power, and programs that do not mind paying laboratory operating costs because the expense is relatively small compared to their overall program budget.<sup>22</sup>

The following examples illustrate EPA's need for more effective management of its limited resources and the limitations of its allocation process for ensuring that all mission-critical laboratory assets are

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<sup>20</sup>Master plans are created for owned properties only. We found there were no master plans for two laboratory properties located in Research Triangle Park, N.C., and Fort Meade, Md. We also found that 9 of the 11 outdated master plans were over 10 years old.

<sup>21</sup>National Academy of Public Administration, *A Review, Evaluation, and Critique of a Study of EPA Laboratories by the MITRE Corporation and Additional Commentary on EPA Science and Technology Programs* (Washington, D.C., May 1994), 10.

<sup>22</sup>Stakeholders include members of Congress, OMB, the real property-holding agencies, state and local governments, business interests in the communities where the real property assets are located, private sector construction and leasing firms, historic preservation organizations, various advocacy groups, and the public in general, which often views the facilities as the physical face of the federal government in their communities. [GAO-07-349](#), 5.

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functioning at an optimal or acceptable level. At one laboratory in Oregon, officials told us the laboratory's heating and cooling system allows temperatures to fluctuate as much as 17 degrees, requiring scientists to frequently recalibrate sensitive laboratory equipment and adjust the results. Laboratory officials said this situation disrupts operating efficiency and could create perceptions about the results' quality. Consequently, according to laboratory officials, they have had to invest additional time and resources in a rigorous quality assurance program to ensure quality results. At another laboratory in New Jersey, the 2007 master plan states that the conditions of the laboratory facilities are deficient in quantity, quality, and functionality, and raise a number of safety concerns. The plan states that the facilities hinder the conduct of scientific research and analysis. The plan also states that a lack of adequate environmental controls requires repetitive tests to be performed on the same samples to obtain valid results, and vibrations in trailer laboratories cause delays in completing sensitive analytical procedures.

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### Possible Cost-Savings Opportunities May Be Lost

In addition to impeding EPA's ability to effectively allocate its capital improvement resources, the agency's lack of an agencywide coordinated approach for managing its laboratory infrastructure as an interrelated portfolio presents other challenges. Because decisions regarding laboratory facilities are made independently of one another, opportunities to improve operating efficiencies can be lost. Specifically, we found cases where laboratories that were previously colocated moved into separate space without considering the potential benefits of remaining colocated. For example, ORD and Region 4 once operated laboratories in one EPA-owned facility in Athens, Georgia. According to agency officials, space limitations, different management structures, and mission differences led the regional laboratory to move to another building across the parking lot within the same campus. The relocation increased operating costs because the laboratories then had two facility managers and two security contracts and associated personnel because of different requirements for the leased facility. Similarly, we found that the National Enforcement Investigations Center laboratory and Region 8 once operated colocated laboratories in a leased facility in Denver, Colorado, and then moved into separate new leased laboratories several miles apart. However, agency officials did not know to what extent this move may have resulted in increased operating cost.

In contrast, we found two laboratory locations that demonstrated the potential benefits from colocation and having a single facility manager, neither of which are factors considered by EPA's site-by-site facility-

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planning process. ORD, the Office of Solid Waste and Emergency Response, and Region 2 operate colocated laboratories at Edison, New Jersey. One agency official manages facility operations, including building maintenance, utilities, and security. Laboratory officials said colocation has provided opportunities to share laboratory equipment and technical knowledge, facility services, and cost savings. Likewise, the Office of Chemical Safety and Pollution Prevention and Region 3 operate colocated laboratories at Fort Meade, Maryland. The EPA-owned building allows the two laboratories to share one facility manager, security, and common areas such as storage space and conference rooms that would otherwise be duplicated at extra cost at two independent locations. These examples demonstrate the potential benefits of colocation, which could occur more frequently if EPA managed its laboratory infrastructure as part of a portfolio.

Our findings are consistent with the conclusion reached by a 2008 study<sup>23</sup> aimed at identifying and implementing cost savings. As discussed earlier, in response to EPA's Chief Financial Officer's 2006 call for developing a laboratory consolidation plan that would achieve a 10 percent reduction in the cost of the agency's laboratory infrastructure in fiscal 2009 and another 10 percent reduction by fiscal year 2011, the agency proposed conducting near- and long-term studies to identify and implement cost savings and improve the laboratories' ability to support the agency's mission. EPA's 2008 near-term study describes examples where individual laboratories have worked together to share resources. The study also found, however, that because EPA's laboratories operate independently, opportunities for increased resource sharing and operating efficiencies are inhibited by institutional barriers, such as concerns about laboratory autonomy and sensitivity about laboratory consolidation. Although EPA briefed congressional staff on the results of the near-term study and plans for the long-term study in 2008 and 2009 and requested funding in the President's fiscal year 2012 budget, the agency has yet to finalize the scope and methodology to be used for its long-term study. However, given that EPA has not responded to recommendations from prior independent evaluations to close, relocate, or consolidate laboratories, it is unclear whether the proposed study will produce

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<sup>23</sup>Environmental Protection Agency, *Commonsense Actions*, 2. Contributors included officials from the Office of Administration and Resource Management, Office of Air and Radiation, Office of Research and Development, Office of Chemical Safety and Pollution Prevention, and Regions 1, 3, 5, 6, 7, and 9.

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meaningful change or fulfill the cost-savings targets envisioned by the Chief Financial Officer.

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### EPA Lacks Sufficiently Complete and Reliable Data for Agencywide Management of Its Laboratory Facilities

EPA lacks sufficiently complete and reliable data to make informed decisions for managing its facilities. Since most of EPA's laboratory facility master plans are outdated, decisions made using these plans are based on outdated usage, condition, and operating cost data. In addition, for those plans that have been updated within the last 5 years, we found that EPA does not use objective benchmarks to determine laboratory usage rates, a guiding principle in real property asset management. Moreover, we found that the agency's real property database lacked the checks and controls necessary for helping to ensure the reliability of data, such as data on operating costs and condition assessments, needed to manage its facilities and for reporting to Congress and other external parties, such as OMB.

In February 2004, the President issued an executive order requiring agencies to, among other things, improve the operational and financial management of their real property inventory.<sup>24</sup> The order established a Federal Real Property Council within OMB, which has developed guiding principles for real property asset management. The council required agencies to draft an asset management plan that addresses these guiding principles, including support for agency mission and goals, use of public and commercial benchmarks and best practices, life-cycle cost-benefit analysis, full and appropriate utilization, disposal of unneeded assets, and accurate inventory and description of all assets. The council also expects agencies to ensure that all real property initiatives are carried out in a manner that is consistent with these principles.

The need to better manage federal real property was underscored in a June 2010 presidential memorandum that directs agencies to accelerate efforts to identify and eliminate excess properties. According to the memorandum, agencies' collective efforts are to produce a total of \$3 billion in cost savings by 2012. These savings are to be measured by usage and occupancy rates and annual operating costs.<sup>25</sup> In response to

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<sup>24</sup>Federal Real Property Asset Management, Exec. Order No. 13327, 69 Fed. Reg. 5897 (Feb. 4, 2004).

<sup>25</sup>Presidential Memorandum, Disposing of Unneeded Federal Real Estate, 75 Fed. Reg. 33987 (June 16, 2010).

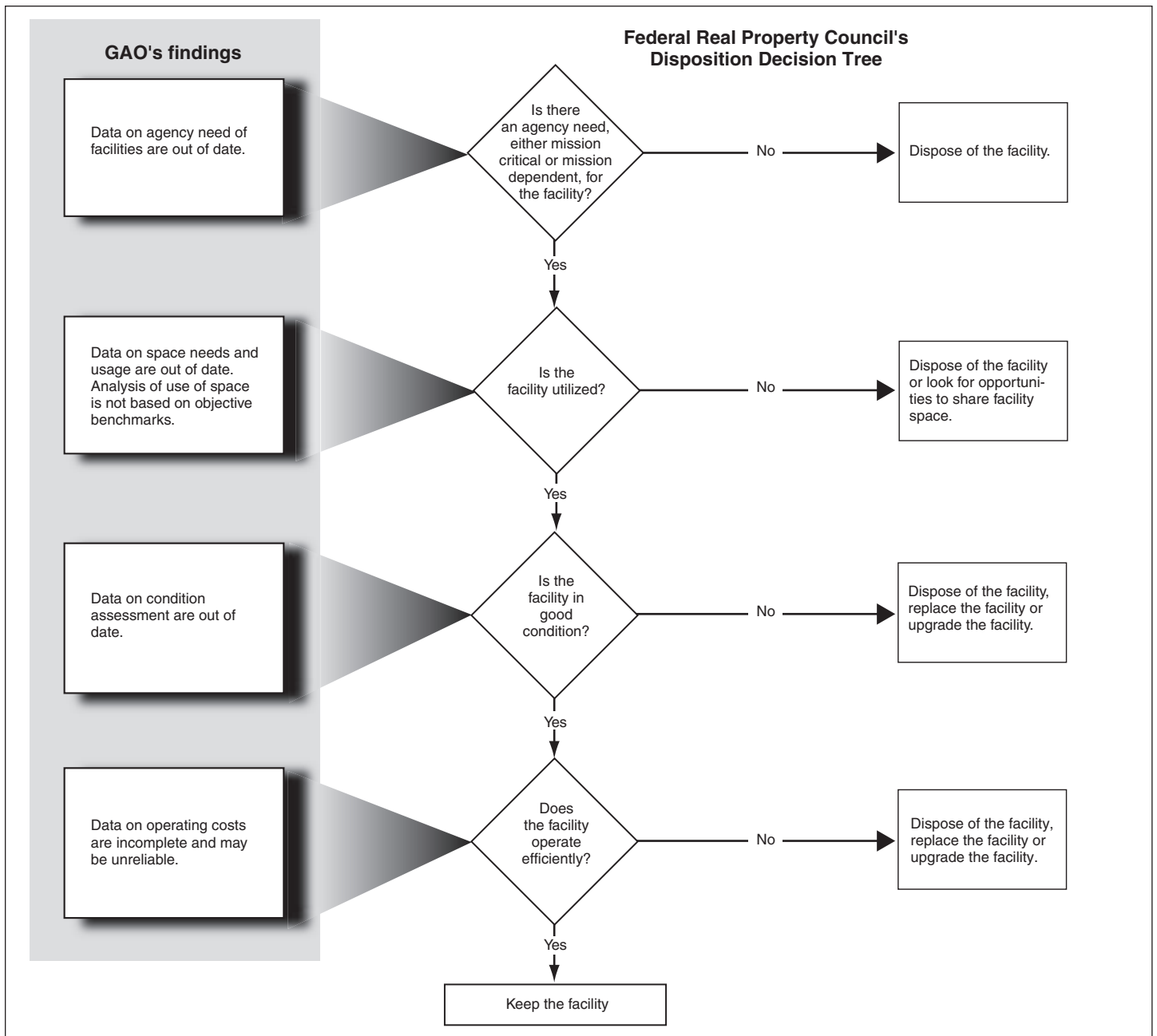
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the President's directive, in July 2010 EPA reported to OMB that it does not anticipate the disposal of any of its owned laboratories and major assets in the near future because these assets are fully used and considered critical for the mission of the customer and overall agency.<sup>26</sup> EPA stated that decisions regarding facility disposal are made using the Federal Real Property Council's disposition decision tree. Nevertheless, as shown in figure 3, we found that at four key points in the decision-making process, EPA lacks accurate and reliable information regarding (1) the need for facilities, (2) property usage, (3) facility condition, and (4) facility operating efficiency—thereby undermining the credibility of any decisions based on this approach.

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<sup>26</sup>Environmental Protection Agency, *Real Property Cost Savings and Innovation Plan* (Washington, D.C., July 23, 2010).

**Figure 3: Incomplete and Unreliable EPA Data Used to Make Facility Disposition Decisions**



Source: GAO.



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First, EPA lacks accurate data to determine if there is an agency need for laboratory facilities because many facility master plans are often out of date. According to EPA's asset management plan, the master plans are tools that communicate the link between mission priorities and facilities. However, without up-to-date master plans, EPA does not have accurate data to determine if laboratory facilities are needed for its mission.

Second, the agency lacks accurate data on space needs and usage because many facility master plans containing space utilization analyses are out of date. EPA also does not use public and commercial benchmarks to calculate usage rates for its laboratories even though the Federal Real Property Council identifies the use of such benchmarks as one of its guiding principles. Instead, EPA measures laboratory usage on the basis of interviews with local laboratory officials. According to EPA officials, they do not use benchmarks because the work of the laboratories varies. In 2008, however, an EPA contractor created a laboratory benchmark based on those used by comparable facilities at the Centers for Disease Control and Prevention, the National Institutes of Health, the Department of Energy, and several research universities to evaluate space at two ORD laboratories in North Carolina. Consequently, we believe that objective benchmarks can be developed for EPA's unique laboratory requirements. In addition, the contractor's analysis concluded that EPA could save \$1.68 million in annual leasing and \$800,000 in annual energy costs through consolidation of the two ORD laboratories. Agency officials told us they hope to consolidate the laboratories in fiscal year 2012 if funds are available.

Third, the agency lacks accurate data for assessing facilities' condition because condition assessments contained in facility master plans are often outdated. Moreover, the out-of-date condition assessment is the basis for data reported to the Federal Real Property Council on facilities' condition. The data may also be unreliable because data entered by local facility managers are not verified, according to agency officials. Such verification could involve edit checks or controls to help ensure the data are entered accurately.<sup>27</sup>

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<sup>27</sup>Edit checks and controls require a review of at least a sample of data entries to ensure that key fields are accurate, nonduplicative, and consistent. For example, the date an injury claim was filed should precede the date of adjudication.

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Fourth, EPA does not have reliable operating cost data for its laboratory enterprise, because the agency's financial management system does not track operating costs in sufficient detail to break out information for individual laboratories or for the laboratory enterprise as a whole. Reliable operating cost data are important in determining whether a laboratory facility is operating efficiently, a determination that should inform both capital investment and property disposal decisions. Operating cost data are also required by the Federal Real Property Council. Consequently, facility managers for each EPA-owned and EPA-leased laboratory compile and manually enter laboratory operating cost data into EPA's real property database, where the data are tracked and ultimately reported to the council.<sup>28</sup> However, the EPA officials responsible for reporting operating cost data to the Federal Real Property Council expressed concerns over the source and integrity of the data entered by facility managers. We found that the data entered by local facility managers, such as operating costs and condition assessments, lacked the edit checks and controls necessary for ensuring their reliability. These data are reported to external parties, such as the OMB's Federal Real Property Council.

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## **EPA Does Not Use a Comprehensive Workforce Planning Process for Its Laboratories**

EPA does not use a comprehensive planning process for managing its laboratories' workforce and does not plan across its laboratories. In addition, EPA lacks basic information on its laboratory workload and workforce, including demographic data on the number of federal and contract employees currently working in its 37 laboratories.

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## **EPA Lacks a Laboratory Workforce Plan, and Its Agencywide Workforce Plan Does Not Discuss Laboratory Workforce**

In fiscal year 2006, EPA issued its first agencywide workforce plan. The plan did not include a specific discussion of the agency's laboratory workforce or the agency's workload, but it did identify 19 mission-critical occupations—of which, many were science-related occupations such as toxicologists, geneticist, biologists, and chemists. The stated purpose of the 2006 agencywide plan was to provide guidance to program and regional offices so they could develop their own workforce plans and

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<sup>28</sup>The General Services Administration is responsible for reporting property it leases for EPA to the Federal Real Property Council.

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submit them to the Office of Human Resources in 2007. However, we found that not all of the regional and program offices with laboratories prepared workforce plans, and for those that did, most did not specifically address their laboratories' workforce. In fact, some regional management and human resource officials we spoke with were unaware of the requirement to submit workforce plans to the Office of Human Resources. Some of these managers told us the program and regional workforce plans were a paperwork exercise, irrelevant to the way the workforce is actually managed. Managers in program and regional offices said that workforce planning for their respective laboratories is fundamentally driven by the annual budgets of program and regional offices and ceilings for full-time equivalents (FTE).<sup>29</sup> These remarks align with our May 2010 report, which found that EPA's 2006 agencywide workforce plan does not directly link workforce planning with its strategic planning.<sup>30</sup> EPA's process for allocating resources involves making annual incremental adjustments and relies primarily on historical precedent.

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## EPA Does Not Plan Across Its Laboratories

None of the program and regional workforce plans we reviewed described any effort to work across organizational boundaries to integrate or coordinate their workforce with the workforces of other EPA laboratories. Consequently, EPA cannot successfully undertake succession planning and management to help the organization adapt to meet emerging and future requirements. For example, although two regional workforce plans discussed potential vulnerability if highly skilled laboratory personnel retired, neither plan explored options for sharing resources across regional boundaries to address potential skill gaps. According to *EPA's Regional Laboratory System 2009 Annual Report*, many of the regional laboratories provide the same or similar core analytical capabilities—including a full range of routine and specialized chemical and biological testing of air, water, soil, sediment, tissue, and hazardous waste. Nonetheless, in these workforce plans, each region independently determines and attempts to address its individual workforce needs. As a result, by not exploring options for sharing resources among the ORD,

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<sup>29</sup>An FTE consists of one or more employed individuals who collectively complete 2,080 work hours in a given year. Therefore, both one full-time employee and two half-time employees equal one FTE.

<sup>30</sup>GAO, *Workforce Planning: Interior, EPA, and the Forest Service Should Strengthen Linkages to Their Strategic Plans and Improve Evaluation*, [GAO-10-413](#) (Washington, D.C.: Mar. 31, 2010).

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program, and regional boundaries to address potential skill gaps, EPA may be missing opportunities to fill critical occupation needs through resource sharing.

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### EPA Lacks Basic Data about Its Laboratory Workforce

In addition, EPA lacks basic demographic information on the number of federal and contract employees currently working in its 37 laboratories. Specifically, EPA does not routinely compile the information needed to know how many scientific and technical employees it has working in its laboratories, where they are located, what functions they perform, or what specialized skills they may have. Moreover, the agency does not have a workload analysis for the laboratories to help determine the optimal numbers and distribution of staff among the enterprise. We believe that such information is essential for EPA to prepare a comprehensive laboratory workforce plan to achieve the agency's mission with limited resources. Because EPA's laboratory workforce is managed separately by 15 independent senior officials, information about that workforce is tracked separately and is not readily available or routinely compiled or evaluated. Instead, EPA has relied on ad hoc calls for information to compile such data. According to agency officials, the most recent request for EPA-wide information was initiated in 1994 in support of the MITRE Corporation's evaluation.

As part of our work, we requested demographic information on EPA's laboratory workforce, but after multiple attempts to compile these data, EPA was unable to provide us with data for the laboratory workforce as a whole that were sufficiently reliable for our purposes. Specifically, we were unable to verify the reliability of the data the managers of program and regional offices with laboratories and the ORD provided because they used inconsistent data sources and did not provide supporting documentation describing how the data were compiled. In addition, we asked EPA's Office of Human Resources to query its personnel database to provide us with a special report of federal personnel working in the laboratories.<sup>31</sup> However, we could not be assured of the accuracy or reliability of the data provided by this office either because, in part, EPA does not have an official master list of database codes showing each laboratory separately from any colocated facilities or clearly identifying

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<sup>31</sup>This office is responsible for managing a database used by EPA to provide the Office of Personnel Management with information on all EPA personnel.

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whether an employee was assigned to the laboratory or another facility.<sup>32</sup> Federal standards for internal control state that effective management of an organization's workforce is essential to achieving results and that, among other things, operational success is only possible when the right personnel for the job are on board.

In response to our prior reports<sup>33</sup> and the work of the EPA Inspector General, EPA hired a contractor in 2009, in part, to conduct a study to provide information about the agency's overall workload, including staffing levels and workload shifts for six major functions, including scientific research. In its budget justification for fiscal year 2012, however, the agency reported to Congress that a survey of the existing workload information provided by the contractor will not immediately provide information sufficient to determine whether changes are needed in workforce levels. EPA has not released the results of this study, and we therefore cannot comment on whether its content has implications for the laboratories. Further, the agency asked its National Advisory Council for Environmental Policy and Technology to help address scientific and technical competencies as it develops a new agencywide workforce plan. However, the new plan is not complete, and therefore it is too early to tell whether the Council's recommendations will have implications for the laboratories.

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## Conclusions

EPA's laboratories play an integral role in supporting EPA's mission by providing the scientific research, technical support, and analytical services that underpin the policies and regulations the agency implements. The complexity of EPA's mission, the rapid pace of scientific and technological advances, and shifts in policy require that the agency's laboratory enterprise be responsive to change and equipped to meet the

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<sup>32</sup>EPA staff had to create a list of laboratory codes based on their personal knowledge to respond to our request.

<sup>33</sup>GAO, *Human Capital: Implementing an Effective Workforce Strategy Would Help EPA to Achieve Its Strategic Goals*, [GAO-01-812](#) (Washington, D.C.: July 31, 2001); *Human Capital: Key Principles for Effective Strategic Workforce Planning*, [GAO-04-39](#) (Washington, D.C.: Dec. 11, 2003); *Clean Water Act: Improved Resource Planning Would Help EPA Better Respond to Changing Needs and Fiscal Constraints*, [GAO-05-721](#) (Washington, D.C.: July 22, 2005); *EPA's Execution of Its Fiscal Year 2007 New Budget Authority for the Enforcement and Compliance Assurance Program in the Regional Offices*, [GAO-08-1109R](#) (Washington, D.C.: Sept. 26, 2008); *Environmental Protection Agency: Major Management Challenges*, [GAO-09-434](#) (Washington, D.C.: Mar. 4, 2009).

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scientific challenges ahead. Although independent evaluations of EPA's scientific activities have called on EPA to address long-standing planning, coordination, and leadership issues, little has changed with respect to EPA's laboratory organization over the past 20 years. EPA's scientific activities remain fragmented and largely uncoordinated—reflecting the independent organizational and management structure of EPA's 15 senior officials charged with planning and managing the scientific work performed at each of EPA's laboratories. In light of current efforts to reduce the federal budget deficit, which include significant proposed cuts in the budgets of most departments and agencies, including EPA, the agency will need to more effectively use its scientific and laboratory resources across the agency to ensure the agency is best positioned to fulfill the critical scientific work for its core mission. However, EPA's ability to respond to this challenge may be hampered by the lack of an overarching issue-based planning process that integrates and coordinates scientific efforts throughout the agency and reflects the collective goals, objectives, and priorities of the laboratories and a top science official to coordinate, oversee, and make management decisions regarding major scientific activities throughout the agency.

Although the laboratories' current operating model may provide its 15 senior officials with greater flexibility to use laboratory resources in support of individual program and regional priorities, this flexibility comes at a price. Beyond potential duplication of effort, EPA's current decentralized approach makes it difficult for the agency to effectively manage its laboratory facilities and workforce. With no single top science official with the authority and responsibility to coordinate, oversee, and make management decisions regarding major scientific activities throughout the agency, EPA does not manage its laboratory infrastructure as an interrelated portfolio of facilities that considers mission capabilities, facility condition, and space allocation across all sites to ensure the most effective use of limited agency resources. EPA also lacks up-to-date facility master plans, objective benchmarks to assess the use of space for both owned and leased laboratories, and complete and reliable operating cost and other data needed to make informed decisions about the management of its laboratory facilities and report to external parties. Finally, because EPA does not attempt to plan for its workforce needs across organizational boundaries and lacks reliable agencywide data needed to identify and fill workforce gaps, EPA does not have a workforce planning process for all laboratories that reflects current and future needs in overall number of federal and contract employees, skills, and deployment across laboratory facilities. Consequently, EPA cannot

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successfully undertake succession planning and management to help the organization adapt to meet emerging and future requirements.

Although EPA's laboratory organizational and management structure and footprint have remained largely the same over the past 20 years—in spite of multiple calls for change—in the current budget climate the agency may not be afforded the luxury of maintaining its current number of laboratory facilities. Past independent evaluations have made numerous recommendations concerning steps EPA can take to address many of its long-standing planning, coordination, and leadership challenges—including steps EPA could implement without conducting another study. It is unclear whether the proposed long-term study being considered by EPA will address the organization of the laboratories' workforce and infrastructure or whether it will identify opportunities for sharing and consolidation. If EPA should conduct its proposed long-term study, to be successful where past independent evaluations have failed to produce change, decisions based on the study's results cannot be made by those with a vested interest in maintaining the status quo. Unless responsibility for making difficult choices falls under the authority and responsibility of one official, such a study is unlikely to yield real improvements in the laboratories' efficiency and effectiveness—including opportunities for sharing and consolidation through alternative approaches for organizing the laboratories' workforce and infrastructure. Such improvements would allow the agency to concentrate its limited resources on the agency's most pressing science priorities.

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## Recommendations for Executive Action

To improve cohesion in the management and operation of EPA's laboratories, we recommend that the Administrator of EPA take the following seven actions:

- Develop an overarching issue-based planning process that reflects the collective goals, objectives, and priorities of the laboratories' scientific activities.
- Establish a top-level science official with the authority and responsibility to coordinate, oversee, and make management decisions regarding major scientific activities throughout the agency, including the work of all program, regional, and ORD laboratories.
- Improve physical infrastructure and real property planning and investment decisions by:

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- managing individual laboratory facilities as part of an interrelated portfolio of facilities;
  - ensuring that master plans are up-to-date and that analysis of the use of space is based on objective benchmarks; and
  - improving the completeness and reliability of operating-cost and other data needed to manage its real property and report to external parties.
- Develop a comprehensive workforce planning process for all laboratories that is based on reliable workforce data and reflects current and future agency needs in overall number of federal and contract employees, skills, and deployment across all laboratory facilities.
  - If EPA determines another independent study is needed, the agency should include alternative approaches for organizing the laboratories' workforce and infrastructure, including options for sharing and consolidation.

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## Agency Comments and Our Evaluation

We provided a draft of this report to EPA for review and comment. We received written comments from EPA's Deputy Administrator. These comments and our detailed response to them are presented in Appendix IV. EPA also provided technical comments, which we incorporated into the report as appropriate.

EPA generally agreed with our findings and recommendations. Specifically, EPA agreed that it should (1) do more to develop a planning process that better reflects the collective goals, objectives, and priorities of the scientific activities across its laboratory enterprise, (2) establish a top-level science official with the authority and responsibility to coordinate, oversee, and make recommendations to the Administrator regarding major scientific activities throughout the agency, (3) improve physical infrastructure and real property planning and investment decisions by managing individual laboratory facilities as part of an interrelated portfolio of facilities, (4) maintain up-to-date master plans that include effective benchmarks, (5) improve the completeness and reliability of operating cost and other data needed to manage its real property, (6) develop a comprehensive work-force-planning process for its laboratory enterprise, and (7) include alternate approaches for organizing the laboratory workforce and infrastructure in a proposed independent study of EPA's laboratories.

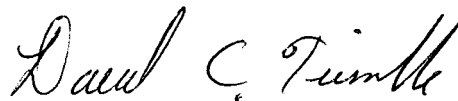


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As agreed with your staff, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies to the appropriate congressional committees, the administrator of EPA, and other interested parties. In addition, this report will be available at no charge on the GAO website at <http://www.gao.gov>.

If you or your staff have any questions on this report, please contact me at (202) 512-3841 or [trimbled@gao.gov](mailto:trimbled@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix V.

Sincerely yours,

A handwritten signature in black ink that reads "David C. Trimble". The signature is written in a cursive style with a large initial "D" and a distinct "C" and "T".

David C. Trimble  
Director, Natural Resources and Environment

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# Appendix I: Objectives, Scope, and Methodology

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Our objectives were to examine the extent to which the Environmental Protection Agency (EPA) (1) has addressed the findings of independent evaluations performed by the National Research Council and others regarding long-term planning, coordination, and leadership issues; (2) uses an agencywide, coordinated approach for managing its physical laboratory infrastructure and whether the agency's near- and long-term studies will achieve their stated cost saving and laboratory improvement goals; and (3) uses a comprehensive planning process to manage its laboratory workforce.

To complete our work, we reviewed agency documentation including strategic plans, budget justifications, Office of Research and Development (ORD) multiyear research plans, regional laboratory annual reports, and information on EPA's laboratory organization and management. We analyzed EPA's relevant funding and workforce documents, policies, procedures, and guidance, as well as related laws, requirements, and leading practices pertinent to EPA's laboratories and efforts to improve its operations. We reviewed our prior reports that were appropriate for this review, such as our high-risk series and those relating to EPA, federal laboratories, federal asset management, human capital and workforce issues, and strategic planning, among others.

In addition, we interviewed officials in EPA headquarters and officials representing all ORD and program laboratories and 5 of 10 regional offices and laboratories. In addition, we visited a nonprobability sample of laboratories located in Athens, Georgia; Chapel Hill, Durham, and Research Triangle Park, North Carolina; Corvallis, Oregon; Denver, Colorado; Edison, New Jersey; Fort Meade, Maryland; and Port Orchard, Washington. We selected the ORD, program, and five regional offices and laboratories we visited based on geographic dispersion and proximity to other EPA offices. Because we used nonprobability sampling to select these EPA offices and laboratories, information we obtained from these visits cannot be generalized to other laboratories, but the visits provide us with information on the perspectives of various laboratory officials. We interviewed laboratory managers, facility managers, scientists, technical employees, contractors, and officials who manage the work of the laboratories and program officials who are the laboratories' customers. We also interviewed representatives from EPA's Science Advisory Board and Board of Scientific Counselors and discussed their views on the organization and operation of EPA's laboratories.

To examine EPA's response to the findings of major independent evaluations of EPA science activities, including the organizational and

management structure of EPA's laboratories, we identified and reviewed the major independent evaluations of EPA's science activities over the past 20 years, including reports from the National Research Council, MITRE Corporation, Science Advisory Board, and Office of Inspector General. For the purpose of this report, we focused specifically on five evaluations that addressed planning, coordination, and leadership issues, including issues related to the organization and infrastructure of the agency's laboratories. We also analyzed internal studies of EPA's laboratories and the policies and procedures the agency uses to plan and coordinate the work of its laboratories. In addition, we examined documentation on EPA's proposed long-term laboratory study. While we considered the budget for the laboratories to be an important part of describing the organization and management structure, our scope was limited because EPA's Office of Budget could not provide us with reliable budget data for all the laboratories. We made several attempts to obtain budget data from the individual offices with laboratories, but they also could not provide us with complete budget data for each laboratory that could be compiled in a consistent manner.

To examine EPA's management of its laboratories' physical infrastructure, we analyzed the agency's facility management and real estate tracking system, called the Strategic Lease and Asset Tracking Enterprise. We also analyzed EPA's asset management plan; operating plans; facility manual; federal real property profile data; Real Property Cost Savings and Innovation Plan; property master plans; nationwide facilities guides; conference presentations from the 2010 Energy, Security and Facilities Workshop; and guidance for acquiring, maintaining, and disposing of laboratories. We also reviewed relevant executive orders, presidential memorandums, and a report from the National Research Council. We assessed the reliability of the laboratory property data maintained in EPA's facility management and real property tracking system by (1) reviewing information about the data and the system that produced it; (2) interviewing agency officials and the database contractor; and (3) analyzing the data for missing, inconsistent, and invalid data. When we found incomplete or contradictory data, we discussed them with agency officials to understand the reasons for inconsistencies. We determined that descriptive information on EPA's inventory of laboratory buildings and facilities, such as property descriptions and estimated square footage, was sufficiently reliable for our purposes. However, we found that other data contained in the database, such as operating costs and condition assessments, were not sufficiently reliable for the purposes of our review, and we reported these limitations as appropriate. Specifically, we found that the database lacked controls necessary for

assuring the reliability of data, such as operating costs or condition assessments that are manually entered by individual facility managers and subsequently used by EPA to report to external parties, such as Office of Management Budget and the Federal Real Property Council.

To examine EPA's management of its laboratory workforce, we analyzed EPA's 2006 strategic workforce plan; workforce documents from program and regional offices and ORD; our and EPA's Inspector General's reports on workforce planning; and budget documents. In addition, we interviewed managers in the program and in regional offices and in the ORD who were responsible for workforce planning at their respective laboratories. We obtained information from the agency's budget office about the ongoing contractor study of workforce planning, and we attended meetings of the National Advisory Council for Environmental Policy and Technology and reviewed their documents on EPA workforce planning. We also interviewed EPA officials responsible for contract management to obtain information on contractors providing analytical services. Our scope was limited because EPA could not provide us with data on its laboratory workforce that GAO could determine to be sufficiently reliable for our purposes. As EPA does not publish the number of employees in EPA's laboratories, either separately or in total, we made several efforts to gather such information. First, we made several requests to the managers of program and regional offices with laboratories and to the ORD. Ultimately, we were unable to verify the reliability of the data the offices provided because they used inconsistent data sources and did not provide supporting documentation describing how the data were compiled. In addition, we also asked EPA's Office of Human Resources to query its personnel database to provide us with a special report of federal personnel working in the laboratories. This office is responsible for managing a database used by EPA to provide the Office of Personnel Management with information on all EPA personnel. Nevertheless, we could not be assured of the accuracy or reliability of the data because, in part, EPA does not have an official master list of database codes showing each laboratory separately from any colocated facilities nor clearly identifying whether an employee was assigned to the laboratory or another facility.

We conducted this performance audit from January 2010 through July 2011, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

# Appendix II: EPA's Inventory of Laboratory Properties

EPA's real property database contains descriptive information for the agency's owned and leased buildings and facilities. Table 1 provides descriptive information about all laboratory and laboratory-related buildings and facilities contained in EPA's real property database. Many properties contain not only the laboratory building, but also additional buildings and facilities that support the work of the laboratory, including offices and conference rooms, storage rooms, greenhouses, fitness centers, maintenance shops, backup generators, and security guard houses. For example, at the Edison, New Jersey, laboratory property, buildings and facilities included structures housing the laboratory, offices, storage, training complex, mobile laboratory garage, landscape equipment, and security guards.

Some of EPA's laboratory property is also occupied by tenants other than laboratory personnel. For example, at Research Triangle Park, North Carolina, office space in laboratory buildings is shared with agency personnel from the Office of Inspector General, Office of the Chief Financial Officer, and the Office of the General Counsel, among others. Similarly at the Edison, New Jersey, property, the Federal Emergency Management Agency occupies a storage building on the laboratory property. EPA's database does not provide the proportion of a property's square footage that is used by nonlaboratory occupants.

**Table 1: EPA's Inventory of Laboratory Properties**

Property <sup>a</sup>	Number of buildings and facilities	Estimated total square feet <sup>b</sup>	Owned or leased	Region or office using property	Location
National Air and Radiation Environmental Laboratory	5	88,605	Owned	Office of Air and Radiation	Montgomery, Ala.
Region 9 Laboratory	2	46,350	Leased	Region 9	Richmond, Calif.
Denver Federal Center	2 <sup>c</sup>	125,514 <sup>c,d</sup>	GSA Leased	Office of Enforcement and Compliance Assurance	Lakewood, Colo.
Central Regional Laboratory	1	34,100	Leased	Region 8	Golden, Colo.
Gulf Ecology Division	21	83,292	Owned	Office of Research and Development	Gulf Breeze, Fla.
Region 4 Science and Ecosystems Support Division Laboratory <sup>e</sup>	1	51,758	Leased	Region 4	Athens, Ga.
Ecosystems Research Division <sup>e</sup>	10	83,778	Owned	Office of Research and Development	Athens, Ga.

**Appendix II: EPA's Inventory of Laboratory Properties**

<b>Property<sup>a</sup></b>	<b>Number of buildings and facilities</b>	<b>Estimated total square feet<sup>b</sup></b>	<b>Owned or leased</b>	<b>Region or office using property</b>	<b>Location</b>
Field Research Annex	8	7,702	Owned	Office of Research and Development	Athens, Ga.
Federal Building, South Clark Street	1	58,537	GSA Leased	Region 5 <sup>f</sup>	Chicago, Ill.
Kansas City Science and Technology Center	1	58,147	Leased	Region 7	Kansas City, Kans.
Environmental Science Center	2	167,745	Owned	Region 3 <sup>f</sup> Office of Chemical Safety and Pollution Prevention	Fort Meade, Md.
New England Regional Laboratory	1	49,262	Leased	Region 1	Chelmsford, Mass.
Environmental Research Laboratory	7	89,950	Owned	Office of Research and Development	Duluth, Minn.
Large Lakes and Rivers Forecasting Research Station	5	35,547	Owned	Office of Research and Development	Grosse Ile, Mich.
National Vehicle Fuel and Emissions Laboratory	4	244,308	Owned and Leased	Office of Air and Radiation	Ann Arbor, Mich.
Environmental Chemistry Laboratory	1	26,785	Leased <sup>g</sup>	Office of Chemical Safety and Pollution Prevention	Bay St. Louis, Miss.
UNLV La Plaza Building	5	105,526 <sup>d</sup>	GSA Leased	Office of Air and Radiation	Las Vegas, Nev.
UNLV On-campus EPA facilities	5	53,100	Leased	Office of Research and Development Office of Air and Radiation	Las Vegas, Nev.
Edison Laboratory	14	761,827 <sup>d,h</sup>	Owned	Office of Research and Development Region 2 Office of Solid Waste and Emergency Response	Edison, N.J.
Human Studies Facility	1	136,786 <sup>d</sup>	Leased	Office of Research and Development	Chapel Hill, N.C.
Grand Slam Building	1	43,436 <sup>d</sup>	Leased	Office of Research and Development	Durham, N.C.
Reproductive Toxicology Facility	1	58,000 <sup>d</sup>	Leased	Office of Research and Development	Durham, N.C.
Research Triangle Park	6	1,067,316 <sup>d</sup>	Owned	Office of Research and Development	Research Triangle Park, N.C.
Test and Evaluation Facility	1	36,101 <sup>d</sup>	Owned	Office of Research and Development	Cincinnati, Ohio

**Appendix II: EPA's Inventory of Laboratory Properties**

<b>Property<sup>a</sup></b>	<b>Number of buildings and facilities</b>	<b>Estimated total square feet<sup>b</sup></b>	<b>Owned or leased</b>	<b>Region or office using property</b>	<b>Location</b>
Andrew W. Breidenbach Environmental Research Center	6	434,636 <sup>d</sup>	Owned	Office of Research and Development	Cincinnati, Ohio
Center Hill Research Facility	4	28,388	Owned and leased	Office of Research and Development	Cincinnati, Ohio
Experimental Stream Field Station	1	3,791	Leased	Office of Research and Development	Milford, Ohio
Steinmart Plaza	1	15,000 <sup>d</sup>	Leased	Region 5 <sup>f</sup>	Westlake, Ohio
Robert S. Kerr Environmental Research Center	8	98,609	Owned	Office of Research and Development	Ada, Okla.
Gaar Corner	2	2,550	Owned	Office of Research and Development	Gaar Corner, Okla.
Willamette Research Station	6	19,710	Owned	Office of Research and Development	Corvallis, Ore.
Environmental Research Laboratory Corvallis	7	102,568	Owned	Office of Research and Development	Corvallis, Ore.
Environmental Research Laboratory Office	1	24,182	Leased	Office of Research and Development	Corvallis, Ore.
Coastal Ecology Branch	4	41,223	Owned	Office of Research and Development	Newport, Ore.
Environmental Effects Research Laboratory	7	96,870	Owned	Office of Research and Development	Narragansett, R.I.
Environmental Laboratory	2	41,749	Leased	Region 6	Houston, Tex.
Manchester Regional Lab	14	72,680	Owned	Region 10	Port Orchard, Wash.
Wheeling Field Office	1	13,865 <sup>d</sup>	Leased	Region 3 <sup>f</sup>	Wheeling, W.Va.
The Valley Building	1	1,968	Leased	Region 3 <sup>f</sup>	Wheeling, W.Va.
<b>Totals</b>					
<b>39 properties</b>	<b>171 buildings and facilities<sup>1</sup></b>	<b>4,511,261 square feet<sup>b,d</sup></b>			<b>30 cities</b>

Source: GAO analysis of the data from EPA's real property database, called the Strategic Leasing and Asset Tracking Enterprise.

<sup>a</sup>Some laboratory properties have multiple buildings and facilities.

<sup>b</sup>EPA's database contain three measures of square footage. In almost all cases, we report total usable square feet. For buildings and facilities where usable square feet were unavailable, we report rentable square feet. For buildings and facilities where EPA lacked data for both usable and rentable square feet, we used gross square feet, when available.

<sup>c</sup>EPA's database did not have complete information on the buildings occupied by the Office of Enforcement and Compliance Assurance laboratory. Therefore, the square footage for the hazardous chemical storage facility is not included.

<sup>d</sup>Some of this space is shared with other occupants. EPA's database does not indicate what proportion of a property's square footage is used by nonlaboratory occupants.

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**Appendix II: EPA's Inventory of Laboratory Properties**

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<sup>e</sup>The Region 4 Science and Ecosystems Support Division Laboratory and the Ecosystems Research Division are considered two separate properties but they are located adjacent to each other. The properties share a perimeter fence and there is a parking lot in between them.

<sup>f</sup>Regions 3 and 5 have more than one laboratory facility. In addition to its laboratory in Chicago, Illinois, Region 5 utilizes the Steinmart Plaza property which consists of offices, laboratories, and machine shop, among other space. In addition to its laboratory in Fort Meade, Maryland, Region 3 has two properties in Wheeling, West Virginia. The Wheeling Field Office houses field and office personnel and the Valley Building is used for storage.

<sup>g</sup>This property is operated under a special use agreement with the National Aeronautics and Space Administration.

<sup>h</sup>Two of the buildings at the Edison laboratory, referred to as buildings 245 and 246, are warehouses with 390,829 square feet. Agency officials said these buildings are unusable, however, they were reported to the Federal Real Property Council as active properties.

<sup>i</sup>This number does not include the agency's mobile laboratories, such as the Bold and Lake Guardian ships and the Trace Atmospheric Gas Analyzers buses.



# Appendix III: Summary of the Planning, Coordination, and Leadership Findings and Recommendations of Independent Evaluations and EPA's Response

Evaluation	Key findings	Key recommendations	EPA response
1992 Independent Expert Panel Study <sup>a</sup>	<p>EPA science is of uneven quality, and the agency's policies and regulations are frequently perceived as lacking a strong scientific foundation.</p> <p>EPA did not have a coherent science agenda and operational plan to guide scientific efforts throughout the agency.</p>	<p>EPA should further expand its issue-based planning process with a goal of producing a broadly based, rational plan to acquire and use the best scientific information that applies to science produced throughout the agency.</p> <p>EPA should appoint a science advisor to ensure that EPA generates credible scientific information.</p>	<p>EPA developed a strategic plan and multiyear research planning process for the science performed by the Office of Research and Development laboratories to support all of EPA's programs.</p> <p>EPA appointed a science advisor in the office of the administrator.</p>
1994 MITRE Corp. Laboratory Study <sup>b</sup>	<p>The number of laboratories and their geographic separation from one another and often from their principal customers raised concerns about their efficiency and technical operations.</p> <p>Many of the laboratory facilities are in need of significant repairs requiring substantial financial resources.</p> <p>Because the activities of laboratories are highly visible and expensive, it is important that they be organized to achieve a high degree of effectiveness in the expenditure of public funds.</p>	<p>EPA could improve the efficiency and effectiveness of its operations, eliminate apparent duplications of facilities and equipment, and increase the disciplinary strengths of its human resource base by making the following management changes:</p> <p>Realign and consolidate the Office of Research and Development laboratories.</p> <p>Consolidate laboratories in the Office of Prevention, Pesticides and Toxic Substances and the two laboratories under the Office of Radiation and Indoor Air.</p> <p>Reduce the number of regional office laboratories through consolidation to a few laboratories with a national service focus.</p>	<p>EPA implemented a functional, but not physical, consolidation of Office of Research and Development laboratories under national laboratories to support EPA's research focus on risk assessment and risk management.</p> <p>EPA did not consolidate the Office of Prevention, Pesticides and Toxic Substances and the two laboratories under the Office of Radiation and Indoor Air.</p> <p>EPA maintained the decentralized structure of EPA's program and regional laboratories.</p>
1995 National Research Council Interim Report <sup>c</sup>	<p>EPA's science advisor lacked substantial managerial authority and generally lacked the means to effectively perform the agencywide role envisioned by the 1992 expert panel recommendation.</p>	<p>Designate the assistant administrator of the Office of Research and Development as EPA's chief scientific and technical officer, with responsibility for coordinating and overseeing agencywide science activities.</p>	<p>EPA's deputy administrator asked the assistant administrator of the Office of Research and Development to coordinate the agency's scientific planning and peer-review activities.</p>
1997 EPA Office of Inspector General Report <sup>d</sup>	<p>EPA's regional laboratories lack a shared identity and national leader to better coordinate the regional laboratories' collective contributions to EPA's science knowledge.</p>	<p>Identify the appropriate responsibilities for a national leader for its regional laboratories.</p>	<p>EPA designated the director of the Office of Regional Operations as the central advocate to represent regional laboratory and regional office interests in the formulation of EPA policies and decisions.</p>

**Appendix III: Summary of the Planning, Coordination, and Leadership Findings and Recommendations of Independent Evaluations and EPA's Response**

<b>Evaluation</b>	<b>Key findings</b>	<b>Key recommendations</b>	<b>EPA response</b>
2000 National Research Council Final Report <sup>e</sup>	<p>EPA's designation of the assistant administrator of the Office of Research and Development as coordinator for the agency's scientific-planning and peer-review activities had proven to be insufficient because the position did not provide the level of authority or responsibility for oversight, coordination, and decision making and EPA's regulatory offices were generally not required to follow the Office of Research and Development's guidance regarding scientific activities or science policy.</p> <p>EPA efforts to improve science collaboration rely on consensus and voluntary cooperation of the agency's regulatory and regional offices.</p> <p>EPA's lack of a top science official is a formula for weak scientific performance and poor scientific credibility.</p> <p>The assistant administrator of the Office of Research and Development could not be reasonably expected to direct world-class science at the office and also try to improve science practices throughout the rest of the agency.</p>	<p>Establish a deputy administrator for science and technology with the authority and responsibility to coordinate and oversee scientific activities throughout the agency.</p>	<p>In 2002, EPA appointed the Assistant Administrator of the Office of Research and Development as science advisor. In 2001, Congress considered two bills to establish a deputy administrator of science and technology but no legislation was enacted.</p>

Source: GAO analysis of independent evaluations.

<sup>a</sup>Environmental Protection Agency, Safeguarding the Future: Credible Science, Credible Decisions, The Report of the Expert Panel on the Role of Science at EPA, EPA/600/9-91/050 (Washington, D.C., March 1992).

<sup>b</sup>MITRE Corporation, Center for Environment, Resources, and Space, Assessment of the Scientific and Technical Laboratories and Facilities of the U.S. Environmental Protection Agency (McLean, Va., May 1994).

<sup>c</sup>National Research Council, Interim Report of the Committee on Research and Peer Review in EPA (Washington, D.C., National Academies Press, 1995).

<sup>d</sup>Environmental Protection Agency, Office of Inspector General, Regional Laboratories (Washington, D.C., Aug. 20, 1997).

<sup>e</sup>National Research Council, Strengthening Science at the U.S. Environmental Protection Agency: Research-Management and Peer Review Practices (Washington, D.C., National Academies Press, 2000).

# Appendix IV: Comments from the Environmental Protection Agency

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

JUL 11 2011

DEPUTY ADMINISTRATOR

Mr. David C. Trimble  
Acting Director  
Natural Resources and the Environment  
U.S. Government Accountability Office  
Washington, D.C. 20548

Dear Mr. Trimble:

Thank you for the opportunity to review and respond to the draft report prepared by the U.S. Government Accountability Office, titled *Environmental Protection Agency: To Better Fulfill Its Mission, EPA Needs a More Coordinated Approach to Managing its Laboratories*.<sup>1</sup> We appreciate the work of the GAO team that developed this report and its recommendations, which are intended to improve the cohesion and management of the U.S. Environmental Protection Agency's laboratory enterprise.

The agency agrees with GAO findings about the importance of the EPA's laboratory enterprise and its scientific contributions to policies and decisions that protect human health and the environment:

1. Scientific research, knowledge and technical information are fundamental to the EPA's mission and inform its standard-setting, regulatory, compliance and enforcement functions. The agency's scientific performance is particularly important as complex environmental issues emerge and evolve, and controversy continues to surround many of the agency's areas of responsibility. The EPA works with many providers of scientific information to accomplish its mission, including international and domestic academic institutions, state and local agencies, industry and other federal scientific agencies. But unlike other primarily science-focused federal agencies, such as the National Institutes of Health or the National Science Foundation, the EPA's scientific research, technical support and analytical services underpin the policies and regulations the agency implements.<sup>2</sup> The essential connection between the EPA's laboratory science and regulatory decision-making illustrates why the agency sustains intramural laboratories.
2. The complexity of the EPA's mission, the rapid pace of scientific and technological advances and shifts in policy require that the agency's laboratory enterprise be responsive to change and equipped to meet the scientific challenges ahead.<sup>2</sup>
3. Current efforts to reduce the federal budget deficit – including significant proposed cuts to the budgets of most federal departments, the EPA and other agencies – require all federal agencies to use their scientific and laboratory resources more effectively. For the EPA, more effective use of its laboratory enterprise will help ensure that its scientific activities respond to the agency's highest-priority needs.<sup>2</sup>

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The agency recognizes that findings and recommendations in the draft GAO report are germane to governmentwide challenges to managing the portfolio of federal facilities.<sup>3,5</sup> One major challenge we discussed with the GAO team is the high cost of maintaining the portfolio of aging federal facilities. Recent policy mandates from Congress and the Executive Office of the President are designed in part to reduce the energy, environmental and materials impacts of current and future federal facilities. These policy mandates include (a) legislation such as the Energy Policy Act of 2005 (Public Law 109-58) and the Energy Independence and Security Act of 2007 (Public Law 110-140) and (b) Executive Orders 13423 and 13514. Executive Order 13423 requires more widespread use of environmental management systems as the framework within which to manage and continually improve sustainable facility practices. Executive Order 13514 requires that each federal agency prepare a strategic sustainability plan to guide its efforts to green its facilities to improve their effectiveness and efficiency. The costs to comply with these policies affect laboratory facilities significantly. This is because laboratory facilities consume more energy and emit more greenhouse gases per square foot of floor space than virtually any other type of facility – from five times to 10 times the amount of energy than office buildings with an equivalent footprint. Despite their costs, these policies are important for our nation’s strategy to achieve energy independence, improve the environment and reduce consumption of natural resources. For example, buildings in the United States account for 12 percent of water consumption, 40 percent of total carbon-dioxide emissions, 68 percent of electricity use, 40 percent of raw materials use and 30 percent of waste generated.<sup>6</sup> These environmental, energy and resource impacts serve as an important reminder of why a commitment to energy-efficient and sustainable buildings is important to every community in which EPA employees and facilities are located.

These building-related environmental, energy and resource impacts help explain why the EPA has a strong leadership commitment to managing its facilities in an efficient and effective manner. One example of the EPA’s leadership commitment is the Labs 21<sup>R</sup> program, co-sponsored by the EPA and the U.S. Department of Energy. Labs 21<sup>R</sup>, named for laboratories for the 21st century, is a voluntary partnership program dedicated to improving the environmental and energy performance of laboratories across the U.S.<sup>7</sup> Labs21<sup>R</sup> is dedicated to the pursuit of sustainable, high-performance and low-energy laboratories that will:

- minimize overall environmental impacts;
- protect occupant safety;
- optimize whole building efficiency on a life-cycle basis; and
- establish goals, track performance and share results for continuous improvement.

#### **GAO RECOMMENDATIONS**

The GAO report recommends that the EPA Administrator take seven actions to improve the cohesion and management of the agency’s laboratory enterprise.<sup>8</sup> Each GAO recommendation is described below and is followed by an EPA response.

**GAO Recommendation 1:** The EPA Administrator should develop an overarching issue-based planning process that reflects the collective goals, objectives and priorities of the laboratories’ scientific activities.

**EPA Response:** The EPA agrees with the GAO that more can be done to develop a planning process that better reflects the collective goals, objectives, and priorities of the scientific activities across its laboratory enterprise.

In its draft report, the GAO describes an “issue-based planning process” in the context of recommendations – from two different independent evaluations<sup>9,10</sup> – about systematic planning, coordination and priority-setting. The GAO uses the term “overarching” to refer to the *integration of* laboratory planning, coordination and priority-setting across the agency’s laboratory enterprise to ensure that the laboratories contribute to the EPA’s highest priority needs for laboratory science. It is important to note that the issue-based planning process mentioned in the GAO report has evolved since the 1990s in response to governmentwide requirements for outcome-oriented planning, performance and accountability – first in the Government Performance and Results Act of 1993 and recently in the GPRA Modernization Act of 2010.

Today, each component of the EPA’s laboratory enterprise plans and manages its science activities in the context of its particular program or region. Scientific activities contribute to specific scientific issues and mission-relevant outcomes linked to a particular GPRA goal and objective. Frequently, outcome-oriented laboratory contributions are linked also to specific clients within the EPA or, in some cases, to a specific client in stakeholder organizations such as state, local or tribal agencies. In most respects, the EPA’s management of the scientific activities of its laboratory enterprise for GPRA results meets the objectives identified in this GAO recommendation.

The agency acknowledges that it does not manage its scientific activities under GPRA with a single overarching system that integrates planning, priority-setting and coordination *across the laboratory enterprise*. The EPA will consult with GAO, Congress and the Office of Management and Budget to determine the best approach to develop an overarching planning process and system that “reflects the collective goals, objectives and priorities of the laboratories’ scientific activities” described in this GAO recommendation.

**GAO Recommendation 2:** The EPA Administrator should establish a top-level science official with the authority and responsibility to coordinate, oversee, and make management decisions regarding major scientific activities throughout the agency, including the work of all program, regional, and research laboratories.

**EPA Response:** The EPA agrees with the underlying principle and objectives of this GAO recommendation. As GAO mentions in its draft report, Congress considered two bills in 2001 to establish a deputy administrator of science and technology at the EPA, and neither bill was enacted.<sup>11</sup> After its 2001 discussion with Congress, the EPA took several steps to strengthen significantly its executive-level science management structure. For example, the EPA Administrator created the position of science advisor,<sup>12</sup> the Office of the Science Advisor, a Science and Technology Policy Council and the Office of Science Policy to serve as mechanisms for addressing overarching science policy issues that span regional, research and program boundaries. These changes have strengthened the EPA’s management and decision making for science priorities, science policy, science advice and risk assessment.

In response to the GAO recommendation, the EPA will expand the authority and responsibility of the science advisor to coordinate, oversee and make recommendations to the Administrator regarding major scientific activities throughout the agency, including the work of all program, regional and Office of Research and Development laboratories.

See comment 1.

See comment 2.

In considering the best structure to accomplish the objectives in this GAO recommendation, the EPA recognizes that the management of its laboratory enterprise must help the enterprise adapt to significant external pressures. These pressures create a demand for:

- solutions to complex, interdependent and dynamic systems problems for many EPA clients across the nation;
- interdependence and a high level of knowledge sharing with many clients, in many regions, at many geographic and temporal scales and in many communities across the nation;
- sharing resources, including shared facilities that are more efficient and sustainable, shared expertise and human resources and shared equipment and supplies; and
- responding proactively to declining financial resources and to increasing mandates for energy-efficient and sustainable facilities.

**GAO Recommendation 3:** The EPA Administrator should improve physical infrastructure and real property planning and investment decisions by managing individual laboratory facilities as part of an interrelated portfolio of facilities.

**EPA Response:** The EPA agrees with the GAO that more can be done and believes that the strength of its master planning process overall has kept the agency's 35 laboratories and 68 laboratory support buildings in good condition. During the next three to five years, depending on funding, the agency plans to upgrade and streamline the master planning process, update the plans as required, reinforce the current master planning portfolio perspective and strengthen the ties between the current annual and five-year Buildings and Facilities call letter process, which is described below, and the master plans.

As the GAO points out, the EPA's internal real property asset-management plan states that facility master plans are supposed to be updated every five years to reflect changes in facility condition and mission. As part of our plan to upgrade the master planning process, the EPA intends to revise this guidance to ensure that the master plans are updated as required to reflect mission or condition changes versus a time line, even if this occurs on a more frequent basis than the current five-year guidance. Again, as the GAO points out, almost 50 percent of the EPA's master plans have been updated to reflect changing mission or infrastructure needs. Some examples are the Cincinnati laboratory five-phase infrastructure replacement project, based on a 2003 master plan, which has been carried out over eight fiscal years; the Research Triangle Park laboratory consolidation; and the Region 10 laboratory modernization based on a 1998 master plan and implemented between FY2003 and FY2011, all of which are multi-year, multi-million-dollar master planning projects.

The agency notes that the draft GAO report does not take into account the agency's annual Buildings and Facilities call letter process, which collects and prioritizes all project requests agencywide as a portfolio. In this process, each project is prioritized by the programs and regions to ensure that it is aligned with the mission of that program or region and meets the agency's priorities and strategic plans. The projects are first reviewed to balance the mission, programmatic and legislative requirements that the EPA must weigh when allocating its limited resources. The projects are then evaluated against agency and industry standards for health and safety, environmental compliance, infrastructure requirements such as green-building requirements and energy-reduction goals. The results of this process form an annual capital spending plan, which effectively allocates limited resources on a portfolio and agencywide basis.

See comment 3.

However, projects identified through the master planning process and implemented through the Building and Facilities call letter process, as described previously, are taking six years to 10 years longer to complete than the five years originally anticipated. Obviously, the master plan projects can only be completed as funding becomes available; this forms the basis of the EPA's position that the master plans need to be updated as required, not on any set time line.

**GAO Recommendation 4:** The EPA Administrator should improve physical infrastructure and real property planning and investment decisions by ensuring that master plans are up-to-date and that analysis of the use of space is based on objective benchmarks.

**EPA Response:** The EPA agrees with the GAO that the agency's master plans must be up-to-date and include effective benchmarks and metrics. As noted above, the GAO points out that the EPA's real property asset management plan states that facility master plans are supposed to be updated every five years to reflect changes in facility condition and mission. Again, as stated previously, the agency plans to revise this guidance to ensure that the master plans are updated as required to reflect mission or condition changes versus a time line, even if this happens on a more frequent basis than the current five-year guidance.

The agency again notes that projects identified through the master planning process and implemented through the Buildings and Facilities call letter process are taking six years to 10 years longer to complete than the five years originally anticipated. Obviously, the master plan projects can only be completed as funding becomes available; this forms the basis of the EPA's position that the master plans need to be updated as required, not on any set time line.

The space conditions and utilization metrics identified in the master plans are updated annually by the facility managers as part of the Federal Real Property Council process and validated through audits. Objective benchmarks for laboratory usage are employed when the laboratories have sufficient size to establish a valid baseline; most of the EPA's laboratories, however, are small and have specific functional requirements for each lab module. The functional requirement establishes the need for the space allocation rather than the population of the laboratory.

As the EPA continues to upgrade its master planning process, the agency will continue to work with other federal agencies and industry associations to define relevant laboratory benchmarks. Once benchmarks are updated and proven valid, the agency will include the benchmarks in its master plans.

**GAO Recommendation 5:** The EPA Administrator should improve physical infrastructure and real property planning and investment decisions by improving the completeness and reliability of operating-cost and other data needed to manage its real property and report to external parties.

**EPA Response:** The EPA agrees with the GAO that the agency's operating metrics should be updated. As stated above, as the EPA continues to refine the master planning process, the agency will work internally to upgrade and validate its internal operating costs and other metrics. The EPA agrees that reliable data are needed for effective management of its laboratory enterprise. Beginning in FY 2011, the agency added coding to track operating costs at program-funded laboratory facilities not previously tracked. The agency will review options for improving data reliability and completeness for the remaining labs within its laboratory enterprise.

See comment 4.

See comment 5.

See comment 6.

See comment 7.

However, as a rule, the agency already uses benchmarks for the square footage of a typical laboratory module. The GAO states that the EPA does not use benchmarking to determine appropriate space allocations for laboratory operations or cost. In fact, the agency uses industry averages, national guidelines and comparable agency references to determine laboratory space and operating costs. As noted throughout the audit process, the EPA's laboratory space allocation process depends upon the nature of the activities being performed and, consequently, is not always suited to a benchmark. That said, the agency will continue to revise and refine its benchmarks.

**GAO Recommendation 6:** The EPA Administrator should develop a comprehensive work-force-planning process for all laboratories that is based on reliable work-force data and reflects current and future agency needs in the overall number of federal and contract employees, skills and deployment across all laboratory facilities.

**EPA Response:** The EPA agrees with this recommendation and recognizes that opportunities exist to improve work-force-planning procedures for its laboratory enterprise. The EPA will develop a comprehensive work-force-planning process for its laboratory enterprise as part of a broader agency work-force-planning process. The comprehensive work-force-planning process for EPA laboratories will be based on information about:

- the EPA's priority needs for mission relevant laboratory science;
- laboratory functions and systems required to meet these needs and to transform laboratory outputs into results that contribute to agency decisions; and
- work force skills and disciplines required to sustain each laboratory and the agency's portfolio of laboratories, including capability and capacity, across the scope of the agency's functions, systems, programs and facility lifetime.

Collectively, these three components define a framework for comprehensive laboratory work-force planning.<sup>13</sup>

The MITRE study of the EPA's laboratory enterprise underscored an important aspect of agency laboratories: "It is important to emphasize that different laboratories have different purposes; some laboratories concentrate on performing analytical work, while others conduct fundamental or applied research."<sup>14</sup> The MITRE study recognized that each laboratory organization has distinct mission-relevant functions, systems and contributions to agency decisions. Thus, in general, comprehensive work-force planning should not be combined across laboratory organizations or centralized as in a single-agency organization.

Beginning in FY11, the EPA plans to strengthen its existing strategic work-force-planning process by integrating work-force planning with its annual budget process. The agency will annually assess if its work force has the skills to meet the nation's environmental priorities today and in the future. Each regional office and headquarters program office will consider the EPA's *Strategic Plan* and the Administrator's priorities to establish their optimal work force based on needed occupations. By using planned FTE resource levels for FY12 and proposed resource levels for FY 2013-2015, each office, including laboratories, can better identify potential skill and work force gaps in developing plans and strategies for obtaining the resources with the proper skills. Overall, these efforts will strengthen succession-planning efforts, lead toward improved strategic recruitment and outreach efforts and ensure office position management, staffing and hiring plans are aligned to mission success.



**GAO Recommendation 7:** If the EPA Administrator determines that another independent study of EPA laboratories is needed, then the agency should include, within the charge questions for this study, alternate approaches for organizing the laboratory work force and infrastructure. These alternate approaches should include options for sharing and consolidation.

**EPA Response:** President Barack Obama has requested funds to begin a long-term study of the EPA's laboratory enterprise in FY12. If funded, this long-term study will be conducted by an independent expert committee of the National Academy of Sciences. When the NAS committee prepares its design for the long-term study, the EPA will request that the NAS consider information in this GAO report and alternate approaches for organizing the work force and infrastructure of the EPA's laboratory enterprise.

Both President Obama and EPA Administrator Lisa P. Jackson have emphasized that science must be the backbone for EPA programs and decisions. As the GAO has indicated in its draft report, knowledge and technical information from the agency's laboratories, scientists and partners are more important than ever to inform decisions that protect human health and our nation's environment. Threats to the environment and human health, such as the 2010 oil spill in the Gulf of Mexico, further increase the demand for laboratory science, technical services and research. Simultaneously, a number of external trends and pressures are creating challenges to the capability, capacity and effectiveness of EPA laboratory facilities and to the supply of laboratory science to meet the agency's highest-priority needs and to address emerging, complex environmental challenges.

**GAO CONCLUSIONS, TECHNICAL INFORMATION AND EVIDENCE**

Laboratories and their facilities are among the most complex built systems in the federal government. To improve the accuracy and clarity of its draft report on the EPA's laboratory enterprise, the GAO requested that the EPA identify any technical information, evidence or conclusions in its draft report, which may require correction or editing.

The results of this EPA review are presented in two enclosures. The corrections described in the first enclosure improve the general accuracy of the report and several of its conclusions. The corrections presented in the second enclosure improve the accuracy of information about EPA laboratory facilities presented in Appendix III, Table 2.

In closing, I want to thank you again for the opportunity to review and respond to the draft GAO report.

Sincerely,



Bob Perciasepe

**Enclosures**

cc: Lisa P. Jackson  
Paul Anastas  
Barbara Bennett  
Diane Thompson  
Arvin Ganesan

See comment 8.

### References

- <sup>1</sup>“ENVIRONMENTAL PROTECTION AGENCY: *To better Fulfill Its Mission, EPA Needs a More Coordinated Approach to Managing its Laboratories*” (GAO, 2011). Draft Report Number GAO-11-347.
- <sup>2</sup> *Ibid.*, pages 1, 26.
- <sup>3</sup> Investments in Federal Facilities: Asset Management Strategies for the 21<sup>st</sup> Century (NAS, 2004).
- <sup>4</sup> Stewardship of Federal Facilities: A Proactive Strategy for Managing the Nation’s Public Assets (NAS, 1998).
- <sup>5</sup> Federal Real Property: Progress Made toward Addressing Problems, but Underlying Obstacles Continue to Hamper Reform. (GAO, 2007). Report No. GAO-07-349.
- <sup>6</sup> Federal Research and Development Agenda for Net-Zero Energy, High-Performance Green Buildings. National Science and Technology Council Committee on Technology, October 2008, page 13.
- <sup>7</sup> Laboratories for the 21<sup>st</sup> Century home page <http://www.labs21century.gov/> last accessed July 3, 2011.
- <sup>8</sup> GAO, 2011. *Op.cit.*, pages 28-29.
- <sup>9</sup> *Safeguarding the Future: Credible Science, Credible Decisions. The Report of the Expert Panel on the Role of Science at EPA*. U.S. EPA, EPA/600/9-91/050, Washington, D.C., March 1992.
- <sup>10</sup> Assessment of the Scientific and Technical Laboratories and Facilities of the U.S. Environmental Protection Agency. The MITRE Corporation, Center for Environment, Resources, and Space. McLean, Virginia: May 1994 (Revised). Report No. MTR 94W0000082V1. Pages 4-29, 4-3, 6-2.
- <sup>11</sup> GAO, 2011. *Op.cit.* Appendix II, page 35.
- <sup>12</sup> U.S. EPA Science Advisor home page <<http://www.epa.gov/osa/>> last accessed July 3, 2011.
- <sup>13</sup> Commonsense Actions and Best Practices that Improve Laboratory Efficiency and Effectiveness. U.S. EPA, Washington, D.C., October 2008. Report Number EPA 600/R-03/069 available from <[www.epa.gov](http://www.epa.gov)>. Exhibit 4, page 10.
- <sup>14</sup> The MITRE Corporation, May 1994 (Revised), *op.cit.*, page 1-4.

The following are GAO's comments to EPA's letter dated July 11, 2011.

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## GAO's Comments

1. We believe that EPA's scientific activities remain fragmented and largely uncoordinated—reflecting the independent organizational and management structure of EPA's 15 senior officials charged with planning and managing the scientific work performed at each of EPA's laboratories. In light of current efforts to reduce the federal budget deficit, which include significant proposed cuts in the budgets of most departments and agencies, including EPA, the agency will need to more effectively use its scientific and laboratory resources across the agency to ensure that the agency is best positioned to fulfill the critical scientific work for its core mission. However, EPA's ability to respond to this challenge may be hampered by the lack of an overarching issue-based planning process that integrates and coordinates scientific efforts throughout the agency and reflects the collective goals, objectives, and priorities of the laboratories.
2. We believe that improvement in scientific leadership of EPA's research and laboratory operations will be driven by the level of authority and responsibility provided to the chosen top-level science official, including management of resources. However, assigning these responsibilities to the science advisor, who is also the head of the Office of Research and Development (ORD), may introduce additional challenges for EPA. We note that in 2000, the National Research Council reported that it had previously “underestimated the level of authority needed to achieve the necessary degree of cooperation and coordination of scientific activities and policy in the regulatory and regional offices.” The Council also concluded that “no single individual could reasonably be expected to direct a world-class research program in ORD while also trying to improve scientific practices and performance throughout the rest of the agency,” stating that “these jobs are inherently different.” Lastly, the Council cautioned that “assigning agency-wide scientific authority to the assistant administrator for ORD might produce a conflict of responsibilities, because many decisions about science in the regulatory programs could affect ORD's budget or favor ORD's research over research done elsewhere.”
3. In 2004 the National Research Council recommended that federal departments and agencies make investment and management decisions about individual projects in relation to their entire portfolio of facilities. Based on our analysis of EPA's master planning process, including the agency's annual “call letter process,” we found that EPA manages its facilities on a site-by-site basis and does not evaluate

each site in the context of all of the agency's real property holdings. As a result, EPA cannot be assured that it is investing its capital improvement funds most appropriately or identifying possible cost-savings opportunities.

4. We assessed the reliability of the laboratory property data maintained in EPA's facility management and real property tracking system. We determined that descriptive information on EPA's inventory of laboratory buildings and facilities, such as property descriptions and estimated square footage, was sufficiently reliable for our purposes. However, we found that other data contained in the database, such as operating costs and condition assessments, were not sufficiently reliable for the purposes of our review, and we reported these limitations as appropriate. Specifically, we found that the database lacked controls necessary for assuring the reliability of data, such as operating costs or condition assessments that are manually entered by individual facility managers and subsequently used by EPA to report to external parties, such as the Office of Management and Budget and the Federal Real Property Council.
5. We continue to believe that EPA could develop objective benchmarks for its unique laboratory requirements.
6. EPA does not have reliable operating cost data for its laboratory enterprise because the agency's financial management system does not track operating costs in sufficient detail to break out information for individual laboratories or for the laboratory enterprise as a whole. Reliable operating cost data are important in determining whether a laboratory facility is operating efficiently, a determination that should inform both capital investment and property disposal decisions. Operating cost data are also required by the Federal Real Property Council.
7. EPA lacks accurate data on space needs and usage because many facility master plans containing space utilization analyses are out of date. EPA also does not use public and commercial benchmarks to calculate usage rates for its laboratories even though the Federal Real Property Council identifies the use of such benchmarks as one of its guiding principles. Instead, EPA measures laboratory usage on the basis of interviews with local laboratory officials. According to EPA officials, they do not use benchmarks because the work of the laboratories varies. Also see comment 5.
8. EPA provided technical comments and clarifications, which we have incorporated into the report as appropriate.

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# Appendix V: GAO Contact and Staff Acknowledgments

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## GAO Contact

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## Staff Acknowledgments

In addition to the contact above, Ed Kratzer, Assistant Director; Diane LoFaro, Assistant Director; Ellen W. Chu; John H. Edwards; Angela Miles; Daniel Semick; John C. Smith; Kwame Som-Pimpong; Tim Persons; Cheryl Peterson; Vasiliki Theodoropoulos; and Greg Wilmoth also made key contributions to this report.

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